COMMERCIAL STANDARDS MONTHLY

A Review of Progress in Commercial Standardization and Simplification



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U. S. DEPARTMENT OF COMMERCE

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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.

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CONTENTS

FEATURE ARTICLES		SIMPLIFICATION NEWS	
	Page		Page
Gasoline characteristics controllable by specifications	261	Arbor holes	289
Simplification and standardization	266	Automobile tire sizes reduced	288
Simplification the keynote in production management.	275	Containers for ice cream	289
Standardization movement in Japan	271	Cooperation of trade associations	280
Standard of minimum requirements for air-passenger		Department store packaging survey	284
transportation being prepared	279	Inflated rubber toy balls	290
damp of the second propagation and the second propagation of the secon		Skid platform schedule revised	289
		Standard can sizes are proposed by packing industry	282
BUILDING AND HOUSING NEWS		brandard can sizes are proposed by packing industry	202
Consulting expert enpointed	906	SPECIFICATION NEWS	
Consulting expert appointed	280	Index to Federal Standard Stock Catalogue now available	265
		New England Council establishes marketing standards	200
FOREIGN NEWS		Purchasing methods of householders	260
		r urenasing methods of nousenorders	209
Annual contribution to British Engineering Standards		STANDARDIZATION (GENERAL) NEWS	
Association increased	283		
German handbook for draftsmen	286	American Standards Association notes	270
German mining standardization	277	Drainage of coal mines	286
Standardization in Australia	276	Flexible cord standard raised	278
		1929 fruitful year for American Society for Testing Ma-	
		terials	278
MARINE STANDARD NEWS		New requirements for weighing devices for concrete ag-	
	000	gregates	281
Standard condenser ferrules and tube sheets	269	Radio-signal transmissions of standard frequency	278
Standard locks for ship doors proposed	290	Safety in coal-mine transportation	276
Wire ropes specification approved	288	Small-dimension lumber bulletin available	283
		Standard methods of purchasing road-building equip-	200
DESEADCH NEWS		ment	289
RESEARCH NEWS		Testing railroad track scales	290
Care and adjustment of paper folding testers	268	Uniformity is urged to cut airplane costs	287
Chemically treated timber in demand	277	ennormety is arged to cut an plane costs	201
Chromium plating research	201	TRADE STANDARDS NEWS	
Commoraial research valuable	265	Feldenar	287
Effect of light on silver ableride	200	Foundry nettorns of wood	268
Cas analysis technique improved	200	Interchangeable ground glass joints	200
Dadio agaillator tort apparatus	200	Server thread tables for shore you	200
Radio oscillator test apparatus	280	Screw thread tables for shop use	201
Rayon dencient as paper-making material	283	Special screw threads	287

AN INVITATION TO VISIT THE BUREAU OF STANDARDS

An interesting fact in the growth of the bureau is the steady increase in the number of visitors. From all over the world experts come to see the work in progress in many specialties. Not alone the experts but in growing numbers many of our people visit the bureau from a public-spirited desire to acquaint themselves with its research work. All visitors, from the newspapermen, who have called the bureau a "house of wonders," to the specialists, who use its services, are welcome, for it is their bureau in a very real sense. They are the owners of the business and its beneficiaries. The annual per capita cost of 2 cents which the average citizen pays toward the operation of the bureau yields returns sometimes a hundredfold or a thousandfold. How science turns wastes into profits, increases the useful life of materials, adds new efficiencies to industry, advances new arts, such as aviation and radio, by research and discovery—these are to be seen first-hand in the scientific and technical laboratories of the bureau.

A cordial invitation is extended to all citizens 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.

GEORGE K. BURGESS, Director.

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QUALITY-GUARANTEEING LABELS

Labeling of specification-made goods assists the producer in marketing these goods and facilitates the purchase of such goods by the public

beling can give the individual consumer in his or her daily purchases is receiving attention in the merchandising industry to-day.

Quality labeling assists the manufacturers and dealers in obtaining the maximum benefit to be realized from the mass production, mass distribution, and mass consumption of such of their commodities as comply with the requirements of nationally recognized specifications and also encourages the small quantity "over-the-counter" buyer to purchase staple goods that are guaranteed to comply with such specifications.

Purchases made on quality labeled goods will pass along to the "over-thecounter" buyer (the nonspecifications-using public) some of the benefits derived by the contract buyer from using nationally recognized specifications. Such labels are now being employed by many manufacturers frequently cooperating under the auspices of their trade associations.

Quality labels give to the individual consumers, as well as the organized producers, the benefit of tests and investigations, the result of such research being placed at the disposal of committees formulating nationally recognized specifications (which may or may not be those of the Federal Government). Their use encourages firms to manufacture goods to comply with, or to exceed, the requirements of these specifications, and facilitates the buying of specification-made goods.

Advertising which identifies one or more trade-branded articles of a producer as complying with certain nationally recognized specifications, is supplementary to, but not a substitute for, trade-brand advertising and other phases of trade-brand sales promotion work. A label on goods manufactured in accordance with the nationally recognized specifications indicates to the buyer that the producer has attempted to comply with the requirements of such specification, or to exceed such requirements.

The significance and strength of the quality-guaranteeing label will be appreciated when consideration is given to the fact that the label is in reality an announcement to the public that the producer is staking his reputation on the compliance of the labeled commodity with the specification requirements.

GASOLINE CHARACTERISTICS CONTROLLABLE BY SPECIFICATIONS

Distinction Between Different Grades of Gasoline Explained; Specifications Should Contain Basic Requirements as Developed Through Research; Federal Specifications for Gasoline Cited as Example

H. C. DICKINSON, Bureau of Standards

When gasoline was a by-product, mainly from Appalachian crude oils, it was tested and sold on a basis of density or Baumé gravity. When a wider variety of crudes became available and it became profitable to put into gasoline for motor-car fuel as wide a range of volatilities as the trade would accept, the Engler distillation test was generally adopted and standardized by the American Society for Testing Materials. This has largely displaced the gravity test

as an index of gasoline quality although "gravity" is still occasionally used and usually misinterpreted.

It was not until about 1920 that any serious and systematic effort was made to determine what gasoline for use as a commercial automobile fuel ought to be. It is sometimes a long step from a knowledge of what a product ought to be to a specification including instructions as to how it shall be tested.

Gasoline is a complex, not a simple material. It is made up of an indefinite number of compounds known as hydrocarbons derived from petroleum. These compounds differ not only in volatility, or the ease of evaporation, but in other properties as well, notably in their tendency to knock when used in high-compression engines or when too much carbon is present.

Final product has different properties.

The final product—gasoline—has different proper-

ties, depending upon which of the various compounds are present and in what proportions. And this, again, is affected by the nature of the crude oil from which the gasoline is refined. Moreover, at present the crude sources of gasoline include not only the natural crude oils but crudes produced by any one of several cracking processes, which produce oils differing from any of the natural petroleums and from each other. It is obvious, therefore, that gasolines which can be produced and marketed on a commercial basis will differ radically in composition in different parts of the country and at different times.

Specifications are often so drawn as merely to identify some particular product known to be good rather than to define all and only such products as will give good service. However, if cost is to be kept down, one must leave all possible leeway for the use of different products in specifying the qualities of gasoline. Therefore, only those tests should be included in the specifications which relate directly to the behavior of the gasoline in service.

The early gasoline specifications were not so drawn. They contained some tests which did not relate at all

When a motorist drives into a filling station to replenish his gasoline supply, he is confronted with a battery of pumps containing gasolines of various brands and colors. He can exercise his choice and select a brand or a color which appeals to him. If he is disappointed in the performance of the engine with this fuel, he can change to another gasoline in a few days, for he has only purchased a few gallons.

When the Government obtains gasoline, however, it purchases large quantities at a time, and the purchase is made under contract in which the lowest bid must generally be accepted. If an unsatisfactory fuel is obtained, many months must pass before a new supply can be procured. Hence, the Government purchases according to specification in order to make sure that a good gasoline will be obtained.

In his article, Doctor Dickinson, chief, heat and power division of the National Bureau of Standards, says: "In order that a gasoline may be satisfactory, it must give satisfactory engine performance. This is the real criterion for a good gasoline, and is the one which is used by the Government in drawing up specifications." to use and others whose relation to behavior in service was not well known. For the past six years the National Bureau of Standards has been studying the behavior of gasolines of all sorts in engines of different kinds, in the laboratory and on the road, and has found out much about what is required of a good gasoline.

Volatility.

Of these requirements the most obvious is volatility, or the ease with which the fuel is evaporated. Volatility is usually tested by distillation of the fuel under standard conditions, which are fully described by the American Society for Testing Material. After several years' work on the subject, this test has been so well related to performance of the fuel in the engine that, given the re-quirements of the engine, the desired volatility can be determined by the laboratory The next question, test. therefore is, What does the engine require of a fuel in

order that it may perform properly under all sorts of conditions?

Engine requirements.

The main items in this catalogue of requirements are somewhat as follows: The engine must start. To be sure, the oil and the battery and the starting motor have much to do with this, but we are discussing fuel and must assume that these other elements are in order. To start an engine requires that enough of the fuel shall vaporize at the existing temperature to form an explosive mixture. Since only the lighter fractions of the gasoline will vaporize at starting temperature, and since the lower the temperature the less will vaporize, excess fuel must be added to supply enough of the lighter portions to produce an explosion.

It has been found that a well-designed choke mechanism will enable the carburetor to supply for starting, a mixture of about 1 pound of fuel per pound of air; that is, from twelve to fifteen times the normal amount of fuel. A long series of careful tests has shown how to determine with some accuracy, the temperature at which any given fuel will start, assuming a 1 to 1 mixture ratio as noted above.

Incidentally, the method of measuring the starting ability of a gasoline, as well as its temperature of complete evaporation, which will be discussed next, is the standard American Society for Testing Materials distillation test referred to above, which is almost universally used in this country for measuring the volatility of gasoline. (See American Society for Testing Materials Book of Standards, 1927, or Bureau of Mines Technical Paper 323B, or current revision thereof.)

Starting temperature computation.

When the test is applied to a gasoline and the temperature at which 10 per cent is distilled, together with the percentage distillation loss, is determined as explained in the test procedure, the starting temperature can be computed with sufficient accuracy from this 10 per cent temperature corrected for loss.

Table 1, gives the practical starting temperature for a series of gasolines determined in this way. From this it is shown that different grades of gasoline may well be used at different seasons of the year. In January or February a gasoline with 10 per cent off at 104° or 122° F. might be desirable, whereas in July one with 10 per cent off at 176° F. might be preferable. The latter might be cheaper and certainly would be less hable to vapor lock, which we will discuss later. Losses in storage would also be much less for the 176° F. gasoline.

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10 per cent	American Society for Test- ing Ma- terials	Starting temper- ature
$ \circ C. 40 50 60 70 80 $	$^{\circ}$ F. 104 122 140 158 176	$^{\circ} F22 -9 1 12 23$

Under operating conditions air and gasoline spray enter the manifold of an automobile engine. Here they are intimately mixed by turbulence of the air stream, heated to some extent by contact with the walls of the manifold and enter the cylinders in about the correct proportions. Entrance through the intake valve still further increases the turbulence and consequent mixing of the charge.

Evaporation is gradual.

Generally, the liquid is not all evaporated at this stage; probably some of it is in the form of small droplets which are further vaporized by mixing with the residual hot exhaust gases in the cylinder and by contact with the hot cylinder wall during compression of the charge before ignition. Hence, under ordinary running conditions little, if any, liquid should remain at the time of ignition.

What little gasoline may remain in the form of droplets suspended in the air at the end of the compresssion stroke is probably vaporized and burned during the power stroke. However, if the cylinder walls, with their film of lubricant, are at too low a temperature, liquid particles striking them will be dissolved in the oil film, or, under extreme conditions, fuel vapor may be condensed on the walls. The oil thus diluted in the cylinder is interchanged with oil in the crank case by the reciprocating action of the piston, and thus dilutes the crank-case oil.



A good gasoline must vaporize in the manifold sufficiently to avoid too much crank-case dilution and to give good distribution of the fuel to the different cylinders. Before crank-case ventilators and other devices for removing fuel from the oil in the crank case became common, the limit in use of heavier or less volatile fuels was set by crank-case dilution. This may not be so at present, but, in any case, experience has shown that for practical purposes a fuel is not satisfactory if too much of it remains unvaporized, nor is it entirely satisfactory if too volatile and, therefore, vaporizes too readily.

Gage of volatility.

For a long time the usual gage of volatility in respect to the completeness of evaporation was the "end point" of the distillation. It was shown, however, some years ago that this is not at all a good measure of volatility, but that the temperature of the 90 per cent of the distillation is a much better measure; in fact, a very satisfactory one.

This is the point, therefore, which is stressed in the Federal specification, and should be so in any specification. In fact, it would be better to omit the end point entirely as it is both inaccurate and misleading.

Table 2 gives the dew points, which are the same as the temperatures at which all of the fuel would evaporate, in a mixture of 16 pounds of air per pound of fuel. This is a somewhat leaner mixture than is commonly used in an engine, but the temperature given would permit almost complete vaporization of the fuel in the usual mixture.

TABLE 2

90 per cent	American Society for Test- ing Ma- terials	16–1	Dew point
° <i>C</i> . 120 140 160 180 200 220	$^{\circ}F.$ 248 284 320 356 392 428	°C. 3 17 31 45 59 73	$^{\circ}F.$ 37 53 88 113 138 163

The sample marked 200° C. (392° F.) represents the current Federal specification limit. This gasoline would vaporize completely at 138° F. in a 16 to 1 air-fuel ratio. Experience in service has shown this to be a fairly satisfactory motor fuel. The average gasoline throughout the country meets this requirement, and it appears to be a good limit to set for ordinary motor fuel which is not intended for use under specially adverse conditions.

Cause of vapor lock.

A gasoline should not be too volatile, since it may cause vapor lock. Vapor lock is caused by the boiling of the fuel in the gasoline line or the carburetor, and often results in stopping the engine, after which one must wait for the fuel to cool down before starting. Vapor pressure is the property of a gasoline which determines its tendency to boil in the fuel line or carburetor, and, hence, cause engine stoppage due to vapor lock. The higher the vapor pressure, the greater is the possibility that vapor lock will occur.

Table 3 gives the gas-free vapor pressures in pounds per square inch, for a series of gasolines when heated to a temperature of 100° F. The lightest of these gasolines will almost boil at this temperature.

TABLE 3	3
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10 per cent	American Society for Testing Materials	Vapor 1 100	pressures °F.
° <i>C</i> . 40 50 60 70 80	$^{\circ}F.$ 104 122 140 158 176	Mm. 720 545 415 310 235	$\begin{array}{c} Lbs./in.^2\\ 13.9\\ 10.5\\ 8.0\\ 6.0\\ 4.5\end{array}$

The vapor pressures of gasolines, excluding those undesirable fuels which are not properly stabilized, is related to the 10 per cent point in the distillation test. In fact, trouble from vapor lock will almost certainly occur if the temperature of the gasoline in the fuel lines exceeds the 10 per cent temperature.

Trouble did not always exist.

Formerly this trouble did not often happen, since there was a dearth of volatile fractions in most gasolines. Of late, cracking processes and increased recovery of natural-gas gasoline have changed this. At present volatile fractions are plentiful and gasolines are often too "good" at the 10 per cent point. To avoid trouble from vapor lock, the Federal Specifications Board has included a lower, as well as an upper, limit to the 10 per cent point of Government gasoline. This appears to be the best solution of the difficulty. It is not wise to make the lower limit too high as this would limit competition and raise the price. There is hardly any need of a lower limit in winter unless one forgets to open the radiator shutters.

In specifications, like those of the United States Government which apply to Government purchases throughout the country at all times, these limits must be as wide as possible to meet all conditions without limiting competition. Some discretion is left to the purchasing officer, as will appear when the detailed Federal specifications are considered. Where purchases are made locally under specifications which can be modified at will to meet local or temporary conditions, it may be desirable to require different limits for the 10 per cent point under different climatic or operating conditions.

But for the tendency of fuels to knock or detonate when the compression ratio is raised, much more power and better economy could be had in automotive engines.

Subject given study in recent years.

It is only within the past four or five years that this subject has been given much attention, and even yet we have no uniform and generally accepted test for the rating of fuels in this regard, as we have for volatility. As a result there is much confusion in the industry and among users of fuels as to relative qualities of different fuels on the market.

Broadly speaking, there are four classes of fuels on the market which are better than straight distillate gasoline from Appalachian crude oils in knock rating; these are (A) California and west coast oils, which are high in aromatic compounds; (B) cracked gasolines, particularly vapor phase cracked products; (C) blends of gasoline with benzol and other coal-tar derivatives; and (D) blends with tetraethyl-lead. Classes (A) and (B), particularly the latter, may rate anywhere between wide limits. Classes (C) and (D), on the other hand, can be accurately controlled by the producers and, in general, are kept to a rather definite standard; this is particularly true of class (D).

While the knock characteristics of fuels are, perhaps, as important as any of the other items noted, there is at present no accepted means of defining or specifying the knock rating. However, a group of interested parties is very actively studying the problem and experiments are being made jointly in a dozen different laboratories, from which it is hoped that a rating system soon will be decided upon.

The only means so far found of measuring fuel knock is to test it in an engine. and the plan of the group working on the problem is to devise a standard engine and a standard test procedure for this purpose. An experimental engine has been designed and supplied to all the laboratories concerned. Until an acceptable standard method of knock rating is found, it is best to postpone any specifications for the knock characteristics of fuels.

50 per cent point less important than 10 per cent.

One other purely physical property of fuels is included in the Federal specifications, viz, the 50 per cent point of the distillation curve. Careful tests have shown that this point is of much less importance than the 10 and the 90 per cent point, but being of some value as an index to the general behavior of a gasoline in the warming-up period, it may well be included in any general specification for gasoline.

Rarely, a sample of gasoline is found to leave a deposit of gum on intake-valve stems and in the intake manifold. This fault has become somewhat more common of late, since cracked gasolines, which are more liable to form gums, have been increasing in amount. This is a fault which should be avoided.

amount. This is a fault which should be avoided. The "copper-dish" test, described in Bureau of Mines Technical Paper 323B, is commonly used to measure gum-forming tendencies of gasoline. This test is not very satisfactory. Some gasolines which deposit gum in the test give no trouble in the engine. It is a fairly safe test, however, in that gasoline which passes is not likely to give trouble. This test is not included in the Federal specification for motor gasolines but is included in those for aviation gasolines. Much work is being done by several laboratories toward devising a better test for gum formation and more satisfactory test methods are under development.

If trouble is experienced from gum formation, the copper-dish test may be adopted until a better test is developed.

One foreign element almost always present in crude oil and in gasoline is sulphur. This may occur as sulphur in solution or as any one of several sulphur compounds. Two sorts of damage are chargeable to sulphur: (a) Corrosion of fuel lines and fittings, and (b) corrosion in the crank case.

Corrosion of fuel lines uncommon.

Corrosion of fuel lines (a) is not common, as nearly all gasoline is refined to meet the copper-strip corrosion test. Like the other tests mentioned above, this has been standardized and is described in the Federal specifications, as well as by the American Society for Testing Materials. It is a part of the Federal specifications, and should be included in any other specification for motor gasoline.

Corrosion in the crank case (b) is a much more insidious and serious fault when it occurs. The cause was definitely discovered only a few years ago. When sulphur is burned along with the fuel, it forms SO₂, some of which leaks past the piston rings, and, combining with water when present in the crank case, forms corrosive acids. The acid attacks any exposed surfaces, particularly bearing surfaces, in the colder parts of the crank case where moisture condenses.

When there is no condensation of water in the crank case, corrosion is not serious, while with water present probably some corrosion takes place even without sulphur in the fuel. Water collects normally in cold weather and particularly when an engine is often

stopped and started. A H-cylinder engine is less subject to water in the crank case than a 6 or an 8 cylinder engine, because with 4 cylinders the air in the crank case is partly displaced at each stroke, which is not the case with the other designs. Crankcase ventilators and other devices reduce or prevent collection of water.

It is clear, therefore, that during most of the time fuels high in sulphur might be used with impunity, but there are times when such fuels may practically destroy an engine in a few weeks.

Sulphur limit.

The Government requires that total sulphur be not more than 0.10 per cent which seems to be a safe limit. This limit certainly should be retained in any specifications applying to gasoline for cold-weather use, and probably is best for all gasolines, at least until reliable data are at hand to show that the limit can be safely raised.

Other tests, such as color, odor, gravity, staining on evaporation, etc., which have been used, appear to bear no direct relationship to engine requirements, other than as possible indexes of qualities already discussed.

Two of the most important characteristics of motor fuels have been omitted entirely from the foregoing discussion as they are omitted from usual specifications. These are the heat of combustion in British thermal units per gallon or calories per liter of the liquid fuel and the heat of combustion per unit volume of the explosive mixture. The former is proportional to the total amount of work which can be obtained per gallon of fuel, the latter to the motive power which can be produced by a given engine.

The reasons that these two important factors can be neglected in specifications, are that the heats of combustion per gallon of hydrocarbon in the gasoline range are substantially alike, and that the heats of combustion of the air-fuel mixtures, formed from them, are even more nearly the same. If alcohols or blends containing them were to be considered the heat of combustion of the liquid would need to be specified, but even here the heats of combustion of the air-fuel mixture are substantially the same.

Present Government specifications which are met by the average motor gasoline on sale, embody the principles discussed above, in so far as the necessary tests have been developed and generally accepted. Accepted test methods have been the result of long continued development, and modifications of them, or the substitution for them of other and better methods must necessarily also be gradual. Much is being done by the research laboratories of the Government, as well as by those of the petroleum and automotive industries toward the better realization of the ideal specification for motor fuel.

Federal specifications satisfactory.

If gasoline is to be purchased on specification it is believed that the present Federal specifications, adopted last September, are a reasonably satisfactory basis for such purchases. Copies of these specifications can be secured from the Federal Specifications Board, National Bureau of Standards, Washington, D. C. The chart gives the distillation limits for United States motor gasoline when the temperatures are plotted against the per cent evaporated, assuming an average distillation loss. The upper full line and the lower full line at the 10 per cent point represent maximum and minimum limits. Between these, as indicated by the dotted lines, a certain amount of discretion is allowed to the purchaser to meet climatic conditions.

It may be well to take account of atmospheric temperature when making purchases locally for immediate use. Thus when freezing temperatures or lower are to be expected, the upper limit at 10 per cent evaporated well may be fixed at 149° F., although it is not desirable to reduce the upper limit for fuels to be used in summer weather. On the other hand, for fuels subject to long storage

On the other hand, for fuels subject to long storage at high temperatures, the lower limit at 10 per cent evaporated may well be raised to 131° F. This limit, however, shouid not be set unless conditions require it, because gasoline purchased on this basis may not start as readily as would otherwise be the case.

INDEX TO FEDERAL STANDARD STOCK CATALOGUE NOW AVAILABLE

Index and Certain Sections Published and on Sale Under Auspices of Catalogue Board

The General Index and certain parts of the Federal Standard Stock Catalogue are now available for purchase from the Superintendent of Documents, Government Printing Office, Washington, D. C., according to an announcement just made public by Rear Admiral T. H. Hicks, United States Navy, chairman of the Federal Stock Catalogue Board.

T. H. Hicks, United States Navy, chairman of the Federal Stock Catalogue Board. This catalogue will be printed in loose-leaf form, for insertion in a 3-post binder, and when completed, will comprise several volumes of approximately 3,000 pages each. Sections I and II can be included in one binder, and other volumes, which will comprise information in Section III, will be compiled and issued from time to time and will probably require a year or two for completion. The Federal specifications, which comprise Section IV of the Federal Standard Stock Catalogue, will not be issued under the plan outlined below, but may be obtained from the Superintendent of Documents direct.

The ordinary procedure in obtaining Government publications is by purchasing from the Superintendent of Documents. In order, however, that the first edition of the catalogue may be readily available to commercial and industrial establishments interested in the publication, authority has been obtained to issue the various parts, as fast as they are received from the Government Printing Office, under the supervision of the Federal Standard Stock Catalogue Board.

Will cost about \$20.

It is not practicable to determine the ultimate cost of Sections I, II, and III of the catalogue at this time, but it is believed that it will be approximately \$20, including the binder at about 75 cents. Should the reader of the Commercial Standards Monthly desire, therefore, to obtain a Federal Standard Stock If a special high-test gasoline is to be purchased on specification for such purpose as operation of fire apparatus, ambulances, and emergency vehicles in cold weather, a special grade of gasoline, motor fuel V, is provided for in Federal specifications.

As for the antiknock characteristics of gasolines, as noted above, no satisfactory basis for specification exists at present. If the grade of straight gasoline procured does not knock, no improvement in operation of the vehicle is to be expected from the use of special antiknock gasolines of like volatility, although there may be increased satisfaction in the use of the latter.

On the other hand, if serious knocking occurs with ordinary gasoline, there should be a gain in mileage and in horsepower and a saving in upkeep cost by the use of fuels having better antiknock qualities. Since the need for antiknock gasolines varies widely with the type of equipment and the conditions of operation, the user must determine whether the added advantages justify the increased cost under any particular set of circumstances.

Catalogue with binder, it is suggested that he draw a check for \$20 to the order of "The property accounting officer of the Navy," and forward this check to Rear Admiral T. H. Hicks (SC) United States Navy, chairman, Federal Standard Stock Catalogue Board, room 1149 Navy Building, Washington, D. C.

This check will be turned over to the property accounting officer and record will be maintained of the cost of each part of the catalogue, as it is issued to the subscriber, and a memorandum of cost will accompany each shipment. In the event that the complete catalogue costs more than \$20 the subscriber will be requested to furnish an additional sum.

The catalogue will be kept up to date by addenda indicating changes, or by reprints of pages or classes. All such addenda and reprints will be issued and charged exactly as the original.

COMMERCIAL RESEARCH VALUABLE

Assistant Secretary of Commerce Emphasizes Present Importance of Fact Finding

In a recent radio talk the Assistant Secretary of Commerce, Dr. Julius Klein, refuted the suggestion that commercial research is partly nonessential and can be cut down safely in a time of financial depression in order to reduce expenses. He claimed that at this particular time commercial research can prove its practical usefulness most forcibly.

He gave much of the credit for the great American commercial advance to the research activities of many of our large business corporations, advertising agencies, and individual manufacturers, who have maintained in recent years rather extensive staffs to gather market data, study purchasing power, chart industrial activity, investigate living conditions and habits in the different regions, determine actual and potential demand, and keep closely in touch with changing tendencies.

SIMPLIFICATION AND STANDARDIZATION

Aids to Manufacturers and Distributors

By EDWIN W. ELY, Chief, Division of Simplified Practice

The month of December, 1929, marked the eighth anniversary of the establishment of the division of simplified practice as a centralizing agency for bringing together the various elements of industry, and for indorsing and supporting their collective efforts toward eliminating the waste inherent in overdiversification of product.

That period has seen the introduction of an organized procedure of nonregulatory cooperation and its acceptance by American business. It has seen the simplification movement recognized as an integral part of successful management methods. Industry is constantly improving the technique of its attack on costs of production and distribution, through a growing reliance upon simplification and standardization as two of production management's most powerful weapons. The effective use of these weapons has rewarded American industry in its effort to reduce the spread between the prices of raw materials and those of finished products.

Many recommendations promulgated.

The 105 simplified-practice recommendations now in effect testify conclusively that interest in simplification has continued to spread. Evidence of the extent of this interest is clearly shown in the degree of adherence to programs which are audited periodically following their first year of activity.

It is futile to expect any simplified practice recommendations to function 100 per cent, but when it can be demonstrated that manufacturers, distributors, and consumers of a product are conforming with an established simplified list of sizes and varieties to the extent of 80 per cent, or better, of the total volume of business, it can be said that the recommendation is functioning successfully. To be specific, the average adherence to 27 of the recommendations recently audited was found to be better than 84 per cent.

The terms "simplification," "simplified practice," "elimination of waste," and "reduction in variety" have become definitely recognized as belonging in the vocabulary of industry, showing that knowledge of this movement is nation-wide in extent. Applications of the principle of simplification are to be found on every hand. Many of them have come about through the initiative of individual firms or groups, in addition to those brought about through the concerted activity of entire industries working under the guidance of the division of simplified practice.

Variety of lamps reduced.

For example, a manufacturer of electric lamps reduced his variety of lamps from 1,260 to 180 types. Lamp base styles were cut from 179 to 3. It is interesting to note that he was able to reduce prices of lamps one-half, over a period of 12 years, and that his sales increased nearly 75 per cent in four years. He reduced his transportation and warehousing expenses, increased the efficiency of his employees, and can now supply the public with a better lamp for 25 cents than it could get in 1909 for \$1.

A manufacturer of self-opening and adjustable diehead chasers found that 80 per cent of his business came from 2,000 varieties-3.6 per cent of his total line. The other 96.4 per cent, representing 53,000 varieties, brought in only 20 per cent of the business. Among other benefits, elimination of the latter cut his inventory by \$225,233, saving him \$13,500 a year in interest charges, and \$10,000 is reduced obsolesence costs.

Other examples of simplification, which may be mentioned, are files and rasps, forged tools, sheet steel, and grinding wheels, in the field of mill supplies; and construction materials, such as hollow building tile, roofing slate, face brick, and so forth. Eaves troughand conductor pipe were reduced from 21 varieties to 16; paving brick sizes sustained a reduction of 94 per cent. The entire list of simplified sizes and varieties of building materials is of great interest to anyone who contemplates the erection of a home or other building.

Factual surveys made.

Factual surveys of the benefits of simplified practice have brought out estimates of savings in materials, time, and labor, which run high into the millions of dollars. Fully half of the industries which have adopted simplified practice found it difficult to interpret their benefits in terms of dollars and cents because of the existence of other contributing factors. All agreed, however, that the savings and benefits were important and none cared to return to the former condition of overdiversifications.

Documentary evidence is available in the division of simplified practice to show that simplified practice is yielding benefits and savings that approximate \$300,000,000 a year. Leaders in various fields and branches of industry have provided the division with conservative estimates regarding benefits in their respective lines.

In the following typical statements from these sources it will be noted that distributors as well as manufacturers and consumers are directly affected:

Metal lath .-- Dealer's stocks in sizes of metal lath eliminated under Simplified Practice Recommendation No. 3 represented an investment of \$2,000,000 which they do not now have to stock.

Stock. Steel reinforcing bars.—Idle stocks of manufacturing dis-tributors (of steel reinforcing bars) have been reduced from 175,000 to 75,000 tons, with a resulting release of capital in-vestment totaling \$4,500,000.

Sheet steel.-Increased production, with fewer machine changes, smaller stocks, and lower handling charges are estimated by the industry to have saved \$4 a ton, or a total of \$2,400,000. When the total effect of the program is felt, it is estimated that this sum will be increased to \$8,000,000. Range boilers.—The general conference of October 30, 1923,

on range boilers and expansion tanks, in addition to adopting

a simplified practice recommendation reducing from 130 sizes to 13, adopted standards for tappings in connection with range boilers and expansion tanks used with piping and heating systems. This makes it possible for pipe to be cut in plumbing and gas shops instead of at the place of installation and to complete the entire job in about one-half the time formerly required, thereby effecting a great saving to the consumer on every boiler placed in service.

The sale of new boilers for the 12 months following the adoption of the program was estimated at \$1,000,000—A conservative figure, according to the manufacturers. It was calculated that the immediate saving to the public would be \$4,000,000. There also was added to this initial saving another \$1,500,000, representing a secondary saving in fuel consumption resulting from increased heating efficiencies made possible by the new standards, according to engineers in the gas industry.

gas industry. Invoices.—Thirty-five business corporations of average size were asked by the National Association of Purchasing Agents to estimate what, in the opinion of their officers, might be saved in their purchasing and accounting departments if all invoices received by them were on a national standard invoice form. If these corporations estimated correctly, the annual saving of 25,000 concerns of corresponding size in the United States, Canada, and Mexico would amount to \$15,500,-000. If we discount the figure for the purpose of being conservative, the potential savings will still run into the millions of dollars.

Bank checks.—In 1928 it was estimated by the American Bankers' Association that 85 per cent of the bank checks then being issued complied with the simplified form. In discussing the simplification movement and the savings resulting from adherence to it, it was stated by the association that the simplified check replaces the heterogeneous shapes and sizes in use prior to its development. It is believed by those affected that the universal adoption of simplified checks will mean a saving of at least \$20,000,000 a year in the conduct of the Nation's business.

Two pamphlets prepared.

A multitude of inquiries from all over the world, both through correspondence and personal contact with foreign visitors to the division, has made it necessary for the division to prepare two publications— Simplified Practice, What It Is and What It Offers, and A Primer of Simplified Practice. These books not only serve to answer many typical questions, but are being used as textbooks in courses in industrial management. Many foreign visitors have published articles and books concerning this movement, and there are instances on record where foreign countries have lost no time in applying the principles of simplification to their own products.

When the work of the division of simplified practice was first started industry was inclined to believe that simplification was merely another name for standardization. Indeed, during the past eight years the Bureau of Standards has found that any opposition to the movement has invariably been the result of misunderstanding of the true meaning of simplified practice. With such misunderstanding removed by the actual results shown on every hand, the spirit of cooperation in industry increased rapidly.

Manufacturers, distributors, and users within a given industry have shown a growing desire to work with each other in solving problems of mutual interest. Also, separate industries are finding it practicable to work together toward the common end of waste elimination, for it is now fully appreciated that the producers in one industry are the consumers of the products of another. Manufacturers realize that they can not fully consummate a program of simplification without the understanding and support of their distributors and consumers, and they have also learned that they can cooperate with each other in such matters without destroying that desirable element—competition.

This building up of confidence in an idea has succeeded because all action is based upon voluntary cooperation, initiated and carried on by industry itself.

In 1922 industry was uncertain as to the scope of the simplification movement. In 1930 industry appreciates the fact that simplified practice means the reduction of variety in sizes, dimensions, and immaterial differences in everyday commodities as a means of eliminating waste, decreasing costs, and increasing profits and values in production, distribution, and consumption. Simplification means concentration upon sizes and varieties that are in greatest demand.

Definition of standardization.

Standardization, based as it is upon technical research, tests, and experience, leads to the determination of sizes, quality, and performance of a given commodity. A list of standards may be short or long, but the important thing is that each item must be essentially correct. Such a list is permissive but not mandatory. It should be carefully examined from the viewpoint of commercial expediency, using actual demand as a measuring stick. True simplification then consists in selecting from the list those items on which production and sales effort can be concentrated to the best advantage of the industry.

Let us say that there is a list of standards covering 800 varieties of a given commodity. Each of those standard items may be technically correct, but if it can be shown that the major demand is for only 160 of those items it is obviously unprofitable to carry in stock the other 640 items. This would be no reflection upon the merits of the 640 items. They may, if necessary, be furnished on occasion, when nothing else will fill a particular need, but the industry will not be justified in establishing or maintaining mass production of items for which there is only a sporadic, uncertain demand.

If any survey shows that 80 per cent of the demand is for 20 per cent of the line, it is at once evident that 80 per cent of the line is made up of so many parasites, not paying their way.

In establishing a simplified practice recommendation, the manufacturers never desire to urge their customers to struggle along with less than the former number of varieties. Their main purpose is to determine the shortest possible list which will adequately cover normal demand—a list that can be modified periodically to conform with changing conditions.

If the producers can definitely determine where to emphasize their manufacturing and sales policies and where to retrench, they will be able to reduce overhead expense and to maintain in a fluid state that capital which formerly remained "frozen" in slowmoving inventory.

It should be thoroughly understood that simplification is not offered either as alternative to, nor as a process superior to, standardization. Instead, it may

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be said that simplification is best applied as a logical preliminary step to standardization. The former clears aways nonessentials and provides "elbow room" in which standardization can work to develop products which are better, not merely different.

Advantages of simplification.

Industry has become a consistent believer in simplification as a useful tool for management. The reason why that is so and why continued demands are being made upon the facilities of the division of simplified practice, may be explained by listing some of the specific advantages which should follow adoption and adherence to simplification.

For the manufacturer.

1. Less capital tied up in raw materials; semifinished stock; finished stock; jigs, dies, templates, and special machinery; storage floor space; and repair parts.

2. More economical manufacture through larger units of production, reduced number of manufacturing units, longer runs with less frequent changes, accurate estimating for production, more effective stock control, less idle equipment, less expensive handling of stock, more accurate cost accounting system, less involved inventories, and elimination of waste in experimentation and design.

3. More efficient labor due to simpler training of employees, increased earnings through increased individual output made possible by longer runs, and less labor idle from preventable causes.

FOUNDRY PATTERNS OF WOOD

Commercial Standard Accepted by Industry Effective Immediately for New Production

Under date of February 10, the Bureau of Standards announced that a sufficient number of written acceptances have been received for the Recommended Commercial Standard for Foundry Patterns of Wood to warrant establishment as a commercial standard and, therefore, it should be considered as effective immediately for new production.

It covers standard color markings for foundry patterns of wood to provide the molder with correct information regarding location of cores, the surfaces to be machined and the portions to be filled up where stop-off construction is used. Surfaces to be left unfinished are to be painted black. Surfaces to be machined are to be painted red. Seats of and for loose pieces are to be red stripes on a yellow background. Core prints and seats for loose core prints are to be painted yellow. Stop-offs are to be indicated by diagonal black stripes on a yellow base.

Pattern manufacturers are, of course, free to use any quality of paint, varnish, or shellac, which may be desired, and a considerable variation in the shades of the colors is permitted. It is understood that each of the recommended colors may be obtained by mixing suitable inexpensive pigments with shellac so that there should be no insurmountable difficulties for those manufacturers who wish to use shellac as a coating material. 4. Better service to the trade in better quality of product, more prompt delivery, less obsolete material, decreased number of sizes of packing required, and reduced amount of material handling.

5. More efficient sales force, increased rate of turnover, intensified sales momentum, easier financing, fewer factory shutdowns.

For the distributor.

1. Quickened turnover because of elimination of slow-moving stock, and concentration on items for which there is a known predetermined demand; and more effective sales force.

2. Decreased capital investment in spot stocks, repair parts, and storage space.

3. Reduced handling charges and improved service to customers.

For the consumer.

1. By reason of his cooperation in making the above-mentioned advantages possible, the consumer should feel such reflected benefits as those conveyed to him in the form of improved quality of product and better service on complete products, repair parts, and prompt deliveries.

These advantages are exemplified in the simplified practice recommendations which are developed by the collective action of producers, distributors, and consumers, with the cooperation of the division of simplified practice in its capacity of clearing house or centralizing agency.

CARE AND ADJUSTMENT OF PAPER-FOLDING TESTERS

New Circular of Importance to Industry on Care and Adjustment of Paper Testers

The Bureau of Standards has completed an extensive study for the purpose of increasing the accuracy of the folding test of paper. This work is of importance, as the resistance which paper offers to repeated folding is considered the best indication of its general wearing quality.

The United States Government places its chief reliance in the folding test as a criterion of the quality of papers which must have considerable endurance, such as currency, bond, ledger, and wrapping. An instrument designed many years ago in Germany is internationally recognized as the standard folding tester. This indicates the number of folds required to break the paper under tension during folding.

The mechanical "fingers" of this machine naturally wear with repeated use and sometimes this causes the mechanical tester to give erroneous indications. The report of the bureau describes the method which the bureau uses to keep the tester functioning properly and no doubt will assist others in increasing the accuracy of this important test.

This investigation is completely described in Circular No. 379, of the Bureau of Standards, which may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents the copy.

PURCHASING METHODS OF HOUSEHOLDERS

Goods Made to Standard Specifications and Labeled Benefit the Individual

A recent issue of the Annals of the American Academy of Political and Social Science, a symposium on Women in the Modern World, contains an important article by Dr. Benjamin R. Andrews, professor of economics at Columbia University, and an international authority in this field, on the Home Woman as Buyer and Controller of Consumption.

Doctor Andrews deals in straightforward fashion with the essential conflict of interest between producer and consumer and in this connection makes some pertinent remarks relative to individual buying.

"Good 'buymanship' requires an answer to one or more questions before a purchase is made," he states, asking the question "Do I need something of this kind?" "Is this the particular type that I want, functionally; in quality? How much will I give for it? How long will it last? How much work will it require to operate it? What else would my money buy now; that is, what other purchases do I give up, if I buy this? Am I buying because I myself need it, or am I being led to buy by social compulsion? Does its purchase encroach upon my savings? Are the claims for it unproven, exaggerated, and the mere prestige of advertising? Is there not a cheaper way to buy it? Will this object give continued satisfaction? What are the possible sources of dissatisfaction?

"It is not that one will use all these test questions in every case, or in any case; it is simply that the purchaser usually has need to think critically at some point in any purchase, and the more he thinks before he buys the more satisfaction he will likely have from his purchase. The business world deals too much in opiates for the consumer. The retail buyer needs to keep awake and not allow himself to be exploited by prestige, chic, pressure to buy, or 'pooh bah' generally."

Business is interested in profits.

"Let business be frank. It is interested in profits, not primarily in meeting needs. Let the consumer be frank. He is not interested in profits, but only in meeting his needs as cheaply as possible. His profits come from the largest possible satisfactions for his money. How, then, shall the twain ever meet? Precisely as they do in wholesale trade, by giving the buyer exactly what he wants, and under conditions that mean reasonable profit to the dealer.

"Standardization of products, according to specification, is the measure that, in the retail market, will prove of greatest benefit to the buyer, as has been the case in the wholesale market. May not the consumer

STANDARD CONDENSER FERRULES AND TUBE SHEETS

Due to the report of unfavorable criticism regarding the marine standard, Standard Condenser Tube Ferrules and Tube Sheets, the executive board of the hope that there will some time be available at his corner store and other places of daily purchase many consumers' goods thus based upon standardized specification? The fact that large private buyers are already using Government specifications gives the home buyer hope of similar standards in her markets. It is noteworthy that business itself seems to be moving in the direction of graded goods openly acknowledged."

System of branding goods of value.

"Our system of branding goods, which at present consists almost exclusively of trade-mark and private brand names, is of significance of course in identifying the product of a certain advertiser, but is inadequate as to qualify identification. It should be supplemented by a system of brands having reference to objective quality and the meeting of specifications. It is conceivable that in standardized goods, such as rubber overshoes, bed sheets, garden hose, and what not, we shall have broad levels of distinctive quality allowing for each grade a considerable margin for variation, so that one might call for a particular commodity, as 'Consumers' Grade I, II, or III,' with the goods labeled accordingly.

"There are under way studies of specifications of consumers' goods, in some cases considered jointly by producers, engineering organizations, and consumers, that look in this direction toward the possible establishment of objective grades of goods.

"There has been time and again demand for obligatory textile, and other descriptive labels, to indicate wool content, leather shoes, etc. This seems but an extension of the law requiring a label of net weight or contents upon food packages, so that many have supported the plea for such labels. Business has opposed obligatory labeling, claiming that such labels would be difficult to administer. As a moderate step ahead there has been rather general support for the adoption in the United States of the English merchandise marks act, the principle of which is 'no label is required; but if goods are labeled, the label must be honest and not misleading.' This principle of square dealing as regards labeling has been in court again and again in decisions of the Federal Trade Commission, which has required honest labels in individual cases where business itself has complained of unfair competition by dishonest labels.

"The consumer by joint action, the business man through upholding equitable standards in trading, and the Government itself, can do much to insure conditions of fair dealing when the home buyer goes into the market to buy."

American Marine Standards Committee, has concluded to let the standard stand until further experience in the use of the ferrules indicates necessity to review it for possible revision. This action was taken in view of the fact that diametrically opposite views were expressed regarding main features of the ferrules.

AMERICAN STANDARDS ASSOCIATION NOTES

Standardization Programs Cover Pipe Traps, Road Materials, Graphical Symbols, Red Lead, Petroleum; Safety Codes for Wood Working Plants and Grand Stands

The establishment of a safety code for grand stands, under the auspices of the American Standards Association, has been formally requested by the department of labor and industry of the State of Pennsylvania, and by the Belmont Iron Works and Wayne Iron Works. The A.S.A. reports that it anticipates taking early action on the request.

"There is," states C. S. Wetzel, of the Wayne Iron Works, "in so far as we know, no standard in existence at present. Accidents are not unknown, and with the greatly increased interest in athletics, there is a pressing need for a standard for design, manufacture, and inspection. As we see it, the standard code should apply both to permanent and portable structures. The former we have found oftentimes are erected without any attention to strength and dura-

bility, the only object being to seat a large given number of persons at small expense. The latter are subject to the same defects, and, in addition, constant assembly and dismantling, many times by inexperienced workmen, carry with them increased hazards."

To standardize pipe traps.

At the organization meeting of the subcommittee on plumbers' pipe traps of the A.S.A. technical committee

on the standardization of plumbing equipment, the decision was made to divide the work among five subgroups. These subgroups will cover brass traps, castiron traps, lead traps, vitreous china traps and intercepters, catch basins and miscellaneous traps, respectively. The technical committee is under the joint sponsorship of the American Society of Sanitary Engineering and the American Society of Mechanical Engineers.

Safety code for woodworking plants.

The American tentative standard safety code for woodworking plants has been revised by the technical committee on this subject, and the revision submitted to the A.S.A. for approval as an American standard. The code was first approved as a tentative standard in October, 1924. Since that time the code has been widely distributed, and, except for a few of its provisions, has proved satisfactory. The most important part of this committee's work on revision has been their investigation of safe limiting speeds for circular saws. Since the former edition of the code, there has been a decided tendency toward higher speeds which are made possible by alloy steels, hence, a redetermination of limiting peripheral speeds was necessary. New petroleum standards.

A method of test for saponification and a method of test for detection of free sulphur and corrosive sulphur compounds in gasoline have been approved as American standard and American tentative standard, respectively. With these important standard tests for gasoline there are now 21 standard methods of test for petroleum products and lubricants, approved by the A.S.A. All of these were submitted by the American Society for Testing Materials.

Red lead.

Standard methods of routine analysis of dry red lead, submitted by the American Society of Testing Materials, has been approved as an American standard by the A.S.A.

Graphical symbols.

The American Standards Association, upon the unanimous action of the board of directors, has become a member body of the International Federation of National Standardizing Associations, usually designated as the Internation Standards Association (I.S.A.), whose central office is in Zurich, Switzerland. This membership will date from the beginning of the fiscal year of the I.S.A., which is October 1,1929.

of the A.S.A. technical committee on scientific and engineering symbols and abbreviations. In an outline of scope contained in the report it is stated that— * * * this report comprises

A draft of proposed stand-

ards for graphical symbols,

used for electric power

and interior wiring, has

been prepared by a subgroup

* * * this report comprises graphical symbols used for one line and complete diagrams of electric-power apparatus, instruments and relays, system

connection diagrams, and interior-wiring diagrams. The symbols are limited to apparatus usually met with

The symbols are limited to apparatus usually met with in electrical-power engineering, such as major electrical equipment in power houses, substations, and transmission and distribution systems, and to system and building wiring diagrams. They are not intended to cover communication, railway or other allied branches of electrical engineering. Basic symbols which seem to have widespread use and application, and only such symbols (with few exceptions), are given. It is recognized that the symbols presented do not cover all types of equipment, but it is believed that with relatively small additions to the basic symbols the variations in practice can be accommodated. This is especially true of the complete diagram symbols for rotating apparatus and transformers where it seems impracticable to show all possible connections of parts.

Road materials standards.

By action of the standards council of the A.S.A. the status of the following American tentative standards has been changed to that of American standard; method of test for toughness of rock; method of sampling stone, slag, gravel, sand, and stone block for use as highway materials; standard method of test for penetration of bituminous materials; standard method of float test for bituminous material; and method of test for the determination of bitumen.

All of these standards were submitted by the American Society for Testing Materials.

STANDARDIZATION MOVEMENT IN JAPAN

Government Takes Lead in Furthering Standardization Movement in Japan; Accomplishments of Various Japanese Organizations Engaged in Developing Standards

By Shoji Konishi

Prior to the establishment of standards, the Japanese specifications for structural steel were diversified and many, especially those for structural steel for bridges, buildings, and general construction. However, structural steel for shipbuilding was made in accordance with Lloyd's specifications. Boiler steel for vessels was fairly uniform, but that for railway locomotives was not.

In making investigations on various kinds of structural steel, conveniences in trade and the future of international standarization were considered, as well as compliance with the standards of more advanced European and American countries; conflicts with the existing specifications were avoided and a decrease in the number of classes were sought. In the study of the standards for structural steel, tensile strength

and elongation, the type and the dimensions of bars, the test pieces and their permissible variations, were the most important items considered.

Methods of analyses.

In the investigations and studies on the methods of analyses for metals, great care was taken to choose such simple methods as might produce comparatively accurate results with a minimum of personal

errors, but at the same time be adaptable to the ordinary arrangements used at home and abroad.

For this purpose data was collected concerning the experiments on the methods made at the leading manufacturing plants, and consuming establishments, as well as the governmental and private research institutions. In studying the data collected, the existing standards of Europe and the United States were also considered. After the methods had been agreed upon by the subcommittee as satisfactory, tests were made at the laboratories with which each member of the committee was associated, and then the final drafts were obtained by adopting or rejecting the views from various quarters on the submitted drafts.

Standards for Portland cement.

The standard for Portland cement developed out of the testing method of Portland cement which was originated by the Department of Commerce and Industry in 1905. In the past serious inconveniences were experienced by the suppliers because of the absence of a specification for the testing of cement in Japan. The Government appointed a committee from among the officials of the departments concerned, in accordance with the request made by the manufacturers, through which the standard testing method was studied and developed.

The Government notified the trades that the testing method would have to be applied to the cement used by them. However, before the testing method was approved as a Japanese engineering standard in 1927, two revisions (1909 and 1919) were made in accordance with suggestions of the Japanese Technical Society of Portland Cement.

Standards for lumber.

The demand for timber and lumber, which are the principal building materials in Japan, increased in recent years. Ready-made lumber on the market, however, was diverse as to quality and dimensions, according to the districts; no definite standard for

The first part of this article by Shoji Konishi, mechanical engineer, of the Bureau of Industry, Department of Commerce and Industry, Tokyo, Japan, appeared in the February issue of the COMMERCIAL STANDARDS MONTHLY, entitled "Standardization in Japan." The two articles are based on the paper the author delivered before the World Engineering Congress last October in Tokyo. quality existed and not only wide differences between the normal dimensions and the actual dimensions were found, but there were great variations in dimensions, according to the districts in which purchased. Consequently, the consumers suffered from serious inconviences.

In view of these conditions, the Engineering Standards Committee made several studies on this subject, using the draft prepared by the

Association of Building Materials (consisting of the Society of Architects and five other societies), with the assistance of the Japan Forestry Association, and various other bodies in the principal districts, all of whom had been very enthusiastic in the studies.

had been very enthusiastic in the studies. After three years' careful deliberation, a definite draft was obtained. The main points of discussion have been whether grades should be expressed by taking knots and other factors into consideration, or should they be expressed by combining all the grades provided for each factor; what should be done to the relation between the length of lumber expressed by the multiples of 1 and the dimensions of the Japanese living houses; and the method of calculating the volume of logs. The method of calculating the volume of logs was decided by taking the figures obtained by the Japanese Forestry Association through an actual measurement of the dimensions of about 10,000 logs.

Standards for induction motors.

In developing standards for small 3-phase induction motors, careful deliberation was made by consulting with the Japanese Electrotechnical Commission and the Electrical Association, and taking the results of home and foreign made motors, the present conditions of production and consumption, as well as the views of users and makers into consideration. The following are the principal items discussed during the consideration of this standard:

Frequency.—Fifty and sixty cycles, which are most universally used in Japan, were adopted.

Standard voltage.—Although it is an ideal to decide upon 200 volts as the standard voltage, it was decided that 220 volts may be used for 60 cycles only in view of the fact that 50 cycle motors of 200 volts and 60-cycle ones of 220 volts can be made, using the frames of the same type.

Rated output.—Round numbers of kilowatts were adopted for the rated output. With a view to avoid inconveniences in its use for the time being, rated outputs of 0.75, 1.5, and 3.7 kilowatts were retained for motors of 1, 2, and 5 horsepower, respectively, which had hitherto been manufactured.

Characteristic.—The determination of characteristic is based on comparatively simple tests, such as no-load tests and shortcircuiting tests, etc., using the circle diagram which is comparatively well known. In the case of the values in the determination made by the circle diagram being doubtful, it has been decided that the values of the circle diagram shall be determined by calculation made in accordance with the method of calculation provided.

Low-speed revolution.—In running the main shaft of a factory with a small motor, the number of revolutions of a lowspeed motor is prescribed in order to avoid the diameter of the pulley of the main shaft becoming too large. The specification for characteristic in this case, however, is left to an agreement between the producer and user.

Standards for screws.

About five years have been spent in the study on screws used in general machinery and construction. In the first place, the forms, kinds, amounts, etc., of the screws used in Japan have been investigated, by collecting the views of the Government and private factories as to the forms of screws to be adopted as standard in Japan, and considering the present condition of standardization on screws, as well as the forms likely to be adopted in the future, in Great Britain, the United States, Germany, and France into consideration.

Furthermore, after studying the effect of standardization on the foreign trade of machinery, and the expenses to be incurred through alterations and abolitions of the existing machines and tools, due to the change in the forms of screws, study was carried on with the idea of standardizing the screws into one of the three different systems, viz, the Whitworth, Sellers, and International.

Differences in opinion.

In view of the fact that the principal Government offices and many private factories used the Whitworth screws and to replace them with screws of other systems would be extremely difficult, and due to the fact that an international standardization was not likely to materialize within the near future, two different opinions on the subject existed.

One group held that the screws should be unified into the Whitworth system, which was most suitable for prevailing conditions in the Japanese industries, while the other held that the screws should be unified with the International system, which not only conformed to the standard measures of Japan, but the screws of the latter type were admitted to be superior.

As a result of experimental manufacture of the English, American, and International screws at different factories, and making a comparative study as to the manufacture of tools (taps and dies), and testing the accuracy of the finished tools and the tensile strength of bars having screw threads, etc., coupled with further careful deliberation, a draft in which screw threads based on the International and Whitworth systems were decided as the standard screw threads—was prepared.

Nevertheless, in view of the undesirability of using screws of two different types, and in order to further the aim of standardization by providing the sphere of use according to machinery and other purposes, a proposal was made by the committee that the Government decide the question as to what should be the standard screw.

This proposal having been carefully studied, it was decided, with the exception of aircraft and automobiles to which metric screw threads were to be used in accordance with the specification separately provided, that of the screws to be used by the Government, those of more than 9 mm in outside diameter should be of the Whitworth system, while those 9 mm or under should be of the metric system.

Promulgating standards.

In view of the desirability of adopting the approved standards in various quarters of the Government and trades, the Department of Commerce and Industry, with the assistance of other departments, issued a notice to the effect that all the articles to be made or used by the Government, as well as works to be ordered by the Government, should conform to the requirements of the standards. The number of the standards promulgated up to May, 1929, was 66.

Thus, by the Government taking the lead in adopting standards for the commodities required by it, and by the fact that the standards are apt to be referred to in the laws and regulations, articles manufactured by private factories are more likely to be produced in accordance with the standards.

As a general means of distribution of the standards, each is printed on loose-leaf paper and distributed among various elements, such as Government offices, academies, societies, schools, trade associations, factories, etc., thus introducing the standards to the public and facilitating adherence to them. In addition, the standards are promoted by means of the distribution of pamphlets, lectures, and exhibitions. Furthermore, the local Government authorities are requested to use appropriate measures for the spread of the standards, and the adoption of the standards is recommended in the principal districts to the perfectures themselves, and the industrial bodies of the cities and towns by means of notifications and messages.

Regulations revised to meet standards.

Upon examining the conditions pertaining to the application of the standards in various quarters of the Government and trades, it is sometimes found that the Government offices engaged in actual works are consistently adhering to them, but certain other offices find it necessary to revise the present regulations or effect new rules in order to make use of the standards. For the purchase of articles on the market, the use of the standards is found difficult, due to the general absence of standard articles. Thus standards are partly used, but there is still room for spreading the general application of the principle.

The sectional offices for electricity, civil engineering, etc., of the principal cities are adhering to the standards, especially those for electric works. The use of the standards is in satisfactory condition throughout the municipalities. Their use by the general factories are various, but the makers of electric machines and tools and the suppliers of electricity, who have been endeavoring to increase working efficiency through standardization of the articles connected with their business, or the works of iron and steel as well as other materials, factories of cars, etc., where the merits of standardization is understood, are strong supporters for standardization, and especially in the development of new standards in anticipation of future benefits to be had regardless of present temporary disadvantages suffered, due to the process of making the changes.

Standards for home articles.

A general desire to advance efficiency, through the application of the principles of standardization, has grown of late and the trend of adopting standards is particularly conspicuous in articles made for the homes, such as steel bars, electric copper wires, small transformers, screws, charcoal, etc., which are capable of meeting the entire demand. The development of standards is likely to make further progress in the future, with the spread of the metric system.

The principal organizations engaged in standardization work are: The Japanese Electrotechnical Commission, the Electrical Association, the Japanese Technical Society of Portland Cement, the Associated Society of Building Materials, the Osaka Limit Gage Society, the Society of Naval Architects, the Association of Chemical Industry, all of which keep in touch with the Engineering Standards Committee, and are of much assistance to the committee.

Histories of committees.

The Japanese Electrotechnical Committee was established in 1910, joining the International Electrotechnical Commission the same year. This committee is a central organization engaged by the request of the Electrical Association in the unification of technical terms concerning electricity and drafting of standard specifications for electric machines and pieces of apparatus, as well as in standardization of other electrical subjects.

The committee has 30 members appointed from among the members of the Electrical Association, who are officials of the departments of the Government concerned, professors of universities, and engineers engaged in the manufacture of electric machines, suppliers of electricity or electric railway. The principal subjects investigated or under investigation concern electrical terms and symbols, rating of electric machines and apparatus, standard items for electric meters, electric wires, electric lamps, iron poles, and iron towers, etc.

The committee is not only engaged, as a member of the International Electrotechnical Commission, in a study of electrical subjects by keeping in touch with various countries of Europe and America, but cooperates with the Engineering Standards Committee. The standards which have been based on the drafts of materials prepared by the committee, approved by the Engineering Standards Committee, and issued as the notifications of the Government, are standards for dimensions of electric wires, dimensions of bases and sockets for electric lamps, small transformers, and small motors.

Electrical Association.

The Electrical Association was organized through an amalgamation of the Electrical Association of Nippon (established in 1882 at Tokyo), the Central Electrical Association (established in 1919 at Osaka), and the Kyushu Electrical Association (established in 1915 at Fukuoka), and took over the standardization work, which included specifications for high-voltage insulators, single-phase oil immersed transformers for use on poles, electric cables for mines, etc.

The committee is divided into two sections on parts of ships and engines. In view of the progress of the work on the part of the Engineering Standards Committee, the committee is now investigating standardization of parts of ships. Before developing definite specifications, careful study shall be made of materials now in use at the dockyards in Japan, as well as data from the leading shipbuilding countries, and by consideration of the current types at home as much as possible.

Association of Chemical Industry.

The Association of Chemical Industry was formed in 1918, and aims at fostering the development of the chemical industry. As a result of certain investigations made as to the future of the industry in 1927, the association made a proposal to each department of the Government concerned, regarding the measures to be used for the development of this industry.

Portland cement group.

The Japanese Technical Society of Portland Cement is a body composed of the makers of Portland cement in Japan, and encourages the establishment of standards for cement, improvement of art, prevention of disasters, etc. This society was formed in 1900, and, as its first step, set to work on a standard sand. As a result a notification for the testing method of Portland cement to be used by the Government was issued.

In making the amendments to the standard in 1909 and 1919, the society gave assistance in preparing the draft, and after 1925 the society engaged in the study of the standard for sand and completed an investigation of the new standard, in which amendments were later added. The new draft of the standards was submitted to the Engineering Standards Committee and was approved as the present standard. In view of the necessity of making further revisions to the standard, due to the improvement in quality of cement, the society is going to present a revised draft decided after conferring with various parties concerned.

Building material group organize.

The Associated Society of Building Materials was established in 1920 as a union of the Architectural Association, the Japan Forestry Association, and four others, and aims at standardization of the grades, dimensions, designations, etc., of building materials. Of various building materials, standardization of timber and lumber, as well as common bricks, having been considered by the society as particularly important, the specifications were obtained after careful review of studies made with the cooperation of the trade and consumers, according to which all the dimensions were given in accordance with the métric system prior to the enforcement of the system, and the old designations which had lacked unity were replaced with the new designations based on exact dimensions.

These two standards have been announced as Japanese engineering standards. The following four standards have been approved by the Engineering Standards Committee, the drafts prepared by the society being used as the proposed standards; standards for roofing tiles, stones, earthenware pipes, and slates.

Osaka Limit Gage Society.

The Osaka Limit Gage Society was organized in 1924 for the purpose of study and diffusion of the limit gage system, and has the engineers of the Government and private factories concerned, and professors, as its members. It has two sectional committees.

The first sectional committee has been engaged in the study of the standards of foreign countries, as well as investigation and study of the merits and demerits of various systems of limits and fits by examining the accuracies of workmanship at the factories in Osaka. This committee is making valuable contribution to the Engineering Standards Committee by presenting specifications relating to tolerances, allowances, and fits, and by participating in the deliberation of the committee.

The second sectional committee is in charge of distribution of the standards for limit gages and acceleration of application thereof, as soon as they are developed. The committee is at present engaged in the study of the type of gages and dimensions thereof, their heat treatment, finishings, etc.

Society of Naval Architects.

The Society of Naval Architects was established in 1898, and consists of professors, engineers, and Government officials connected with shipbuilding and mechanical engineering, as well as the representatives of the dockyards and shipping companies, as its members.

The different dockyards in Japan have their own standard specifications for ship's equipment, but have not had the means or opportunity for unification. In 1922 or 1923, when shipbuilding industry was inactive, the Society of Naval Architects advocated the importance of standardization, but failed to make headway at that time. With the development of standards for chemical products, especially those for petroleum products and paints, the association appointed a standards committee for petroleum products in March, 1928, which is composed of chemists, the Government officials concerned, authorities of the public bodies, and the trade as its members.

European connections.

In April, 1921, the secretaries of the national standardizing bodies of various countries in Europe and America met in London and exchanged information, as well as their views, regarding international standardization that might be made in the future on some of the national standards. They also decided to exchange correspondence respecting the progress of work, and the Japanese Engineering Standards Committee was requested to participate.

The committee decided to join the cooperative exchange in October, 1922, and ever since it has been exchanging reports on its work, as well as materials. with the countries in Europe and America.

The second conference of the secretaries, held at Zurich in July, 1923, decided on the establishment of a central office of the secretaries' conference in the Swiss Standards Bureau, where all the correspondence with the various countries could be controlled and also that on collateral subjects summarized. At the conference of chairmen and secretaries of various national bodies, held in New York in April, 1926, deliberation was made as to the draft constitution of the International Standards Association. After making necessary adjustments in accordance with the opinion of the committee of seven, consisting of the representatives of the secretariat bodies of Great Britain, the United States, and five other countries, a draft was so drawn.

Further, the committee of seven took over the work which had been looked after by the central office in Switzerland, and at the same time continued the relations among the national bodies, through the establishment of temporary offices in London and Switzerland, for the purpose of studying technical subjects. In October, 1927, the committee requested the national bodies to give their approval to the establishment of the International Standards Association. Due to failure of certain countries to give their approval at the time the plan fell through, but the study of technical subjects was continued at the office in Switzerland.

Interest in association.

In appreciation of the benefits derived through the exchange of materials and views in the past, and trusting that not only international standardization itself, but the accompanying exchange of information would be helpful to the growth of industries of the countries concerned, the Japanese Engineering Standards Committee welcomed the opportunity of establishing the association. As many as 15 countries, including France, Germany, Italy, Switzerland, Sweden, Russia, etc. (exclusive of Great Britain, the United States, Australia, and Canada), having expressed their desire for the establishment of the association, the meeting of the committee of seven, held at Prague in October, 1928, voted to establish the association.

The Japanese Engineering Standards Committee formally joined the association in June, 1929, after completing the necessary procedure, thereby participating in the exchange of materials and in the study of international standardization.

SIMPLIFICATION THE KEYNOTE IN PRODUCTION MANAGEMENT

Present High State of Efficiency Has Been Based on a Gradual Growth in Operations, with the Application of Common Sense in Connection with Higher Standards of Accuracy

To the question, "What lies over the production horizon?" E. K. Wennerlund, director, factory engineering section, works managers committee, of the General Motors Corporation, in a recent issue of *Automotive Industries*, states that the best answer is probably found in a study of the past and the present. "We haven't reached our present high state of production efficiency as the result of sudden leaps or specific steps," says the writer. "It has been a gradual growth based chiefly on the application of common sense, simplification, and higher standards of accuracy. In addition, we have had many mechanical developments, and we will have more in the future, some of which we can not even foresee at present, new tools and processes, new materials which will cut costs and give us better products—in short a continuation of production progress which has been going on for years.

Intangible factors.

"Much of an intangible nature is now being done to increase our production efficiency. Simplification is the keynote to-day. In the early days of industrial development, production was more or less haphazard. The system became the byword, but the swing of the pendulum carried many organizations too far in that direction. System became a fetish in many cases, which resulted in losing sight of the main purpose in the detail systematization itself. When applied to larger organizations, it just got so big that it was beyond handling. "The relatively high cost of handling a wage-in-

"The relatively high cost of handling a wage-incentive system on an individual basis led us to develop and adopt quite generally the group plan of wage payment. It was found that some of our plants had as many as 25,000 job tickets a day, all of which had to be extended, audited, and credited to individual accounts. Under the group plan we have been able to do away with job tickets, using only the in-andout clock cards and giving credit for finished good product. This has been a great saving in clerical detail in our factories, it has cut inventories of workin-process, and has on the whole stimulated production efficiency.

"It is now realized that system has its place only where it simplifies production routine. As a result, the systematizer-for-the-sake-of-system has been replaced by the practical man who applies system as a method of simplifying production control.

Materials control good example.

"Materials control is a good example. Here there was a tendency in the past to systematize down to the last detail. Nowadays we use less system and greater accuracy in scheduling and adherence to schedules. We finish our final designs of new models well in advance of production. That enables us to work out our material requirements. When we go into production, management sets definite schedules and tries to adhere to them. Engineering design is changed only reluctantly thereafter and only when absolutely necessary.

"Proper inventory control, incidentally, is a production cost factor which a surprising number of companies have not given the attention which it merits, in spite of the fact that it sometimes may mean the difference between profit and loss. Just recently an old-established automobile company was carrying an inventory of roughly \$4,000,000. One of our men got a job with them on the promise that he would cut their inventory in half. He did even better than that and this company is saving \$120,000 a year in interest alone, with interest at 6 per cent.

Overhead costs.

"Relative costs also underlie equipment of factories for day and night shifts. We might provide sufficient production capacity in machine tools to make a night shift unnecessary. But if we do this our overhead goes up not only in actual investment dollars, but also in percentage of overhead per unit manufactured. Unless a machine tool is kept busy money is being wasted.

"Machine tool manufacturers have further assisted us in reducing our equipment cost by commercializing special-purpose tools, with the consequence that individual special-design tools are much less frequently used. Some of our largest automobile manufacturers use very few specially designed machines. Of corrse, in organizations manufacturing a highly specialized product, special-design tools are being used and probably will continue to be used, chiefly because machinetool manufacturers do not find it profitable to develop commercially tools for this character of work, considering the limited market possibilities. Even in the specialized-parts business, however, we find a gradual tendency away from the special-design tool and toward the commercial, with its greater flexibility and lower investment cost.

Budget necessities.

"In buying our productive materials, it has long been customary to buy on specification; but even here, the search for greater accuracy has led us to change our bases for specifications and acceptance. Every shipment of material is subjected to inspection, and often to chemical and tensile tests. We are devising tests and inspection methods, generally, that will have more direct bearing both on the process to which the material is to be subjected and on the final result desired. In this connection, machinability measuring devises simple in character and operation are possibly an interesting development for the near future.

"As far as factory supplies and perishable tools are concerned, we are just awakening to the necessity of "budgeting." Waste elimination campaigns have been run, and they serve their purpose in that they show what can be accomplished. But they are not sufficient. We must sit on the lid, and that requires organized effort. There are many manufacturers who have no idea of how much money they are spending on this end of the business, much less how much they could save by proper control. Hand in hand with this goes buying on specification and in accordance with production volume.

Foremen training.

"Coming now to the workingman, our chief problem, of course, is labor stabilization. Stabilizing production, as desirable as it may be, is not the complete economic solution with the present set-up. That involves tying up much money in merchandise inventory during slack sales seasons, especially where the product is bulky and costly and requires considerable stor-

STANDARDIZATION IN AUSTRALIA

Consumer Participation on Technical Committees Engaged in Developing Standards Found of Great Practical Value

The Australian press has lately been carrying news of a heated controversy between those opposed to standardization and those favoring it. In answer to an invitation received by the Richmond City Council to join the Commonwealth Engineering Standards Association, the council's engineer reported adversely, stating (according to press reports) that in his opinion standardization was against the interests of progress and hindered the display of initiative.

He advised the council to have nothing to do with the movement. The standard specification for concrete prepared by the association was one of the worst that he had seen.

In reply, it was pointed out that the aim of standardization in Australia is the greatest good for the greatest number, by seeking to "exclude initiative of the wrong sort only, the sort that provides us with bolts and nuts that are not interchangeable; with wall plugs that do not fit their sockets; with broken railway gages (railway gages in Australia are not uni-form and changes of cars have to be made by passengers traveling between various points) and varying sizes of steel rails. On the other hand, no single factor has been of greater importance than standardization in cheapening production and improving quality; without standardization, millions of people would be unable to enjoy the benefits of invention and of scientific research into such matters as telephones, . wireless, and motor cars.

It is pointed out in the official reply to the Richmond Council's declination, that Australian standardization committees are comprised of all interests concerned in the particular equipment or material under consideration, with the important proviso that consuming interests shall predominate and that before any specification is promulgated, ample opportunity shall be given to all interests affected to offer comment upon it.

The Australian's practice of providing for a predominance of consuming interests in technical committees seems to have furnished the best possible reply

age space. Aside from this there is the influence of model changes necessitated by competitive conditions of style trends.

"The workingman is given more consideration today than ever in the past. In progressive plants the curtailing of working hours in off seasons is preferred as an alternative to the complete laying off of many men, and full-time operation for the rest. We have gone to the expense of building up highly trained personnel departments to properly select our employees, and we use every reasonable means to keep them steadily in our service. No foreman is allowed to discharge an employee without investigation.

"Giving workers the opportunity to invest in the company by which they are employed, and the company itself adding to that investment, is a further aid to labor stabilization."

to the implication that interested parties have undue influence in the standardization work. (A. S. A. Bulletin.)

SAFETY IN COAL MINE TRANSPORTATION

Joint Committee Engaged in Developing Safety Code for Coal Mine Transportation; Sponsored by American Mining Congress; Scope of Code Outlined

A joint committee has been engaged during the past several years in the development of a standard safety code for coal-mine transportation, which is now nearing completion, according to an announcement of the American Mining Congress. The committee is composed of the American Association for Labor Legislation, the American Institute of Mining and Metallurgical Engineers, Coal Mining Institute of America, National Coal Association, National Electrical Manufacturers Association, National Safety Council, Rocky Mountain Coal Mining Institute, United States Bureau of Mines, United States Department of Labor, and the American Mining Congress, the latter organization serving as sponsor under the American Standards Association procedure.

The scope of this code covers safety requirements for the installation and operation of transportation equipment in and about coal mines. It is proposed to suggest and recommend safe methods of transportation for the coal mines of the United States.

Outline of code

Part I, "Installation," deals with tracks, clearances,

signals, doors, slope hoists, shaft hoists, and cars. Part II, "Operation" contains requirements on gathering for trips, main haulage, slope haulage, shaft, including standard signal system, locomotives, requirements for man trips, requirements for hauling explosives and inspection. In each case, such as track specifications, wire rope specifications and electrical installations, suitable cross references are given to existing national standards sponsored by the American Mining Congress, and approved by the American Standards Association.

The American Mining Congress points out that the general adoption of these uniform safety precautions will result in widespread accident reduction.

GERMAN MINING STANDARDIZATION

Establishment of Standards for the Industry of Paramount Consideration the World Over

In view of the widespread effort being made by the American Mining Congress, largely under A. S. A. auspices, to establish standards for the coal-mining industry, there is special interest in a review of standardization in the German mining industries, presented by F. W. Wedding in a lecture before one of the German technical mining conferences. The lecture was reported in the "Colliery Guardian," of London, England. The report states, according to the A. S. A. Bulletin:

For mines standards there is a special standards committee for the mining industry, affiliated to the German Industrial Standards Committee, and having representatives from the industry, the manufacturers, and the official side. The Mining Industry Standards Committee again has special subcommittees for dealing with standardization in the several branches of mining—bituminous coal, lignite, metalliferous mining, etc.—and for various classes of machinery and supplies. Meetings are held regularly at which the various data and suggestions are discussed, after which draft standard specifications are issued for discussion and approval by the several parties concerned.

Only after full discussion are the draft standards approved by the Mines Standards Committee and submitted to the Industrial Standards Committee for final approval and issue. In this way various standard specifications have already been issued and others will follow at regular intervals as completed.

Utility of standards.

The author gives some examples to show the utility of standards for mine work. To take one case, the standardization of picks for pneumatic ripping machines; considerable difficulty was experienced at first, owing to many manufacturers having their own standards as regards dimensions and shapes. By adopting the standardized pick, the number of types will be reduced from 62 to 3. Similarly, there were formerly 19 different types of suspended conveyor sections, 50 shapes of fixed conveyors, and 34 of roller conveyors. Standardization has enabled these numbers to be reduced to 1, 2, and 4, respectively. The number of mine-rail sections has

CHEMICALLY TREATED TIMBER IN DEMAND

Railroads Save \$145,000 Daily Through Use of Chemically Treated Timber

"A saving of \$145,000 a day accrues to the railroads of the country through the present practice of using chemically treated timber for crossties and other purposes," said C. C. Cook, maintenance engineer of the Baltimore & Ohio Railroad, at a conference of the public-utility group of the National Association of Purchasing Agents, which was held at the National Bureau of Standards on January 23.

He addressed the meeting as a member of the National Committee on Wood Utilization of the Department of Commerce, which committee advocates the use of preserved lumber as a part of its program to further the intelligent use of wood.

"Since 1909," he said, "the consumption of treated wood in this country has increased from 75,000,000 to 336,000,000 cubic feet. The railroads consume threefourths of this quantity at the present time, largely for crossties. It has been found that the life of likewise been reduced to 8 standard sections, which, it is claimed, will meet all requirements. Before standardization was adopted, there were 155 types of pit tubs, and these have now been reduced to 3 standard types, which means that manufacturers will be relieved of the necessity of keeping enormous stocks of spares which were formerly necessary for efficient repair service.

Standardization is not being carried through without opposition, this coming mostly from the works and purchase departments of colliery concerns. The purchase departments have their suppliers to which they go, irrespective of whether they supply standardized equipment. In many cases the colliery loses a good deal of money simply because the nonstandardized supplies to which they have been accustomed are dearer than the similar standardized articles.

The works department of a colliery do not always realize that, even though a standardized article should sometimes be more expensive in first cost, it is cheaper in the long run because it is cheaper to run and maintain. The author gives an instance of a large colliery concern in the Ruhr district. Due to the adoption of standardized articles used in large numbers, viz, hammer drill and coal cutter air cocks, rapidsealing valves, rubber hose and picks, this concern has saved £2,700 (\$13,500) in one year, due to the cheaper purchase price of the standardized supplies, approximately 2d. (4 cents) per ton of coal brought out. Added to this is the considerable saving effected, due to the reduction of stocks and the simplification and cheapening of operation.

Purchase price of standardized articles in millions.

The purchase price of the articles which are already standardized, or which are now being standardized, amounted to more than five and one-half million pounds sterling for the whole of the collieries in the Ruhr 12 months ago, when the effects of rationalization were first beginning to be felt.

If it is possible to cut down this sum by half, due to the reduction of the stocks necessary (and the author thinks it can be done), it will mean that the industry will save 6d. (12 cents) per ton of coal brought out. Reduced purchase prices and savings due to simplification of operations would effect a similar saving, so that an average saving of 1s. 2d. (28 cents) per ton of coal mining would be possible with very little expenditure for the necessary changeover.

chemically treated ties is frequently treble that of untreated ties." He predicted that as a result of continued improvement in wood-preservation methods, the average life of ties will soon be more than 20 years. When this is true the railroads will save \$287,000 a day by using treated stock, as compared to the present saving of \$145,000.

"Another important outlet for treated lumber," he further stated, " is for telephone, telegraph, and power poles. This field is steadily expanding. Through the efforts of the National Committee on Wood Utilization the average consumer who uses lumber in small quantity is now able to secure treated stock from retail lumber yards. In cooperation with the American Wood Preservers' Association, the National Lumber Manufacturers' Association, and the Ohio Association of Retail Lumber Dealers, the National Committee on Wood Utilization has arranged for the retail distribution of treated lumber in the State of Ohio. "The use of treated lumber is economical in two

"The use of treated lumber is economical in two ways; in the first place, treating wood extends its life; in the second place, its use lowers replacement and upkeep costs materially."

RADIO SIGNAL TRANSMISSIONS OF STANDARD FREQUENCY

Bureau of Standards Announces New Schedule For January to June

The Bureau of Standards announces a new schedule of radio signals of standard frequencies for use by the public in calibrating frequency standards and transmitting and receiving apparatus. The signals are transmitted from the bureau's station WWV. Washington, D. C. They can be heard and utilized by stations equipped for continuous-wave reception at distances up to about 1,000 miles from Washington. The transmissions are by continuous-wave radiotelegraphy. A complete frequency transmission includes a "general call," "standard frequency signal," and "announcements." The general call is given at the beginning of each 12-minute period and continues for about 2 minutes. This includes a statement of the frequency. The standard frequency signal is a series of very long dashes with the call letter (WWV) interventing; this signal continues for about 4 minutes. The announcements follow on the same frequency as the "standard frequency signal" just transmitted, and contain a statement of the frequency. An announcement of the next frequency to be transmitted is then

FLEXIBLE CORD STANDARD RAISED

Industry's New Standard Will Mean Increased Safety in Use of Electrical Appliances

Increased safety and serviceability of flexible cord, a common adjunct to many household electrical appliances, is expected to follow the establishment of a higher standard for flexible cord, by the National Electrical Manufacturers Association, is the opinion expressed by the A.S.A. Bulletin. The standard, which is also approved by the Underwriters' Laboratories, became effective January 1, 1930, and no cord not complying with the standard will bear the label of the Underwriters' Laboratories.

Although flexible cord has been synonymous with the industry's worst substandard problem for a number of years, it was, curiously enough, completely standard when first produced. The factors which led to the gradual decline in quality and price shaving, largely through the cheapening or deletion of braids, are well known to the industry. After lengthy debate, manufacturers of flexible cord, in conference with representatives of the Underwriters' Laboratories, formulated a new standard with particular reference to marked improvements in braids.

The problem now becomes one of effective advertising, publicity, and distribution. It was never essentially one of manufacturing. Viewed from the standpoint of the purchaser, all cords looked pretty much the same in the past. With the new standard in effect, however, the closeness of braiding will so improve the external physical appearance of the cord that the uninitiated will have a far better opportunity of distinguishing as between standard and substandard cords. given. There is then a 4-minute interval while the transmitting set is adjusted for the next frequency.

Information on how to receive and utilize the signals is given in Bureau of Standards Letter Circular No. 171, which may be obtained by applying to the Bureau of Standards, Washington, D. C. Even though only a few frequencies are received (or even only a single one), persons can obtain as complete a frequency meter calibration as desired by the method of generator harmonics, information on which is given in the letter circular. The schedule of standard frequency signals is as follows:

Eastern standard time	Jan. 20	Feb. 20	Mar. 20	Apr. 21	May 20	June 20
10 p. m	1, 600	4,000	550	1, 600	4,000	550
10.12 p. m	1, 800	4,400	600	1, 800	4,400	600
10.24 p. m	2, 000	4,800	700	2, 000	4,800	700
10.36 p. m	2, 400	5,200	800	2, 400	5,200	800
10.48 p. m	2, 800	5, 800	1,000	2, 800	5, 800	1,000
11 p. m	3, 200	6, 400	1,200	3, 200	6, 400	1,200
11.12 p. m	3, 600	7, 000	1,400	3, 600	7, 000	1,400
11.24 p. m	4, 000	7, 600	1,500	4, 000	7, 600	1,500

1929 FRUITFUL YEAR FOR AMERICAN SOCIETY FOR TESTING MATERIALS

Bulletin of Society Reviews Progress of Past Year

The year 1929 was in many ways an eventful one for the American Society for Testing Materials, and substantial progress was made in the promotion of knowledge of materials of engineering and the standardization of specifications and methods of testing, the fundamental purposes for which the society is organized, states the A.S.T.M. Bulletin for January.

In its work of standardizing specifications and methods of text, considerable progress was made through the activities of the standing committees. Under the appropriate topics are listed the several actions taken in respect to standards, which in all represent the acceptance of 20 new tentative standards, the formal adoption as standard of 32 tentative standards, and the revision of 19 existing standards. The society now has 390 standards and 173 tentative standards.

EFFECT OF LIGHT ON SILVER CHLORIDE

In practically all analytical procedures that deal with the precipitation of silver chloride the analyst is cautioned against exposing the precipitate to light, although no information is given as to the magnitude of the errors caused by the neglect of such precaution. These errors have been determined by the Bureau of Standards, and it is interesting to record that the precaution is necessary in all accurate work, that the error is positive in precipitations of silver, and that dry silver chloride undergoes practically no change. This subject is treated in the January number of the BUREAU OF STANDARDS JOURNAL OF RESEARCH.

STANDARD OF MINIMUM REQUIREMENTS FOR AIR PASSENGER TRANSPOR-TATION BEING PREPARED

Aeronautics Branch, Department of Commerce, is Taking Action Looking to Present and Future Needs

By CLARENCE M. YOUNG, Assistant Secretary of Commerce for Aeronautics

A standard of minimum requirements, drawn up to provide for the present increased growth and expansion of passenger air transportation and applicable to operators carrying passengers for hire on scheduled services over fixed routes, will be placed in effect as soon as conditions will permit.

The requirements are being prepared with the cooperation of the air transport organizations, and will include complete radio equipment to insure 2-way communication between aircraft in flight and stations on the ground and adequate ground organizations and facilities for the proper handling, maintenance, and operation of the aircraft.

This contemplated action by the Department of Commerce is another step in the orderly progress and development of air transportation and air commerce.

Two objectives stated.

Under the provisions of the air commerce act of 1926, the Aeronautics Branch of the department has established two fundamental requirements to insure the maximum degree of safety and reliability in air transportation. They are: First, airworthy aircraft operated and maintained by competent airmen. Second, development of airways equipped with aids to air navigation for both day and night operations, including boundary-lighted intermediate fields, beacon lights, weather service, frequent radio broadcasts of complete weather information; 2-way radio communication with planes in flight and radio range beacons for guiding aircraft through fog, storm, or other conditions of poor visibility.

Third requirement added.

To these two requirements there now is added a third which, in addition to licensed aircraft and airmen, requires a full utilization of the air navigation facilities, and specifies that all aircraft engaged in the transportation of passengers for hire on scheduled interstate service shall be operated over fixed routes provided with these aids to air navigation and that the aircraft engaged in such operations shall be equipped to take full advantage of these aids.

Experience has shown us that our objectives can best be accomplished through the promulgation of suitable regulations, which, through their flexibility, may be readily kept abreast with the rapid progress of aeronautics, rather than by legislation which requires action by Congress to meet conditions as they arise.

Representatives of a majority of the air transport operators have held conferences at the Department of Commerce on the details necessary to carry out the objects in mind.

Needs are outlined.

In general, the requirements for the further development of air transportation and air commerce, to be applicable to those organizations carrying passengers for hire over scheduled, fixed routes, are: 2-way radio facilities aboard the planes for reception of frequent broadcasts of weather information, emergency messages, the transmission of inquiries to ground organizations for the proper guidance of the plane, and also for reception of signals from available radio range beacons, which are designed to keep the plane on its course at all times.

The routes over which such operations are conducted shall be provided with adequate airports and suitable intermediate landing facilities properly equipped for use in case the flight is interrupted; also proper communication and weather-reporting service, so that the operating units will be able to keep in touch with their planes by radio at all times, by sending and receiving messages of importance to the safe completion of the flight.

Adequate night-flying facilities for air passenger operations after dark, which will include airways lighted with beacon lights and properly lighted airports and intermediate fields and also the equipment of the planes themselves with navigation lights and suitable lights for landing after dark.

Greater safety predicted.

Greater safety and reliability, increased use of air transportation by the public and further development of air commerce and the aircraft industry undoubtedly will result from strict adherence to these requirements, I firmly believe.

The Department of Commerce has made much progress in the matter of equipping airways with aids to navigation. It has provided beacon lights, has established lighted intermediate landing fields, is issuing carefully prepared airway maps for the guidance of flyers, has provided the radio range beacons and facilities for radio communication between the ground and planes in flight, and has provided for the broadcast of weather information to planes at frequent intervals.

The department's efforts in this respect are almost without end. As fast as authorization and appropriations are available, new projects of this nature are undertaken, and the department is speeding this work to the utmost of its ability.

Must await equipment.

In the interest of public safety and the development of air transportation and air commerce, transport organizations under the regulations to be established will be required to have the prescribed facilities available before undertaking operations. If the Government has been unable to provide the facilities, such as lighted airways, radiocommunication, radiobeacons, and weather reports, then the organization itself must take the necessary steps or await the Government's ability to provide them in the ordinary course of its airway development program.

This develops a situation which is not unlike a newly projected railway system. The trains can not operate until the right of way has been established.

RADIO OSCILLATOR TEST APPARATUS

System Provides Improved Accuracy, Availability of Calibration Points, and Flexibility

Piezo oscillators are the most satisfactory frequency standards yet devised for use in radio broadcasting stations. A piezo oscillator may be used either to check or to control the frequency of a radio station. Most of the piezo oscillators tested by the Bureau of Standards are used to check the frequency of a station, because there is considerable difficulty in submitting a complete piezo oscillator intended to control the station frequency. A description of the apparatus and methods used at the bureau in testing piezo oscillators is contained in the BUREAU OF STAND-ARDS JOURNAL OF RESEARCH for January.

A piezo oscillator is a generator of radio-frequency current, the frequency of which is determined primarily by the dimensions of the quartz plate used. If another radio-frequency generator is operated at approximately the same frequency, a beat note will be produced, the frequency of which can be measured with considerable precision. The measurement of the frequency of a piezo oscillator can, therefore, be made with high precision, although the device may not maintain its frequency as accurately as may be desired.

Measures frequency.

The complete piezo oscillator must be submitted for test. Preliminary tests are first made to determine that the quartz plate operates readily and does not have one or more extra frequencies near the desired frequency. The piezo oscillator is then kept in a constant-temperature room for at least two days, during which the frequency is measured.

The method of measurement may be briefly stated as follows: All measurements on piezo oscillators for broadcasting stations are made by reference to a 200 kc temperature-controlled piezo oscillator. In ac-

COOPERATION OF TRADE ASSOCIATIONS

Associations Interested in Simplification and Standardization, Reports Writer in Mid-West Purchaser

"Trade associations are going far in the direction of bringing about simplification and standardization in industry," states J. R. Kraus, vice president, the Union Trust Co., Cleveland, Ohio, in his article, "Modern Business in Evolution," which appeared in the Mid-West Purchaser. He further observes that "they are also doing much to abolish trade abuses and unethical practices in general. The spirit of cooperation fostered by trade associations gives to smaller business enterprises many of the advantages that are characteristic of larger organizations. In short, trade associations are typical of the business spirit of the age, and the business that is keeping abreast of the times will do well to keep in touch with them. Research, mass production, and commensurate financial requirements are accelerating the trend toward mergers."

In a discussion on "The Automobile and The Buyer," which appeared in the same issue of the magcomplishing this result, harmonics of a 10 kc generator accurately adjusted in terms of the standard, are used in the setting of another radio-frequency generator to the frequency assigned to the station submitting the piezo oscillator for test.

Telephone receivers used.

Special indicating circuits are employed to make the required settings of the apparatus. After these settings are made, a beat note usually is heard in the telephone receivers connected to the test piezo oscillator. The frequency of the beat note is matched by comparison with a similar note produced by a calibrated audio-frequency generator. The frequency of the audio generator represents the correction to be applied to the piezo oscillator under test. At the same time that this measurement is made a check measurement is made on the radio-frequency generator using a frequency meter.

The radio-frequency generator is next readjusted to zero beat with the test piezo oscillator, and another reading taken with the frequency meter. The difference between the two readings of the frequency meter should give the same frequency as the audio generator. Under certain conditions one of the radio-frequency generators is set 400 cycles off of the required harmonic by matching the beat note with the note produced by a tuning fork.

While the method and apparatus were developed chiefly for piezo oscillator testing, they have also proven to be useful in frequency meter calibration and station frequency measurement. The system has the following advantages: Great accuracy, high precision, usefulness of a given frequency standard over a wide range, large number of calibration points available, flexibility of system, and ready operation.

azine, Roger W. Babson, said that "the desire for even greater standardization and increased efficiency in production and distribution will also precipitate mergers."

GAS ANALYSIS TECHNIQUE IMPROVED

Automatic Pressure-Control Device Constructed For Gas Analysis

The technique of gas analysis has been improved by a stopcock which was designed at the Bureau of Standards for controlling pressure balance. The control permits pressure balance to be obtained easily, quickly, and with high accuracy. Diffusion errors are eliminated without danger of emptying the manometer. The accidental surge of pipette reagents into the train is prevented. Difficult combustions of heavy hydrocarbons may be made without the deposition of carbon. The technique of operation and actual means of construction of the stopcock is described in the January number of the BUREAU OF STANDARDS JOUR-NAL OF RESEARCH.

NEW REQUIREMENTS FOR WEIGHING DEVICES FOR CONCRETE AGGREGATES

American Road Builders' Association Writes Detailed Specifications for Bins, Hoppers, and Scales in Which All Concrete Materials are to be Weighed

By Lyle A. Brookover

Rigid requirements for the standardization of weighing devices for concrete aggregates are set up in a report of the year's work of a committee of the American Road Builders' Association, which was presented at the annual convention in Atlantic City in January. The committee was headed by P. M. Tebbs, of the Pennsylvania State Highway Department.

The report contains detailed specifications for the equipment, and states that the weighing devices include the bin or storage reservoir, together with its supporting framework, from which the aggregate is drawn into the weighing hopper; the hopper or container, holding the portion of the aggregate being weighed, including discharge levers gates and counterweights; and the scales, which is the balance or weighing mechanism.

Definition of weighing equipment.

The report states that weighing equipment shall be approved by the engineer. It requires that the bin shall be of suitable size and shape, and reasonably tight to hold the aggregates without leakage, and shall be supported by a rigid framework which, when set upon a suitable foundation, will hold the bin safely in correct position. The whole must be designed and constructed for easy assembling, disassembling, and moving.

The hopper also shall be of suitable size and shape, reasonably tight, and supported entirely upon the scales, but otherwise hanging free. It shall be equipped with a discharge gate which shall close so that there will be no loss of aggregate. A means of removing an overload of aggregate from the hopper shall be provided. The hopper shall be so designed and constructed as to eliminate the rentention of varying tare materials on any of its parts. It shall be so operated that it will be fully and quickly discharged

CHROMIUM PLATING RESEARCH

Poor "Throwing" Power in Chromium Plating Solutions Partially Offset by Suitable Arrangement of Articles in Plating Tanks

During recent years chromium plating has come into extensive use, notably on automobile and plumbing fixtures. In this process it is difficult to deposit chromium in the recesses or remote parts of irregularly shaped articles. In the language of the platers, the solution has poor throwing power. It is important to define and employ those conditions of operation which will yield the most uniformly distributed deposits. The American Electroplaters' Society has, therefore, supported a research along these lines at the Bureau of Standards.

The results of extensive studies show that any revolutionary improvements in throwing power are improbable. It will, therefore, still be necessary for the without shaking and jarring the scales. When more than one aggregate is to be weighed in the same hopper, each aggregate shall be in a separate compartment. The compartments shall be so arranged that each aggregate can be discharged separately and an overload in either compartment removed.

Type of scales.

The scales shall be either beam or springless dial type, made by an established manufacturer. They shall be capable of supporting the hopper or hoppers, and shall be of simple rugged design requiring but a minimum number of adjustments consistent with accuracy.

The report sets forth in full detail the requirements for scale levers, pivots, leveling lugs, and connections; for scales equipment designed to provide a separate scales for each kind of materials weighed; for scales equipment designed to weigh more than one kind of material on a single scale; and for full-capacity weight beams, multiple-weight beams, poises, graduated dials, "telltale" dials, and other equipment.

The arrangement of the bin scales, mechanism for operating gates or valves, and the operator's platform shall be such that the operator may stand in a comfortable position beside the weighing hopper, with the weight beam or dial in full view as he operates the gates or valves that control the flow of material into the weighing hopper. All working parts of scales, particularly knife-edges, shall be so protected as to prevent any material, excepting wind-borne material, from falling upon or against them.

With each scale there shall be furnished full and complete instructions for setting up and adjusting. These instructions shall be attached to some part of the equipment.

platers to exercise their ingenuity to so arrange the articles in the tank as to get the current density as nearly uniform as possible.

Better throwing power.

By the use of relatively dilute solutions of chromic acid, with a low sulphate content and at a fairly high temperature and current density, better throwing power is obtained than under the reverse conditions. When, however, as is generally true in plating plants, the available voltage is less than 6, lower temperatures and current densities must be used.

Chromium plating is entirely practicable, as shown by its present extensive use. This study shows that it will continue to require more care and ingenuity of the platers to produce complete covering with bright chromium deposits than does plating with nickel or other metals.

This subject is fully discussed in the January number of the BUREAU OF STANDARDS JOURNAL OF RESEARCH.

STANDARD CAN SIZES ARE PROPOSED BY PACKING INDUSTRY

Industry Recommends Reduction From 64 Varieties to 27 in Types of Cans for Fruits and Vegetables

Recommending that 27 sizes of cans be substituted for 64 that have been used for the packing of fruits and vegetables, the division of simplified practice announces the results of a survey it undertook at the request of the National Canners' Association. The smaller number recommended should answer all normal requirements.

In April, 1928, the National Canners' Association requested the division of simplified practice to make a survey of the canning industry with a view to ascertaining the diversity existing in sizes of packers' cans. It was felt by that organization that there was a needless waste being created by the use of too wide a range of sizes and that a study of actual operating conditions might bring to light data which would be helpful in deciding which cans should be used.

Canners circularized.

Accordingly, the Department of Commerce circularized some 2,800 canners throughout the country, requesting information on the various sizes of cans which they used in packing their products. About 500 replies were received containing sufficient information to indicate that there were being used an enormous number of sizes, some differing only thirtyseconds of an inch. While this information indicated a wasteful condition, it was not sufficient upon which to base any definite recommendation. It was felt that further data should be obtained from the large can companies.

A representative of the Department of Commerce conferred in Chicago with officials of the American and Continental Can Cos. and submitted a report of the survey which had been completed. It was felt by these officials that many of the differences shown in the canners' replies were due to inadequate facilities for accurately measuring the cans, and that while a diversification certainly existed that it was not quite as bad as the figures which had been collected would indicate.

The report was then redrafted, and many of the cans which varied by small fractions of an inch were grouped together under classifications which seemed logical. When this work had been completed it was found that there were 64 different sizes of cans being used for the packing of fruits and vegetables.

Many sizes eliminated.

The can companies were then requested to supply figures on the production of these sizes of the cans for the years 1927 and 1928, in order that a fairly accurate idea might be obtained as to the volume of business enjoyed by each individual size. This data when compiled indicated very clearly that certain sizes which enjoyed a very small percentage of the total might easily be eliminated without working hardship on anyone and with considerable benefit to the great majority of concerns in the food industry, for wholesalers, retailers, and chain stores, as well as for canners and manufacturers of cans.

Out of the 64 sizes it would seem that 27 would readily supply the requirements of the large bulk of the demand. In reaching this conclusion due consideration was given to the particular use for which each can was intended. In practically every case the cans eliminated enjoyed less than one-tenth of 1 per cent of the total annual business represented in the canning of fruits and vegetables.

By this method the following list of sizes to be considered as standard for the country for the packing of fruit and vegetables was arrived at: 202 by 214, 5ounce tomato paste; 202 by 308, 6-ounce tomato paste, southern 4-ounce nickel milk; 208 by 211, 8-ounce bean, 8 E, baby milk; 211 by 300, special sauce (coast) regular tamale; 211 by 304, No. 55, 8-ounce sauce; 211 by 400, No. 1 standard eastern oyster; southern 8-ounce, picnic; 211 by 408, special olive; 211 by 600, pint olive; 300 by 308 by 308, No. 1 tip asparagus (square); 300 by 308 by 604. No. 2½ asparagus (square); 300 by 407, 16-ounce bean, dog chow; 300 by 409, 20-ounce tall milk; 301 by 208, 8-ounce pimento; 301 by 400, No. 1 tall (Hawaiian), No. 1 Honolulu tall; 301 by 411, No. 1 tall, No. 1 coast, 1-pound salmon; 303 by 406 by 303 can, 18-ounce bean, medium soup; 307 by 204, No. 1 squat (Hawaiian); 307 by 302, No. 93, 3¹/₈-inch No. 2; 307 by 400, No. 95, 18-ounce bean, No. 2 squat (or short); 307 by 408, No. 2 standard (coast); 307 by 409, No. 2 standard (east); 401 by 205, No. 1 flat (coast); 401 by 206, No. 1 tuna, No. 1 flat (Cali-fornia); 401 by 411, No. 21/2 standard; 404 by 414, No. 3 standard; 603 by 700, No. 10 standard; 603 by 812, full gallon, No. 12 pickle.

The Louisville grocery survey, conducted by an entirely separate branch of the Department of Commerce, indicated that in 16 stores of all sizes surveyed in that city, between 90 and 95 per cent of the total business done in canned fruit and vegetable was covered by about five of the sizes in our standard list. While it might be pointed out by some that Louisville is not representative of all sections of the country, it is true that all types of stores from very small corner groceries to large retail houses were covered, and while the five sizes most popular there might not be those which would answer for the same percentage of demand all over the country, the list of 27 sizes should certainly answer all normal requirements. From the figures obtained from the can companies, it looked as though the 27 sizes retained would supply 95 per cent of the demand.

Inventories reduced.

The result of the use of this standard list of sizes by wholesalers, retailers, and chain stores will materially reduce their inventory and release capital tied up in slow-moving stock. It should make for The success of any cooperative movement such as this is entirely dependent on the whole-hearted support of all of the elements of the industry and it is sincerely hoped that the list of sizes proposed in this

RAYON DEFICIENT AS PAPER-MAKING MATERIAL

Although Received in Increasing Quantities by Paper Mills, Experiments Indicate That It Is Detrimental to the Final Product

Rayon, unlike the cotton or wood fibers from which it is made, is not suitable for a paper-making material. Laboratory tests conducted at the Bureau of Standards show that it is not only valueless in papermaking stock but may actually be detrimental to the quality of the paper.

The rayon used in the tests was submitted to the same manufacturing processes as rags are in the production of high-grade papers. Cotton and linen rags are commonly used as the fibrous material for fine paper when strength and durability are desired and the presence of any other fiber which would adversely affect the quality of the paper is to be avoided. Since rayon has become established as a leading raw material in the textile industry, however, increasing amounts are being found in the rag stock supplied for paper making. Data on the value of rayon when submitted to the paper-making treatment usually given such materials are therefore of interest to the ragpaper industry.

Fibers lose strength when wetted.

Owing to loss of strength when wetted, the rayon filaments tended to break into short lengths during the pulping operations without the fibrillation and fraying necessary for good felting in the formation of the sheet. As a consequence the sheets from rayon lacked the strength to withstand the handling required in the subsequent pressing and drying operations, and the pliability character of rag papers. This investigation will be fully described in the February number of the BUREAU OF STANDARDS JOURNAL OF RESEARCH.

SMALL-DIMENSION LUMBER BULLETIN AVAILABLE

National Committee on Wood Utilization Issues Data on Small-Dimension Stock, its Seasoning, Handling, and Manufacture

The development of the use of small-dimension stock—the lumber of the future—cut to sizes suitable for the manufacture of chairs, furniture, automobiles, sporting goods, agricultural implements, toys, musical instruments, and numerous other articles is the result of actual savings in dollars and cents to users of such stock.

The National Committee on Wood Utilization, of the Department of Commerce, has just released a bulletin, Small-Dimension Stock, Its Seasoning, Hanreport will be accepted for use by the canning and affiliated industries and that the economies which seem apparent in the program will be realized. The division of simplified practice offers its services in promulgating this recommendation as a national standard, should it meet with the approval of the affected industries.

dling, and Manufacture, which summarizes the best practices of 70 of the largest small-dimension plants in the country.

ANNUAL CONTRIBUTION TO BRITISH EN-GINEERING STANDARDS ASSOCIATION IN-CREASED

British Government Increases Grant from \$511 to a Maximum of \$24,333 Per Annum, Resulting from Recommendation in Final Report of Balfour Committee on Industry and Trade

The British Government has decided to increase its grant to the British Engineering Standards Association from \$511 to a maximum of \$24,333 per annum, according to a report from American Consul Gen. John K. Davis, London, England. This increase follows on the recommendations in the final report of the Balfour Committee on Industry and Trade, issued in the early part of last year.

In that report the committee expressed its cordial appreciation of the valuable work performed by the association and its 500 committees in the interests of British trade and industry. A weak spot, in the judgment of the committee, is the excessive dependence on trade support. Though most of the work, especially the committee work, the Balfour committee observed in a statement, is unpaid, the present annual expenses of the association amount to \$102,197 a year. To this expenditure the annual contribution of the British Government is at present \$511, and contributions of \$2,433 a year are also made by the Government of India, and the Crown Agents for the Colonies. There are other receipts from fees for special work and the sale of publications, but the bulk of the income is derived from subscriptions from trade organizations.

Committee recommendations.

The committee did not wish to make any suggestion that would have the effect of diminishing the support or interest of the trades, but for the reasons given, and also with a view to developing the work. it considered that the income from independent sources ought to be very much more substantial than at present. It, therefore, recommended that the Government should make an annual contribution equal to the sum subscribed by the trades, subject to a maximum of, say, \$48,665.

The Government attaches great importance in the interests of British industry to the development of standardization, and as a condition of the grant expects the association to resume and energetically pursue the work of translating the principal British standard specifications into foreign languages.

Preliminary Survey Among Typical Stores Reported to National Retail Dry Goods Association

The nineteenth annual convention of the National Retail Dry Goods Association, which closed in New York on February 7, received a report from the division of simplified practice on the results of a preliminary survey of wrapping and packing methods and supplies used by six typical stores in the New York metropolitan area and in Boston.

This survey, which was undertaken by the Department of Commerce at the request of the association, disclored striking equation

disclosed striking opportunities to effect savings. The association has asked that the scope of the study be extended so as to include 12 cities. When completed, it will present a picture of average conditions throughout the country.

Merrill W. Osgood, operating manager, Jordan Marsh Co., one of the Boston stores already surveyed, commented on the importance of effecting savings in wrapping and packing expenses to a general session of the convention as follows:

Expense control has turned the searchlight on the items of sup-

plies. The average percentage figure for supplies in stores with net sales of more than \$1,000,000 is usually around 1.5 per cent. If you examine the Harvard Bureau of Business Research figures, you will find that stores doing a volume of more than \$1,000,000 will spend more money for supplies than they do for insurance, taxes, and delivery wages combined. In fact, only three "out-of-pocket" expense items (salaries, rent, advertising) are larger than the item of supplies.

Standardization could save 10 to 15 per cent.

It has been estimated that if the principles of scientific analysis, simplification, and standardization were applied to supplies, that the supply expense could be reduced by 10 to 15 per cent. This would mean a saving of many thousands of dollars to retail stores. For example, a store doing around \$10,000,000 would spend \$150,000, or 1.5 per cent, for supplies, which is the standard set up by the Harvard Business School. A 10 per cent saving of this would be \$15,000, or the equivalent to a \$300,000 increase in sales.

Alexander B. Galt, of the division of simplified practice, in introducing a report on the preliminary survey, said in part:

The division of simplified practice has prepared an Introduction to the Survey of Methods and Supplies for Wrapping and Packing of Department Store Merchandise. This statement covers the purpose and scope of the proposed study and some of the findings of a preliminary survey covering three stores in the New York metropolitan area and three in Boston. Copies of this statement can be secured from the division upon request. The final data will not be available until after the completion of the national survey, some months hence. A year ago the Assistant Secretary of Commerce, Doctor Klein, estimated that the annual waste in distribution amounted to about \$8,000,000,000; onetwelfth of our national income; almost \$275 for every family in the United States. This estimate includes all the so-called intangible wastes, such as useless advertising, duplicated sales effort, cross hauling of similar commodities, and movement of empty transportation equipment.

But the waste in physical distribution alone has been estimated by several competent groups at not less than \$3,000,-000,000 a year. This includes the wastes of time, labor, and material in the nulltifarious operations that take place after a product leaves the final machine or process in a factory, and before it is in the hands of the

fore it is in the hands of the final consumer ready to be used. It is often supposed that transportation cost, in the form of freight charges, represents a large factor in the cost of physical distribution, but this is far from being the case. A recent survey of distribution cost of 20 staple commodities showed that freight charges amounted to only 10 per cent of the total, whereas packing, handling, loading, unloading, rehandling, each often repeated several times, accounted for the other 90 per cent.

Work divided into three phases.

This cooperative effort undertaken by the division of simplified practice was done so at the request of



The 23 methods of taping boxes and packages as noted by the preliminary survey

the association's committee on simplification and standardization of stores supplies, and divides itself into three parts: (1) Field survey of selected stores in various cities, in which the division's representatives

mittee to disseminate its findings and recommendations.

into three parts: (1) Field survey of selected stores in various cities, in which the division's representatives | non. On the contrary, it may properly be regarded as



The diversity in bags

Of the 61 pictured, 23 are of the serrated-edge type, 21 dic-cut, 5 die-cut handle bags, 4 dic-cut clasp, 4 dic-cut string, 3 serrated-edge string bags, and 1 satchel-bottom die-cut handle bag. Of these 61 bags, 1 was common to 3 stores 3 to 4 stores, and 1 to 5 stores.

gather data on methods and supplies used in the wrapping and packing of merchandise; (2) preparing this material for study and use by the committee and merchants generally; and (3) assisting the com-

an integral part of the much larger movement now under way to secure basic data necessary for the next general advance in industrial efficiency. It is obvious that whatever may be the ultimate solution of these problems the first step must be to secure reliable statistics on existing conditions.

In reporting details of the conditions observed, George A. Cooper, of the division, said:

It is reported that in the United States there are more than 6,000 department stores, exclusive of specialty stores doing an annual volume of busness of approximately \$6,500, 000,000. All of these stores distribute annually almost 3,000,000,000 packages. It is estimated that if, as a result of this survey, it is found possible to effect a saving of 10 per

GERMAN HANDBOOK FOR DRAFTSMEN

German Standardization Body Publishes a Guide For Use of Its Standards

After the German national standardizing body had completed its standardization of technical drawings and drafting-room practice a handbook was published to serve as a guide in the use of the standard (DIN) sheets.

This book, which contains a number of reproductions of the standard sheets referred to, has now been printed in its fifth edition. Among the subjects dealt with are the following: Kinds of drawings, sizes of drawings and systems of folding; scales; layout of views and cross sections; types of lines and their thickness; method of making cross sections; designation of materials and of surface finish; diagramatic presentation of component parts, such as screws, gears, valves, switches, etc.; indication of dimensions, including tolerances; indication of fits according to the German standard system of fits; type and size of lettering on drawings, part lists; and text of stamp to be placed on drawings indicating the proprietorship of the subject matter. (A. S. A. Bulletin.)

The reader will understand that the letters DIN are the initials of the words Deutsche Industrie Normen (German Industrial Standards). Dinbuch 8, then, means "Book of German Industrial Standards No. 8."

CONSULTING EXPERT APPOINTED

Robert Spurr Weston, Sanitary Engineer, Appointed to Department of Commerce Committee on Plumbing

Upon the invitation of Secretary Lamont, Robert Spurr Weston, of Boston, Mass., has accepted membership upon the subcommittee on plumbing of the Department of Commerce Building Code Committee. Weston is a sanitary engineer and member of the firm of Weston & Sampson. He has had a long and distinguished career in his profession, and is the author of numerous articles dealing with sanitation. He is president of the New England Water Works Association and a member of the executive boards of the American Institute of Consulting Engineers and the Sanitary Engineering Division of the American Society of Civil Engineers.

The subcommittee on plumbing is composed of sanitary engineers and master plumbers who cooperate with experts of the Bureau of Standards in establishing basic plumbing principles and their application through plumbing codes. As a result of an extended cent in the present cost of wrapping and packing merchandise, the economies thus secured would amount to more than \$9,000,000 a year.

One to three stores were tentatively selected for survey in each of the following cities: Atlanta; Boston; Chicago; Dallas, Detroit; Los Angeles; Milwaukee; Minneapolis; New York; Pittsburgh; Portland, Oreg.; San Francisco; St. Louis; St. Paul; and Washington, D. C.

experimental program at the Bureau of Standards, the committee issued in 1924 a publication entitled "Recommended Minimum Requirements for Plumbing in Dwellings and Similar Buildings," which was widely accepted as the basis for establishing modern plumbing regulations. Last year it brought out a re-vised edition entitled "Recommended Minimum Requirements for Plumbing" in which recommendations covering plumbing in all types and sizes of buildings were given. At the present time the committee is interested in a proposed program of experimental work directed toward finding out more precisely what happens in the plumbing systems of high buildings. As before, the Bureau of Standards is undertaking the fundamental research work and the committee contributes its practical experience and intimate knowledge of sanitary conditions existing throughout the country.

DRAINAGE OF COAL MINES

American Mining Congress Committee Conducting First Revision of Mine Drainage Standard

Representative of 10 national associations interested in the development, a large committee is just completing the first revision of the existing mine drainage standard, reports the American Mining Congress. This revision expands and brings up to date the recommendations and specifications contained in the former code, which was formulated under the auspices of the American Standards Association. The nine parts into which the work is divided are as follows:

Field pumps, permanent pumps, piping for pumps, operations of pumps, storage of mine water, natural drainage, unwatering unabandoned workings, mine water, and its action upon mine drainage equipment and acid-resisting metals.

These recommendations, the American Mining Congress points out, are considered to be of utmost value to medium small companies not served by widely experienced drainage specialists. Of particular interest in the development of mine drainage practice and equipment to-day, are the automatic features now being perfected to such an extent that there are in use numerous important mine pump stations which have no other attendance than an inspection of an authorized person one or two times in 24 hours. Where three shifts of pumps are otherwise required, the saving in attendance labor will usually amply justify the added cost of the automatic features.

This standard points out that only motor centrifugal pumps lend themselves to full automatic operation, that they can be arranged to self-prime, start, and stop by the height of the water in the pump, and an alarm is given in case of the failure of any part to perform properly.

UNIFORMITY IS URGED TO CUT AIRPLANE COSTS

Standardized Materials and Designs Advocated for Economy in Production

When airplane manufacturers settle on certain designs there is no question but that the cost of planes will be lowered, stated the Aeronautics Division of the Department of Commerce in an oral interview with newspapermen. Another factor which will enable them to cut the price of their products will be an increased production, it was stated.

The airplane is built of specially selected materials which are carefully and painstakingly chosen, and added to that is the fact that the work of assembling the materials requires skilled manual labor and also requires careful engineering work, it was said. These things are partly responsible for the prices of airplanes. Another factor which makes the plane high priced is that much material must be rejected before the plane is put together, according to the statement of the department.

It is possible for the manufacturers to settle on a given design and, by quantity production and sales, the price can be made much lower, as is true in other industries. Quantity production would make the cost of manufacturing cheaper and would eliminate much of the expense which is incurred in manufacturing a great many designs. Competition has made it necessary for the manufacturer of airplanes to construct them of several types, and the consequence is that he has not had the opportunity to specialize on one particular type of plane and go into quantity production, the department explained.

Advancement has been rapid.

The airplane has skipped, to a certain extent, some of the phases of development which the automobile went through. The plane has begun to change designs at a comparatively early stage, while for a period the designs and models of the automobile remained substantially the same. The airplane manufacturer now has to change his models as frequently as the automobile manufacturer does, in order to stay in the competition.

By selecting a certain type, however, it is possible for the airplane manufacturer to install line-production methods and other time and money saving devices and produce the plane for less than is possible without concentrating on a certain design, it was said.

SCREW THREAD TABLES FOR SHOP USE

Pamphlet Prepared by National Screw Thread Commission Circulated Among Producers, Distributors, and Users of Standard Screw Thread Products to Determine Extent of Adoption

Purusant to a request from the National Screw Thread Commission, a pamphlet prepared by that body entitled "American National Screw Thread Tables for Shop Use. I. Standard Threads," was circulated under date of January 23 to producers, distributors, and consumers of standard screw-thread products for written acceptance, in order to determine the extent of actual adoption.

These tables cover, in a form for convenient use, the basic sizes, limiting dimensions, tolerances, and tap drill sizes for the American National coarse and fine thread series, as recommended by the National Screw Thread Commission. In the event these standard dimensions and tolerances for screw threads are adopted by a satisfactory majority of the producers, and in the absence of any active opposition, the recommendations will be established as a commercial standard for the industry. It may be of interest to note that in circulating these screw thread tables for written acceptance, the Bureau of Standards has made no attempt to either recommend or urge acceptance, the emphasis has been rather to determine the desire of the industry in general relative to the use of these standards.

SPECIAL SCREW THREADS

Pamphlet Circulated Among Interested Elements to Determine Extent of Actual Adoption

Pursuant to a request from the National Screw Thread Commission, a pamphlet prepared by that body entitled "American National Screw Thread Tables for Shop Use, Special Threads," was circulated under date of January 23 to producers, distributors, and consumers of special screw-thread products, for written acceptance, in order to determine the extent of actual adoption. These tables present in compact form the basic sizes, limiting dimensions, and tolerances for the American National 12-pitch thread series and other screw threads of special diameters, pitches, and lengths of engagement in four classes of fits.

In the event these standard dimensions and tolerances for screw threads are adopted by a satisfactory majority of producers, and in the absence of any active opposition, the recommendations will be established as a commercial standard for the industry.^{*} It may be of interest to note that in circulating these screw-thread tables for written acceptance the Bureau of Standards has made no attempt to either recommend or urge acceptance; the emphasis has been rather to determine the desire of the industry, in general, relative to the use of these standards.

FELDSPAR

General Conference Appoints Committee to Redraft Tentative Standard; Proposal Will Be Submitted to Industry for Signed Acceptance

The efforts of the feldspar grinders in their attempt to establish uniform classifications for their product, will be met with interest by all divisions of the ceramic industry. The movement has been initiated by the Feldspar Grinders' Institute, but is receiving the interest and cooperation of all producers as a basis of common understanding for the industry.

A general conference of producers, distributors, and users was held at the Bureau of Standards on January 14 to consider the classifications proposed, and while general opinion was in favor of standard classifications and tests some changes were suggested by various consumer groups. Since these recommended changes involved mature consideration and thought, a committee of the feldspar industry was appointed to incorporate the changes. The committee was authorized to prepare the specification and tests for submittal to the industry for formal approval and acceptance.

The committee which is representative of the industry is composed of the following:

Individual	Official title	Business connection	Interest represented
B. C. Burgess	Manager	Tennessee Mineral Products Co.	Feldspar grinders.
Charles E. Golding_	President	Standard Flint &	Do.
V. V. Kelsey	Sales manager	Consolidated Feld-	Do.
Jos. P. Rodgers	Secretary-treas-	Seaboard Feldspar	Do.
Arthur S. Watts	Professor ceramic	Ohio State Univer-	Ceramic schools.
P. H. Bates	Chief	Clay and silicate	Bureau of Stand-
James Hamilton	Superintendent	Trenton Potteries	Whiteware manu-
Edw. Schramm	Chemist	Onondaga Pottery	Do.
L.E.Barringer	Engineer of insu-	General Electric	Do.
F.C.Flint	Chief chemist	Hazel-Atlas Glass	Glass manufactur-
T. R. Earnill	Director, research and develop- ment.	Owens-Illinois Glass Co.	Do.
H. G. Wolfram	Director of re- search.	Porcelain Enamel & Manufactur- ing Co.	Enamel manufac- turers.

It is hoped that the classifications to be recommended will benefit the entire industry by providing a better understanding between buyer and seller. United States Standard Sieve Series will be recommended for use, and standard methods of chemical analysis will also be included to assure comparable tests.

INTERCHANGEABLE GROUND-GLASS JOINTS

Proposed Standard Now Before Industry for Acceptance; Standard Provides Uniform Taper and Nine Sizes

The recommended commercial standard for interchangeable ground-glass joints for laboratory and industrial glassware was circulated during February to the industry for formal acceptance.

The standard provides for a uniform taper and nine specific sizes based on the diameter of the joint. Because of their interchangeability, it will be possible to quickly substitute one portion of a complicated piece of apparatus in case of breakage, rather than replace the whole thing, which would be necessary if hand-ground joints were employed.

The commercial standard recommended by the industry has been sent to a comprehensive list of glass apparatus manufacturers and dealers and many consumers, as represented by college and industrial laboratories. Others interested will be furnished copies of the recommended standard upon request directed to the division of trade standards, Bureau of Standards, Washington, D. C.

WIRE ROPE SPECIFICATIONS APPROVED

American Marine Standards Committee Approves Wire Ropes Specification

Standard general specifications for wire ropes for marine uses have been approved by the executive board of the American Marine Standards Committee. They establish cast-steel rope as the basic standard and provide three higher grades of steel ropes as follows: Extra strong cast steel; plow steel, and improved plow steel; and phosphor bronze for certain grades of the ropes.

The following types of rope strand construction are included; 6 by 7, 6 by 19, 8 by 19, 6 by 37, 6 by 24, 6 by 12, 6 by 6 by 7 (6 by 42) tiller rope; 5 by 19 marline-clad rope; 1 by 7 stiff strands; seizing strands; sash and bell cord; and lead line with wire cord center. The specifications are appended notes on recommended practice for the storage, handling, use, inspection, and maintenance of wire ropes and notes on working loads and requirements of ship classification societies.

NEW ENGLAND COUNCIL ESTABLISHES MARKETING STANDARDS

New England Council Has Established Grades and Standards for Farm Products; 2,505,251 Graded and Labeled Packages Sold in 1929

In all of the six New England States, uniform legislation has been enacted for the establishment of grades and standards for quality products of New England farms, and a uniform label for the identification of these products, known as "The New England Farm Label," has been adopted. Grades and standards, as authorized by this legislation, have been adopted in the several States, covering such quality products as eggs, day-old chicks, maple sugar and sirup, asparagus, potatoes, bunched vegetables, and fruits. The majority of the standards set up have been developed either identical with, or in close conformity to, Federal standards for such commodities.

In accordance with a recent statement issued from the headquarters of the New England Council a total of approximately 600 licensed users developed business in 1929 with 13 different grades of commodities representing a total sale of 2,505,521 labeled packages. The use of these labels and standards assures the consumer of fresh, near-by farm products of dependable quality and aids the producer by providing him with staple markets for more profitable merchandise.

AUTOMOBILE TIRE SIZES REDUCED

Ten Former Sizes Dropped and Two Added; Present Schedule of Sizes Used on Original Equipment is Seventeen

Survey made at the National Automobile Show in New York revealed that but 17 sizes of tires were used as original equipment on the 272 models of 47 different makes of passenger cars exhibited, states the magazine Tires. This shows a reduction from last year, when 21 sizes were used on 254 models representing 40 makes. This reduction reflects the effect of the balloon-size tire standardization program proposed by tire manufacturers and automobile interests in 1928.

Only two new sizes were added to their original equipment lineup, the 3.75 by 18 and the 7.00 by 19. Ten former original-equipment sizes are discontinued. These are: 28 by 4.75, 29 by 4.50, 29 by 4.75, 30 by 5.00, 30 by 5.50, 30 by 6.20, 30 by 6.75, 31 by 6.20, 32 by 6.20, and 32 by 6.75.

SKID PLATFORM SCHEDULE REVISED

Revision of Simplified-Practice Recommendation for Skid Platforms Referred to Industry for Signed Acceptance

At a recent meeting of the standing committee on the simplification of skid platforms it was unanimously decided to revise the simplified-practice recommendation as originally adopted, and to submit to industry, for its signed acceptance, the following uniform dimensions:

It is recommended that the clearance from bottom of runners or other supports to under side of skid platforms be either 8 or 12 inches; and the distance between inside of runners or other supports be 29 inches. It is also recommended that over-all dimensions for skid platforms used for shipping goods be either 33 inches wide by 54 inches long, or 42 inches wide by 66 inches long. The changes proposed by the standing committee are to be effective from March 1, 1930.

The action of the revision meeting, while based by the standing committee of the industry on a careful study of conditions and requirements of the industry, is susceptible of such modifications as future trends in the industry may render desirable. When sufficient signed acceptances, representing at least 80 per cent of the industry by volume of production have been received, the revised recommendation will be printed in accordance with the usual procedure of the division of simplified practice.

ARBOR HOLES

Industry Contemplates Simplifying Variety of Arbor Holes for Portable Electric Saws and Grinding Wheels

The increasing use of portable power tools has made it more desirable than ever for manufacturers of these tools to secure greater interchangeability between the applicances fitting on such machines. An example of the impracticability of nonstandard items was brought out at the recent meeting of the portable electric machine manufacturers, held at the National Bureau of Standards.

It seems that various manufacturers of these machines have been requiring odd shaped and sized arbor holes for circular saws and grinding wheels used on portable electric power tools. If the recommendation, which was drafted by the manufacturers' conference on February 11, is approved March 20, when a general conference of all interests is scheduled, the shape of holes will be simplified to the extent that only one shape will be considered as standard and sizes will be reduced from some 6 or 8 to 2.

STANDARD METHODS OF PURCHASING ROAD-BUILDING EQUIPMENT

Convention of American Road Builders' Association Receives Seven Recommendations for Standardization of Purchasing Methods of Road-Building Equipment

Seven far-reaching recommendations for standardization of methods for purchase of road-building equipment were made by cooperating committees of the American Road Builders' Association, and the American Association of State Highway Officials, reporting at the convention of the former group, which was held at Atlantic City in January. The object of the committee is set forth as an endeavor to eliminate unsound policies in the purchase of equipment, an effort to prescribe suitable legislation, and an attempt to standardize purchasing methods along practical and efficient lines. The report included recommendations by State highway departments on all details of equipment purchase.

Further recommendations by the joint committee included specific definition of formal public lettings, informal public lettings, and purchase by negotiation, and the conclusion that all purchases of equipment over \$500 be by formal lettings; that all purchases from \$50 to \$500 be by informal lettings; and purchases not to exceed \$50 be made by private negotiation.

Recommends central information agency.

The joint committee also recommended that information be given to States from a central agency; that there be an exchange and comparison of experience and information on service and cost records and purchase price of different kinds and makes of equipment, and that a central point be established for the exchange of this information; that in purchasing equipment no trade-ins enter into the transaction; that in awarding contracts the determining factors shall be considered in the following order of importance:

Your own past experience with similar machines, performance record of equipment, experience of others with similar machines, efficiency in repair parts service, mechanical details of equipment, first cost of equipment, materials used in equipment, location of, and service rendered, by local distributors or agents, price of repair parts, length of time product has been on market, financial standing, past performance of bidder, capacity of plant, ability to make prompt deliveries, and number of similar machines manufactured and sold.

That purchase of country equipment be handled by clearing through State highway departments when so requested by counties; that model specifications, inventory, equipment service and cost-record forms be prepared; and that the committee be continued to make further studies of the problem.

CONTAINERS FOR ICE CREAM

Bureau of Business Research Urges Use of Factory-Filled Cartons for Ice Cream; Industry Has Approved Simplification for Variety of Ice-Cream-Brick Molds and for Machine-Filled Cartons

In connection with its study of dealer profits on ice cream, the Boston University Bureau of Business Research made a survey of consumer preference to bulk and packaged ice cream, including the reasons for such preference in each case. The prediction is made, by the investigators, on the basis of that survey, that the next important advance in the ice-cream trade will be the introduction, by progressive manufacturers, of factory-filled packages of approximately the same consistency, flavor, and taste as the present storepacked package.

The Bureau of Business Research recommends the increased use of factory-filled packages, claiming that they will solve the shrinkage problem and yield the druggist or storekeeper a more certain profit: they conform to the trend of modern merchandising methods, public opinion, and the preference of the buying public in other lines. They are more convenient and economical to handle; they are more sanitary; a properly made package provides a uniform quantity in a convenient form for service at home.

The problem of economical and sanitary distribution of ice cream is now attracting the attention of the ice-cream manufacturers, and it is the opinion of many of the leaders in this field that the industry must turn to packaging as the proper method of merchandising this confection.

Simplifying variety of cartons.

In line with this idea a general conference has been held, under the auspices of the division of simplified practice, which approved simplified dimensions for the 2-gallon ice cream brick mold and for the pint and quart machine-filled cartons. This general conference was held on December 4, 1929, at the request of the simplified practice committee of the International Association of Ice Cream Manufacturers, and the recommendations will shortly be placed before the producers, distributors, and consumers for acceptance.

An extension of this program came about through a recent meeting of the committee in New York to discuss the simplification and standardization of dimensions of cup-shaped containers for ice cream. Representatives of the manufacturers of containers and filling machinery were present, and different makes of cup-shaped containers were studied. Those present indicated their desire to cooperate and the committee is now giving further study to the question of sizes with the view of developing a tentative recommendation. This will be submitted for consideration and approval of a general conference to be held under the auspices of the division of simplified practice at a future date.

INFLATED RUBBER TOY BALLS

Simplified Sizes and Classifications Approved by Conference; Now Before Industry for Acceptance

A simplified schedule of sizes and classifications for inflated rubber toy balls was unanimously approved by a general conference of the industry held in New York on February 6, under the auspices of the division of simplified practice in cooperation with the toy manufacturers of the United States of America.

The recommendation establishes nine classes of balls, varying in size from 2 inches outside diameter to 12 inches. Two of the classes in the smaller sizes provide for more than one size ball to take care of the mold requirements of manufacturers and the current needs of the trade. The other classes contain one size each.

The entire schedule applies to balls of the inflated type only, decorated and undecorated, with or without design. The recommendation will, therefore, not interfere in any way with the artistic side of the toy-ball industry. General acceptance of the recommendation should result in economies to manufacturers, by reducing mold inventory, and will permit the trade to do business on the same basis so far as size of balls is concerned. The recommendation, when and if approved by the industry, will go into effect on July 1, 1930, in time for the seasonal demand which commences at that time.

The conference approved the appointment of a standing committee of the industry for the purpose of maintaining interest and adherence by keeping the program abreast of current practice and requirements through periodic revision.

A summary report of the general conference, together with an acceptance from, will shortly be sent to all concerned. Upon receipt of sufficient acceptance to insure the success of the plan, the recommendation will be printed as one of the series of publications issued by the Department of Commerce in the interest of simplification.

TESTING RAILROAD TRACK SCALES

Bureau of Standards Makes Public Annual Report of Railroad Track Scale Testing Service

To accommodate numerous requests for information regarding the general fitness of freight-car weighing facilities throughout the United States, the Bureau of Standards has adopted a policy of publishing annually the results of track scale tests conducted during the preceding fiscal year. The first of these reports was published at the close of the fiscal year 1924. The present one reviews the work completed during the year ended June 30, 1929.

The investigation of railroad track scales was begun by the bureau in 1913 and has since been a regular function. The work is supported by congressional appropriation. Operating schedules for the three test units of the bureau are arranged to include: (1) Annual tests and readjustment of 20 master track scales to which railroads or other organizations periodically refer test cars for weight standardization, (2) tests of miscellaneous track scales whose owners have filed formal request for the service, and (3) tests of several hundred track scales located in representative sections of the United States and used for different kinds of service.

The total number of railroad track scales used for weighing revenue freight on railroads approximates 5,000. There are, in addition, some 7,000 in service at industrial and commercial plants. With the present equipment and organization, the bureau is seldom able to test more than 800 scales in any one year. The annual testing schedules are, therefore, planned, as far as may be possible, to serve different localities in succeeding years and to insure widespread distribution of the tests.

STANDARD LOCKS FOR SHIP DOORS PROPOSED

General specifications and standards for 14 locks and their accessories have been approved by the executive board of the American Marine Standards Committee, subject to incorporation in the final draft of a number of suggestions received in connection with the membership vote.

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SCIENTIFIC, TECHNICAL, AND COMMERCIAL PERIODICAL PUBLICATIONS ISSUED BY THE NATIONAL BUREAU OF STANDARDS

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* * * 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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THE UNITED STATES DEPARTMENT OF COMMERCE

R. P. LAMONT, Secretary of Commerce

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

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