





.

*

. * . 6 .

.

Bureau of Standards OCT 8 1935 44463 HII62 . U3 cop.2

JBr

.

.

.

4

COMMERCIAL **STANDARDS** MONTHLY

A Review of Progress in Commercial Standardization and Simplification



AIRPLANE VIEW OF NATIONAL BUREAU OF STANDARDS

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

Vol. 8, No. 1



JULY, 1931

- - - Price \$1.00 per Year

U. S. DEPARTMENT OF COMMERCE R. P. LAMONT, Secretary NATIONAL BUREAU OF STANDARDS GEORGE K. BURGESS, Director

COMMERCIAL STANDARDS MONTHLY, S. F. Tillman, Editor

The Commercial Standardization Group

DIVISION OF SIMPLIFIED PRACTICE Edwin W. Ely

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

modity or activity in which it will reduce waste. The division stands ready to render service in developing and making effective any application of simplified practice which will reduce waste, stabilize business, or extend commerce.

BUILDING AND HOUSING DIVISION J. S. Taylor

The division of building and housing, formed in 1921, cooperates with business, technical, and professional groups in furthering construction activities. It works to

modernize building codes and to encourage improved standards for the quality of building construction, and the practical application of the latest development in design and use of building materials.

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

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

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

DIVISION OF SPECIFICATIONS A. S. McAllister

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

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

DIVISION OF TRADE STANDARDS I. J. Fairchild

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

changeability, or other acceptance criteria as a national basis for marketing manufactured commodities.

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

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

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

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

STANDARDIZATION ...IS... A CONTINUING PROCESS G+0 ITS AIM IS NOT FIXITY OR STAGNATION ...BUT... TO ADD SERVICEABILITY AS OFTEN AS THE POTENTIAL GAIN MAKES IT WORTH WHILE

recommendation, and to secure data for reaff revision. Simplified practice may be applied t modity or activity in which it will reduce waste. The division stands ready to render service in developing and making effective

COMMERCIAL STANDARDS MONTHLY

A Review of Progress in

Commercial Standardization and Simplification

VOLUME 8

WASHINGTON, D. C., JULY, 1931

NUMBER 1

SUBJECT ANALYSES

AERONAUTICS	Page	GENERAL	Page
Bulletin for air navigation (standardization briefs)	29	Activities of the American Standards Association	16
Current aircraft standardization (standardization briefs)_	29	Foundations for better marketing	31
Safety in aeronautics (standardization briefs)	29	"Saving by simplicity"]
(stondardization briefs)	28	Simplification briefs	
(standardization briefs)	20		40
CODES Ruilding and situation	10	HIGHWAYS	0.1
Safety in geronautics (standardization briefs)	20	British standard for road tar (standardization briefs)	31
Standard color code for control cable (standardization	20	Standardizing road materials in Idano	23
briefs)	28	briefs)	20
Traffic sign code adopted in Europe (standardization		Uniform street sanitation records (standardization briefs)	31
briefs)	29		01
COLOR		METALS	
Colors for sanitary ware	21	tion briefs)	21
Federal catalogue contains color codes for marketing		Eaves trough and conductor pipe (simplification briefs)	8
metal bars	27	Fourdrinier wire cloth	10
Standard color code for control cable (standardization	90	Iron and steel roofing (simplification briefs)	- 8
Drieis)	28	Methods for classifying wear of metals (standardization	
(standardization briefs)	20	briefs)	31
	20	Roofing ternes (simplification briefs)	8
ELECTRICAL		Sheet steel (simplification briefs)	3
British standard for procelain insulators (standardization	20	Steel bone plates and screws	20
Drieis)	30 15	Wreught incompany nipples	ح مر
Measures minute electric currents	$\frac{10}{27}$	wrought-from pipe mpples	29
Wiring the home (standardization briefs)	30	MINING Mining standardization	19
BUDGILISING	00	wining standardization	10
Federal specifications	25	PAPER	
Purchasing railroad material by specification	$\overline{22}$	Diesel-engine testing forms available (standardization	20
FOREIGN		Driefs)	30
Association Belge de Standardization	24	Paper board shipping cases for fruit and vegetables (sim-	17
Australian classification for building materials (standard-		plification briefs)	8
ization briefs)	30	FOOD	
British specification for steel gas cylinders (standardiza-		Deine sten dende protect congumen	14
tion briefs)	30	Endored grade label for packaged meats	26
British standard apparatus for testing magnets (stand-	90	Food standards for the housewife	17
ardization briefs)	29	Grading canned foods (standardization briefs)	29
briefs)	30	RADIO	
British standard for road tar (standardization briefs)	31	Covernmental control of radio-frequencies	5
Bulletin for air navigation (standardization briefs)	$\tilde{29}$	Radio-frequency standards	7
Classifying fractures in hardened tool steel (standardiza-		Standard allocations of radio-frequencies and bands	5
tion briefs)	31	Standardizing wavelengths or frequencies of radio stations.	7
Hospital beds standardized in Germany (standardization		TEXTILES	
briefs)	30	Boys' blouses (standardization briefs)	23
New magazine on Russian standardization	25	Cotton goods for rubber and pyroxylin-coated automotive	
briefa)	29	fabrics	15
Standard schedule of colors for ready-mixed paints	20	Knit underwear (exclusive of rayon)	26
(standardization briefs)	29	Standard "sun tests" for dyed textiles	25
Traffic sign code adopted in Europe (standardization		WEIGHTS AND MEASURES	
briefs)	29	Accurately reproducible light standard	17
Weights and measures law for Iraq (standardization	0.0	Mechancial tests used in grading farm products	10
briefs)	30	National Weights and Measures Conference	9
HEALTH		Testing capacity of containers	21
Dairy standards protect consumer	14	The extension of weights and measures supervision	11
Food standards for the housewife	17	Thickness gage for fabrics	20
Standardization of biological products	20	weights and measures law for frag (standardization briefs).	30
			-

AN INVITATION TO VISIT THE NATIONAL BUREAU OF STANDARDS

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

It is encouraging to note that in spite of adverse conditions, American industry is pressing steadily forward in the voluntary building of better foundations for marketing its products. Visible evidence of these foundations is embodied in commercial standards, initiated and formulated through the voluntary action of individual industries and adjusted and promulgated through cooperation with the National Bureau of Standards which acts as an impartial referee. During the fiscal year 1931 (ending June 30, 1931) there were issued in printed form 12 commercial standards as compared to 11 during 1930 and 5 during 1929, making a total of 28 published to date.

These commercial standards record the recommendations of each industry concerning terminology, types, classes, limiting dimensions, tolerances, physical and chemical requirements, or other criteria used as a basis for acceptance or rejection by the distributor and consumer. These standards apply to daily purchases and are not limited to purchases under contract.

For example, some of the commodities covered during the last few months are tents, tarpaulins and covers, boys' blouses, wrought-iron pipe nipples, red cedar shingles, colors for sanitary ware, cotton goods for rubber and pyroxylin coated automotive fabrics, and knit underwear.

Such standards provide not only a means for better understanding between buyer and seller, but furnish also minimum standards of performance which the producer plans to supply and which the consumer desires to be furnished. The movement as a whole represents one of the most fundamental and generally beneficial trends in modern business.

 $\mathbf{2}$

"SAVING BY SIMPLICITY"

Simplified Practice is a Rational, Appealing, Carefully Devised Plan to Save Money and Promote Good Business

By Dr. JULIUS KLEIN, Assistant Secretary of Commerce¹

I know there will be some sly quips about that title—"Saving by Simplicity." "Why, of course," you say, "it is simple to save these days because we haven't so much to spend." But that is not quite what I have in mind. I would like to tell you of a carefully planned effort, launched in the Department of Commerce years ago, which is to-day strengthening very substantially the resources of thousands of firms to withstand the strain of the depression. Remember that it frequently takes but a very little bit to make the difference between solvency and bankruptcy—just a few drops of red ink, if they linger long enough on the ledger pages, may turn the fateful trick. Now is the time when little things may work wonders in maintaining that invaluable equilibrium in business.

With the ever-increasing complexity in our business organization, we realize more and more the values of what might be called economic statesmanship. Here is a concrete instance of what I have in mind, a carefully planned undertaking which has secured the adoption by a large and growing section of American industry of what has become internationally known, copied, and commended as simplified practice. Now the proof of any statesmanship, economic or other-wise, is in its accomplishment. We have had nearly 10 years of this particular effort, so that we can now get a good perspective on its real value. I grant you that this is not quite the kind of headline fodder that appeals to arm-waving demagogues, but to you and me and all the rest of the everyday folks throughout the land it has meant the saving of hundreds of millions of dollars; it has meant jobs, and that is what counts these days.

"What is simplified practice?" you may ask. Well, it is the policy of limiting varieties of any given manufactured article to such convenient minimum as will satisfy all normal and reasonable demands. Variety may be the spice of life; but variety can also be the curse of business. Here is a good illustration. Perhaps in your innocence you thought an inch was always an inch, never more, never less. Not by any means. Until simplified practice got established in this country, there were 16 different sizes of an inch recognized in a single American business—the lumber industry. A buyer who ordered inch plank might have found his delivery running anywhere from a half inch to 1¼ inches in thickness, and yet every piece of it would be legitimately proper "inch lum-ber" under the mixture of understanding built up in the trade-planks measured before or after drying. before or after planing on one side, and so on-16 different kinds of an inch measurement. That is how the "spice of variety" can easily become an enormous and expensive and useless luxury-more costly than the spices which early merchant adventurers brought from India and Far Cathay around the bleak southern

capes. This field where excessive variety frequently proves costly is in the common, everyday articles we use—things with which you and I are in constant contact. Until we look into it, we can not realize how immensely a simple program of eliminating unnecessary variety in the manufacture and distribution of such things can benefit everybody, makers and users alike.

The fact that simplified practice has within 10 years attained a wide and beneficent application in American industry can be attributed largely to the genius and capacity of one man-President Hoover. Many people before him had realized this type of costly wastefulness. Methods of improving such practices had been suggested, and in a few cases tried out by individual concerns. But what he furnished was the result-getting effort whereby was set up the machinery for voluntary self-government in business on a large scale, designed to mobilize an effective attack on such wastes-on the extravagance of variety in common, utilitarian things, such as bricks, hardware, steel, lumber, and countless other products. But he saw also the very vital need of leaving unimpaired the desirable shifting of style, the free play of artistic novelty in matters of appearance, ornament, and individuality of taste. Here is the vital point: Simplification in industry does not mean in the least destruction of style.

"We do not by this process propose to abolish Easter bonnets," he remarked years ago at the outset of endeavor with simplification, "we propose more bonnets for less money and effort."

Mention was made, a moment ago, of the fact that our simplified practice movement has aroused keen interest and warm praise in foreign countries. Other people see that it is sensible, economical, helpful in every way. Over in Vienna, that delightful old capital by the "beautiful blue Danube," there was organized not long ago a "Society for Simplifying Men's Clothes"—not quite the sort of thing we are doing here, but presenting, nevertheless, some fascinating possibilities. And one absent-minded Austrian immediately arose to suggest, that, as a first effort, they should reduce the number of pockets in which a railway ticket can be lost, from 13 to 3. Now there is a man who said something.

Ten years ago, producers in the United States were turning out 78 distinct sizes and dimensions of bedsteads, not styles, please note. Mattress manufacturers, spring manufacturers, and makers of all kinds and types of bedding had to adjust production to this extraordinary variety of sleeping framework. You can see what obstacles there were to the great economies of quantity-production methods in this whole group of industries; they were almost on a custom tailoring basis: and you can see what that would mean in costs. To-day, the number of standard sizes (not styles, mind you, but sizes) of bedsteads has been reduced to 4 (instead of 78) and the whole business of

¹A radio talk by Doctor Klein delivered over the coast-to-coast network of the Columbia Broadcasting System on May 24, 1931.

accessory supply has been simplified and vastly cheapened accordingly. Now let us follow through the accomplishment. In the factory, there can be a smaller investment in machinery and pattern. There can be a reduction of warehouse space and a big reduction in the amount of capital tied up in inventories, with a proportionate reduction in interest and other carrying charges. These advantages carry on into the field of distribution. In wholesale and retail houses, total inventories can be kept down (not so many varieties to carry) without reducing the stock of any single item in regular demand.

The cost of accounting is reduced, and the chance of mistakes and errors in shipments brought down lower. There is a valuable indirect accomplishment as well, which makes for stability of employment. During slack times, producers can safely manufacture for stock, knowing that, when demand improves. standard items will again be called for. All this means savings of tens of thousands of dollars, savings to be distributed over the industry and among the consumers concerned.

Now, how are these objectives being attained in industry? Under a procedure which has been developed and smoothed out during 10 years of actual operation, but which is still based squarely on the original concept, the initiative lies with industry itself. That factor of self-help, absolute freedom from paternalistic governmental dictation, is vital. When opinion in any line of industry has developed to the point of making the introduction of simplified practice feasible, representative men in that industry, whether producers, distributors, or users of the product, ask the Department of Commerce (through its National Bureau of Standards) to cooperate in arranging a preliminary conference. The output of the industry is surveyed, and the actual quantity of use and demand for each item produced is expertly determined. A simplified-practice committee then prepares a table showing the sizes or varieties of product which, in the opinion of the committee, will cover all normal and reasonable demand. Then it is submitted to the entire industry for full consideration and action. If a substantial majority of producers, distributors, and representative users agree, the simplified list of varieties of products is adopted as a guide to future production, to be used (and that is most important) on a purely voluntary basis by the industry, with no compulsory limitation whatsoever. A standing committee, representing all elements in the industry, is appointed to sponsor the application of the new program, now known as a simplified-practice recommendation.

The National Bureau of Standards job is to insure that the interests of all elements are considered, including distributors, producers, and users, and to publish the program. Each simplification is subject to annual review by a standing committee, and may then be reaffirmed, or modified to meet changed conditions and new developments. That is how the recommendation is kept flexible and up to date. Bureaucratic dictation or regulation is conspicuously absent. The success and the survival of the practice depends upon the common consent of the business community. Complete freedom of action has been the key to progress in simplified practice, for, as President Hoover has rightly observed: "You can't catch an economic force with a policeman." The success of the system has vindicated the conviction that American industry is entirely competent to order and conduct its own affairs, using the Government solely as a coordinating agency.

Now, how much of this has been going on? Well, so far, about 120 separate industries in the United States have embarked upon simplified practice by the methods described, and some 18 others are in process of undertaking it. As I said before, standardization of style, ornament, appearance, or individuality has been absolutely avoided. You know we would not be quite so foolhardy as to try to abolish fashion. That is too much for any agency of mere men, governmental or otherwise. Speaking of fashions, somebody was wondering the other day why it is that a woman who is constantly complaining that she has "absolutely nothing to wear" almost invariably needs about six closets to keep it in.

But let us get back to simplified practice. How many wire fence patterns can you think of off-hand? Ten years ago there were 552 patterns and dimensions of woven wire fencing on the market; simplification cut the total to 62. Do you notice your milk bottles particularly as you come home in the early—well, anyway, do you notice your milk bottles? Once there were 49 varieties; now 4 are standard, and even the little caps have come down to standard dimensions. And that has meant cheaper milk for us consumers and better business for the producers.

As you recall the old school blackboard, does it seem like a proper subject for variety? These were once offered in 251 dimensions; but now the 52 supplied meet all requirements. Everybody is just as happy except the youngsters who have to stay after school and correct their spelling on the said blackboard.

Paving brick, in which a certain uniformity of size and shape is certainly desirable, once came in 66 models, but it has since been proven that 6 would meet all the needs and contribute to savings for all persons concerned in pavement. You can run through the list of paper bags, tin cans, jack knives, shipping tags, a whole host of building items beginning with lumber, and find like accomplishment. The principles of simplified practice worked out identically in all these fields; the industries were free of the burden of cumulative costs attaching to the production, storage, and handling of useless variety, while the channels of distribution were swept clear of similar cluttering. The essence of all this is the prevention of waste. If we can cut down waste, we can increase wages and at the same time lower the price of things—which is again increasing wages.

In order to sum up completely the savings due to simplified practice, we would have to trace out all the ramifications of industry and commerce. It is hard to set a definite limit to such savings. Here is one angle you probably would not think of: It has even been found that the efficiency of sales forces dealing with simplified lines is increased sufficiently to be measurable in cash. But disregarding such indirect gains, the representative industries which have established simplified practice have estimated that their present annual output is being made and distributed for \$250,-000,000 less than would be its costs under old conditions. That is nearly \$5,000,000 a week; just translate that into jobs—100,000 of them at \$50 a week. That is what I mean when I say that this thing may not lend itself to demagogic orators but it does mean pay envelopes and bread and butter.

Not a single trade which has once taken up simplified practice has ever abandoned it. Indeed, new recruits are always coming forward from still unorganized lines of industry to take up the policy. In times of severe business stress, the savings it makes possible are even more to be sought than in the periods of fullest prosperity. Simplified practice offers one of the best means by which business can accomplish its necessary task of getting down costs of finished goods to levels that will place them within reach of temporarily reduced buying power.

It has had, and will continue to have, an essential part in maintaining the ability of the American manufacturer to hold a place in world trade while producing at the American wage scale, against competitors in countries where living standards are far lower. Simplification practice is almost inseparable from success in quantity-production policies for industry. But here is just one point that is worth repeating: Simplified practice does not mean an attempt to abolish diversity where diversity is desirable. It does not mean reducing us all to robots. That is a million miles from the truth. Simplified practice is just a rational, appealing, carefully devised plan to save money and promote good business.

It is an accomplishment in economic statesmanship which has reached its objective. It has made available to all of us more articles of necessity and luxury than we could have otherwise enjoyed. Without injuring any legitimate interest, without "cramping anybody's style," without limiting or even restricting the spread of culture, taste, or individuality, it has moved resolutely against the overdiversification which has been taking money out of the pockets of every element in the economic structure of the country. And the \$250,-000,000 a year of direct savings resulting from simplified practice is sheer gain for all of us.

GOVERNMENTAL CONTROL OF RADIO-FREQUENCIES

Radio has become so great a factor in our economic, social, and political life that the privilege of operating a transmitting station is now a highly prized possession. In order to avoid confusion and to use this new agency effectively, the different "channels" available, represented by specified narrow portions of the radio spectrum, must be allotted to prospective users by some authority; there must also be an inspection service to see that each user confines his operations to his own proper range of frequencies; and as a basis for allocation and operation there must be standards and instruments to determine accurately the frequencies used.

By common consent all of these functions are assigned to the Federal Government because radio is no respecter of political boundaries. The three kinds of service mentioned are so different that three separate agencies have been found desirable. These are the independent Federal Radio Commission and two branches of the Department of Commerce, namely, the Radio Division and the National Bureau of Standards.

The three articles printed below present briefly some activities of these three organizations bearing particularly upon governmental control of frequencies:

STANDARD ALLOCATIONS OF RADIO-FREQUENCIES AND BANDS

By E. K. JETT, Engincer, Federal Radio Commission

Prior to the adoption of the International Radiotelegraph Convention in 1927 there was a general policy of freedom of operation throughout the entire radio spectrum. To-day, however, as a result of extensive development and international agreement, we have a well-organized system of channeling of the ether which permits the allocation of radio channels in much the same manner as telephone and telegraph wires are assigned for private use. The International Radiotelegraph Convention became effective on January 1, 1929. It provides for the use of frequencies from 10 to 60,000 kilocycles and above (wave lengths from 30,000 to 5 meters and below) according to classes of services as follows:

Fixed service.—The term "fixed service" means a service carrying on radio communications of any kind between fixed points, exclusive of broadcasting and special services.

points, exclusive of broadcasting and special services. *Mobile service.*—The term "mobile service" means a radio communication service carried on between mobile stations and land stations, and by mobile stations communicating with one another, exclusive of special services. *Special service.*—The term "special services" means the

Special service.—The term "special services" means the services of radiobeacons, radio compasses, transmission of time signals, notices to navigators, standard waves, transmissions having a scientific object, etc.

having a scientific object, etc. Broadcasting service.—The term "broadcasting service" means a service carrying on the dissemination of radiotelephone communications intended to be received by the public, directly or by the intermediary of relay stations.

The allocation of frequencies among the various services is shown in article 5 of the general regulations annexed to the International Radiotelegraph Telegraph Convention of 1927, as follows:

Frequencies in kilocycles per second (kc/s)	Approximate wave lengths in meters (m)	Services
10- 100	30.000-3.000	Fixed services
100- 110	3 000-2 725	Fixed services and mobile services
110- 125	2 725-2 400	Mobile services
$125 - 150^{-1}$	2, 400-2, 000 1	Maritime mobile services open to public corre- spondence exclusively.
150- 160	2,000-1.875	Mobile services.
		 (a) Broadcasting. (b) Fixed services. (c) Mobile services. The conditions for use of this band are subject to the following regional arrangements: All regions where broadcasting
160- 194	1, 875–1, 550	 stations now exist working on frequencies below 300 kc/s above 1,000 m). Other regions [Fixed services. Mobile services. Regional arrangements will respect the rights of other regions in this band.

 $^1\,{\rm The}$ wave of 143 kc/s (2,100 m) is the calling wave for mobile stations using long continuous waves.

Frequencies in kilocycles per second (kc/s)	Approximate wave lengths in meters (m)	Services	
194- 285	1, 550–1, 050	(a) Mobile services. (b) Fixed service. (c) Broadcasting. The conditions for use of this band are subject to the following regional arrangements: (b) Air fixed services celusively. (c) Within the band 250-285 kc/s (1,200- 1,050 m). Fixed service not open to public correspondence. (d) Broadcasting within the band 194- 224 kc/s (1,550-1,340 m). (a) Mobile services except com- mercial ship stations. Other regions (b) Fixed are rvices exclusively. (c) Fixed services not open to pub- line accremendence	
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	 Radio beacons. Air mobile services exclusively. Mobile services not open to public correspondence. (a) Radiocompass service. (b) Mobile services, on condition that they do not interfere with radiocompass service. 	
390-460 460-485 $485-515^{3}$	770-650 650-620 $620-580^3$	Mobile services. Mobile services (except damped waves and radio- telephony). Mobile services (distress, call. etc.)	
515- 550 550- 1, 300 ⁴	580- 545 545- 230 4	Mobile services not open to public correspondence (except damped waves and radiotelephony). Broadcasting.	
1,300- 1,500	230- 200	 (a) Broadcasting. (b) Maritime mobile services, waves of 1.365 kc/s (220 m) exclusively. 	
1, 300- 1, 713	200- 175	Mobile services.	
1,715- 2,000	175- 150	Amateurs.	
2,000-2,250 2,250-2,750	150-133 133-109	Mobile services and fixed services. Mobile services.	
2,750-2,850 2,850-3,500	109 - 105 105 - 85	Fixed services. Mobile services and fixed services.	
3.500- 4.000	85- 75	Mobile services.	
4 000- 5 500	75 54	A mateurs.	
5, 500- 5, 700	54 - 52.7	Mobile services. Mobile services.	
5,700-6,000 6,000-6,150	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Fixed services. Broadcasting.	
6, 150 - 6, 675 6, 675 - 7, 000	48.8 - 45 45 - 42.8	Mobile services. Fixed services	
7,000-7,300	42.8 - 41	A mateurs.	
8,200-8,550	36.6 - 35.1	Mobile services.	
8, 900- 9, 500 8, 900- 9, 500	35.1 - 33.7 33.7 - 31.6	Fixed services.	
9,500-9,600 9,600-11,000	31.6 - 31.2 31.2 - 27.3	Broadcasting. Fixed services.	
11,000-11,400 11,400-11,700	27.3 - 26.3 26.3 - 25.6	Mobile services.	
11,700–11,900	25.6 - 25.2	Broadcasting.	
12, 300-12, 825	25.2 - 24.4 24.4 - 23.4	Mobile services.	
12, 825–13, 350 13, 350–14, 000	23.4 - 22.4 22.4 - 21.4	Mobile services and fixed services. Fixed services.	
14,000-14,400 14,400-15,100	$\begin{vmatrix} 21.4 - 20.8 \\ 20.8 - 19.85 \end{vmatrix}$	Amateurs. Fixed services	
15, 100-15, 350	19.85 - 19.55 10.55 18.2	Broadcasting. Fired convious	
16, 400-17, 100	$13.30^{-10.3}$ 18.3 - 17.5	Mobile services.	
17, 750–17, 750	17.5 - 16.9 16.9 - 16.85	Broadcasting.	
17,800-21,450 21,450-21,550	16.85 - 14 14 - 13.9	Fixed services. Broadcasting.	
21, 550-22, 300	13.9 - 13.45 13.45 - 13.1	Mobile services.	
23,000-28,000	13.1 - 10.7	Not reserved.	
20,000-30,000	10.7 - 10 10 - 5.35	A mateurs and experimental. Not reserved.	
56,000–60,000 Above 60.000	5.35- 5 Below 5	A mateurs and experimental. Not reserved.	
,	1	1	

² The wave of 333 kc/s (900 m) is the international calling wave for air service.
³ The wave of 500 kc/s (600 m) is the international calling and distress wave. It may be used for other purposes on condition that it will not interfere with call signals and distress signals.
⁴ Mobile services may use the band 550 to 1,300 kc/s (545-230 m) on condition that this will not cause interference with the services of a country which uses this band exclusively for broadcasting.

Note.—It is recognized that short waves (frequencies from 6,000 to 23,000 kc/S approximately—wave lengths from 50 to 13 m approximately) are very efficient for long distance communications. It is recommended that as a general rule this band of waves be reserved for this purpose, in services between fixed points.

It is convenient to divide the radio spectrum into five major bands of frequencies and to discuss each band separately, as follows:

Low-frequency band, 10 to 100 kilocycles (30,000 to 3,000 *meters*).—The low-frequency band is divided into 201 communi-cation bands or channels. A channel, it should be explained, is a theoretical highway of the ether which serves as the con-

necting wire between the transmitter and receiver. It is to be issumed that ideal conditions prevail and that no interference will exist when the channels are properly allocated and used in accord with the present-day technical possibilities of radio apparatus. The frequency band width required for a channel of communication depends on the particular type of emission and stability of the carrier frequency. Radiotelegraphy, for example, requires a much narrower band width than is needed for radiotelephony and televice bardways of the great for radiotelephony, and television because of the great amount for radiotelephony, and television because of the great amount of detail which must be rapidly produced requires vastly greater "space" than telephony. The frequencies below 75 kilocycles are best adapted for high power long distance com-munication and those above 75 kilocycles for comparatively low power short distance communication. The band, therefore, may be considered as being international in its service range and is used for fixed service

and is used for fixed service. *Medium-frequency band, 100 to 1,500 kilocycles (3,000 to 200 meters).*—These frequencies were the first to be made available for practical use and the band is now used to full capacity by Government stations, stations engaged in fixed service communication, ship stations, sircraft stations, beacon and com-pass stations, and broadcasting stations. There are 265 radio-telegraph channels between 100 and 550 kilocycles and 96 broadcast channels from 550 to 1,500 kilocycles. The frequency band width for radiotelegraph channel varies from 1 kilocycle in the lower part of the band to 2 kilocycles in the upper por-tion. Each broadcasting channel is 10 kilocycles wide.

Mcdium high-frequency band, 1,500 to 6,000 kilocycles (200 to 50 meters) .- This band is referred to as the continental band because the frequencies therein are considered as being regional in their service range. Therefore it is practicable to simultaneously use these frequencies on the various continents of the world without the possibility of serious interference resulting between continents. In North America the band is allocated to services as between nations by a special treaty commonly known as the North American Agreement of 1929. The United States has the exclusive use of 112 general communication channels, and shares 34 additional channels with other nations. In addition the United States shares, for mobile service and visual broadcasting, a total of 411 radiotelegraph channels. It is pointed out that a visual broadcasting channel in this band is 100 kilocycles in width. The 639 standard telegraph channels which combine to make up this band are separated from one another by approximately 0.2 per cent of the frequency; for example, a channel designated as 3,004 kilo-cycles having a width of 0.2 per cent of the frequency (0.2 per cent \times 3,000 kc=6 kc) extends 3 kilocycles on each side of the center of the channel from 3,001 to 3,007 kilocycles. There is thus a 6-kilocycle separation between the centers of the adjacent channels. The band is used by maritime and aviation stations, amateurs, visual broadcasting stations, point-to-point stations, Government stations, and special stations including police, fire, and geophysical.

High-frequency band, 6,000 to 23,000 kilocycles (50 to 13 met--These frequencies are world-wide in their service range, ers) the higher frequencies, above approximately 16.000 kilocycles, being useful only during the daylight hours. The frequencies in the lower part of this band; that is, frequencies between about 6,000 and 9,000 kilocycles are considered as being re-gional during the daylight hours and may be used simultaneously by the various continents of the world without the possi-bility of serious interference resulting between continents. This band is made up of 624 channels separated from each other by approximately 0.2 per cent of the frequency. The international convention recognizes that these frequencies are useful for very efficient long-distance communication and, as a general rule, they are allocated for this purpose. Point-topoint stations, short-wave broadcasting stations, amateurs, aviation, maritime, and Government stations are assigned in this band.

Very high-frequency band, 23,000 kilocycles and above (13 meters and below).-No allocations to services have been made internationally in this band because the frequencies are still considered to be largely experimental at this stage of develop-Consequently no definite channels have yet been desigment. nated.

The technical phase of the radio art is in the process of rapid development and now it is recognized by international experts that a channel of communication above 1,500 kilocycles may be considered as being approximately 0.1 per cent of the frequency. The effect of this recognition will unquestionably result in the adoption of a new channeling system whereby the present number of high-frequency channels will be approximately doubled.

STANDARDIZING WAVE LENGTHS IN FRE-QUENCIES OF RADIO STATIONS

By W. D. TERRELL, Radio Division, Department of Commerce

Radio has passed from the field of an adventure to that of a public utility.

Prior to 1911, when the Radio Service of the Department of Commerce was organized, little attention had been given to the wave lengths used, and interference was expected. The operators were able to work through such interference successfully due to the different tones of transmitters. The use of radio was limited to the Government stations, ship stations, coast stations working with ships, and a few amateur stations. The station owners selected their own call letters; usually consisting of two letters. A little later, hot-wire ammeters and wave meters were provided.

Under an act, which was approved August 13, 1912, all radio stations were required to be licensed. Ship and coastal stations were required to have equipment for wave lengths of 300 and 600 meters. The wave lengths between 600 and 1,600 meters were reserved for Government use. Stations were also allowed to use wave lengths below 600 and above 1,600 meters. The requirement that a pure and sharp wave be used made it necessary to provide the inspectors with decremeters. The wave length of 600 meters was provided for distress purposes, and the distress signal: 3 dots, 3 dashes, and 3 dots, commonly known as SOS, was adopted. It was stipulated that sufficient power should be used to enable the distress signals to be received by day over sea a distance of 100 miles, and absolute priority was given to these signals.

Government stations were required to observe a division of time at important seaports and at all other places where naval or military and private or commercial shore stations operated in such close proximity that interference between the services would result.

Amateur stations were not permitted to use a wave length exceeding 200 meters or power exceeding 1 kilowatt except by special authority of the Secretary of Commerce.

The Federal Radio Commission was created in the radio act of 1927. This commission took over the duties of licensing radio stations. The Radio Division, a separate unit under the office of the Secretary of Commerce, conducts the field work which embraces the examination and licensing of all radio operators employed in licensed radio stations; the inspection of all licensed radio stations, including those on shipboard; the investigation of interference complaints; the measuring of the field strength or service range of stations, and the checking of wave lengths or frequencies of stations; the acceptance of applications for construction permits and licenses; and the making of reports to the Federal Radio Commission relating to station activity.

The radio inspection service endeavors to minimize the interference by inspection of the radio stations, by licensing only competent operators, by using accurate measuring apparatus, and by observing the operation of stations through monitoring stations. The principal monitoring station is equipped to measure all of the working radio-frequencies, or wave lengths. The station has 5 receivers: 1 for the long waves, 2 for the broadcasting waves, and 2 for the short waves. Monitoring equipment is also installed on radio test cars to measure the frequencies of small stations and stations simultaneously using the same frequencies. These measurements can be made only by getting to a point near the station which is to be measured, as it is difficult to identify such stations when several are operating simultaneously on the same frequency.

The field strength apparatus on the test cars is used to measure the strength of signals at various distances from the stations. This information indicates the service range of each transmitting station. Furthermore, during these observations, information can be gathered as to the interference between stations operating on the same frequency. It can be determined at what point the heterodyne becomes objectionable or at what point the cross talk becomes objectionable; also at what point the conflicting programs make reception from any of the stations using a common frequency impossible.

RADIO-FREQUENCY STANDARDS

By J. H. DELLINGER, National Bureau of Standards

The primary radio-frequency standard of the National Bureau of Standards consists of a group of four piezo oscillators, each vibrating at 100,000 cycles per second. The first three are alternative standards, the fourth serves as a reference point. Beats between each of the first three and the fourth, are visually indicated, and the number occurring in 1,000 seconds is automatically recorded. Variations of these beat numbers for each pair, from period to period, show the relative variation of the pair in parts per hundred million. The output of one piezo oscillator is stepped down to 1,000 cycles by a submultiple generator, to drive a synchronous clock, which is rated against time signals, to establish the absolute value of the frequency.

The temperature, pressure, and electrical conditions of the oscillators are all carefully regulated. The crystals themselves are doughnut shaped, that shape being found to give a very small temperature coefficient of frequency. The variations of this frequency standard from day to day are less than 1 part in 10,-000,000. Comparisons of other frequency standards with the primary standard are made by selecting harmonics of both standard and unknown frequency such that there will result an audio beat note. The beat note is then compared with a calibrated audio oscillator, measured on an audio-frequency bridge, or counted on an oscillograph.

One phase of the work of the National Bureau of Standards in improving frequency standards has been the progressive development of secondary standards. These are standards which are capable of being calibrated accurately and which can be relied upon to remain constant over a long period of time. Piezo oscillators are well suited for this work, and they have been intensively developed.

The quartz plate used in the bureau's most recent piezo oscillators is mounted in a special holder designed for minimum change of dimensions, in a

thermostatically controlled inclosure which is capable of maintaining the quartz plate at a very constant temperature. The circuit arrangements and shielding are such that the frequency of the complete piezo oscillator is not affected by outsite influences. An amplifier is built into each piezo oscillator and is so balanced that any type of connection may be made to the output without changing its frequency.

In connection with this work, a study of the fundamental properties of piezo-electric materials is being made, with a view to improving the vibrating plates themselves. This includes intensive study of the elastic properties of quartz.

SIMPLIFICATION BRIEFS

Sheet steel.—Effecting an elimination in variety of stock sizes of sheet steel in various gages from 1,809 to 209, the simplified-practice recommendation for this commodity (designated as R28-29) has been reaffirmed by the standing committee of the industry, without change, for another year.

Elastic shoe goring.—The standing committee of the industry in charge of the simplified schedule for elastic shoe goring (R112-29) has reaffirmed the schedule, without change, for another year. This program has been instrumental in reducing the stock varieties of unmercerized carded cotton elastic shoe goring from 70 to 29, or an elimination of approximately 58 per cent.

Roofing ternes.—Several years ago industry developed a simplified schedule covering the variety of weights for roofing ternes which reduced the existing variety from 9 to 7. After a review of the schedule the standing committee of the industry has announced its reaffirmation, without change, for another six months. Copies of the printed recommendation are available, at 5 cents each, from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Paper board shipping cases for fruit and vegeta-bles.—A proposed simplified schedule of 27 sizes of paper board shipping cases for canned fruit and vegetables received the approval of a general conference of the industry, held May 29, 1931, in Washington, D. C., under the auspices of the division of simplified practice of the National Bureau of Standards. The proposal in the form of a simplified-practice recommendation has been referred to all interests for their formal acceptance.

Eaves trough and conductor pipe.-The May, 1931, meeting of the standing committee of the industry, reaffirmed, without change, the simplified schedule (R. 29) for eaves trough, conductor pipe, conductor elbows, and fittings, for the next six months. Prior to the adoption of this recommendation industry was confronted with 21 varieties of the commodities, whereas now there are 16. Copies of this recommendation are available, at 5 cents each, from the Superintendent of Documents, Government Printing Office, Washington, D. C.

The frequencies of the secondary standards are compared against primary standards at regular intervals. These comparisons are made by measuring the fre-quency difference between selected harmonics of the fundamental frequency of each standard. Several such difference frequencies are measured, and a mean taken. The measurements of difference frequencies are made by means of an oscillograph, or by a directreading balance method. Measurements over several months have shown that the piezo oscillators remain constant to a few parts in a million under all ordinary conditions of use. These conditions include occasional transportation by motor truck.

Iron and steel roofing.-The simplified recommendation (R78-28) covering iron and steel roofing has been reaffirmed by the standing committee of the industry, without change, for another year. This recommenda-tion established dimensions for widths, lengths, gages, and weights of corrugated, roll, V crimp and pressed standing seam galvanized or painted roofing. Through the promulgation of this schedule the industry reduced the variety of iron and steel roofing items from 292 to 179, or an elimination of approximately 39 per cent.

Abrasive grain sizes.—The simplified schedule for abrasive grain sizes is now available in printed form, and copies may be secured from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents each. This recommendation estab-lishes a table of allowable limits for the sizing of aluminum oxide and silicon carbide abrasives for polishing uses and for grinding wheel manufacture. In requesting copies from the Superintendent of Documents it should be designated as "Simplified Practice Recommendation, R118-30, Abrasive Grain Sizes."

Plain and colored polished cotton twine.—A general conference of representatives of all interests, held in New York, N. Y., on June 17, 1931, under the auspices of the division of simplified practice of the National Bureau of Standards, approved a simplified practice recommendation on plain and colored polished cotton twine. The recommendation, which covers twine sizes, yarn sizes, number of feet per pound, put-ups, colors, and packaging of stock varieties of this commodity, will shortly be submitted to the industry for written acceptance. The appointment of a standing committee of the industry was also authorized by the conference.

Wire screen cloth.—The division of simplified practice of the National Bureau of Standards has just announced that a general conference of all interests held in New York, N. Y., on June 18, 1931, approved a simplified practice recommendation covering wire screen cloth. The appointment of a standing committee of the industry was also authorized by the conference. This simplification program considers the meshwire size, width and length of roll, and method of packing steel wire screen cloth, and bronze and copper wire screen cloth. The recommendation will be effective one month after the department's letter announcing the receipt of the required degree of acceptance.

NATIONAL WEIGHTS AND MEASURES CONFERENCE

Actions of Conference Are Far-Reaching in Their Effect, Although Such Actions Are Not Binding on the States

Last month at the National Bureau of Standards was held a meeting of 250 weights and measures officials and representatives of scale and pump manufacturers, railroads, and industry, which considered and took action on a wide variety of matters directly affecting the buyers and sellers of commodities and services.

The "penny-in-the-slot" scale may not ordinarily be thought of as a device for the selling of service, yet such a scale does represent itself as prepared to render a weighing service for a consideration, and as such it becomes subject to official regulation. One of the actions taken by the Twenty-fourth Na-

One of the actions taken by the Twenty-fourth National Conference on Weights and Measures, which will be far-reaching in its effects, was the proposal of a code of regulations for person-weighing scales the "penny scales" which are now appearing in everincreasing number on the streets and in public places.

Whether the scale passes out a ticket with a weight stamped upon it or whether the customer reads his weight from a chart, the code will require the same clearness and definiteness of the indications and will impose the same restrictions as to permissible errors as in the case of commercial scales used in the weighing of commodities. The National Conference on Weights and Measures

The National Conference on Weights and Measures is composed primarily of weights and measures officials, who gather from all parts of the country to discuss problems affecting their work which has for its principal object the prevention of short weight and measure in the buying and selling of commodities and service. The conference is effective in promoting uniformity throughout the United States in the matter of weights and measures laws and regulations and methods for their enforcement.

At the conference, which concluded June 5, 25 States and the District of Columbia were represented. Among the subjects considered were a special equipment for the testing of large-capacity oil meters, several forms of trucks carrying from 7,000 to 16,000 pounds of test weights in units of 500 or 1,000 pounds, special scales installed on the highways for determining the actual load on each wheel of a loaded truck so as to prevent overloading and consequent damage to the highways, and various types of gages and gaging utilized in industry to control manufacturing processes.

A number of officials of the Federal Government addressed the meetings which extended over four days. R. S. Regar, of the Post Office Department, announced a 4-year program of his department for the testing, adjustment, and replacement of scales used in the weighing of the mails, in which connection it was stated that "scales are the most important item of supply and equipment in the entire Postal Service," and that it is apparent that "corrective measures must be taken immediately to protect the revenues of the Government and the interests of the public."

The conference was asked by H. A. Spilman, of the Department of Agriculture, to consider a proposed 64781-31----2 bill designed to effect a consolidation of existing Federal legislation relative to baskets, hampers, and barrels for fruits and vegetables, and to correct certain faults which have been found to exist in these laws, particularly interference with State statutes demanding sale of dry commodities by weight.

A recent amendment to the Federal food and drugs act was discussed by Dr. W. S. Frisbie, also of the Department of Agriculture; under the new law canned fruits, vegetables, and fish will be considered standard if they conform to a certain standard of quality and fill, in which case no special labeling will be required. However, if below the established standard of quality or fill, they must be labeled "Below U. S. Standard— Low Quality but Not Illegal." Doctor Frisbie pointed out that both grades of products will, of course, be required to be entirely wholesome and pure under the general provisions of the food and drugs act.

F. S. Holbrook, of the National Bureau of Standards, spoke upon the status of standard-weight legislation for bread; several State laws requiring standard-weight loaves have recently been attacked in the courts by the bakers.

The conference was addressed by Hon. Charles West, Member of Congress from the Seventeenth Ohio district, who urged that a proper balance be maintained between Federal and State regulations along weights and measures lines, so that on the one hand interstate commerce might be safeguarded, and on the other hand there might be a minimum of encroachment on the rights of the States to regulate their own internal commercial affairs.

The methods of weights and measures control in Canada, where the entire service is maintained by the central Government of the Dominion, was described to the conference and contrasted with the system followed in the United States, by D. J. McLean, superintendent of the Canadian Weights and Measures Inspection Service.

Other speakers were H. S. Jarrett, of Charleston, W. Va., who discussed the marking of all package goods with statements of their net contents; W. O. Williams of Girard, Ohio, who urged the rigid inspection and testing of all person-weighing scales; A. Bousfield, of St. Johnsbury, Vt., who traced the development of large-capacity scales over the last 50 years; M. J. J. Harrison, of Chicago, Ill., who discussed, with particular reference to coal weights, the factors involved in large capacity weighing; De Forest McLin, of Huntington, Ind., who extended a warning against the activities of incompetent, so-called "scale mechanics" who prey upon scale owners particularly in the smaller towns; and C. L. Richard, of Chicago, Ill., who told the conference of the activities of the National Scale Men's Association, an organization having many interests in common with the conference.

The conference revised a previously adopted code of regulations for glass bottles used at retail filling stations for dispensing lubricating oil for automobile crank-case use. Certain oil distributors wanted the conference to exempt from the requirements of the code all bottles intended to be marketed as sealed containers, but while the former code was liberalized in some respects, notably by permitting a popular type of tall, small-diameter bottle, it failed to accede to the request for the exemption of sealed bottles, and recommended that both sealed and unsealed bottles be required to have a capacity line and a statement of their capacity blown in the bottle.

A code of regulations for mileage-recording instruments, known as odometers, was finally adopted, having been tentatively adopted a year ago. It was recommended that after January 1, 1932, new measuring devices for grease and transmission oil be required

MECHANICAL TESTS USED IN GRADING FARM PRODUCTS

Mechanical and chemical tests are rapidly replacing human judgment in measuring the quality of farm products. Ten years ago, says the United States Department of Agriculture, only a few such tests were used successfully. To-day many products are tested chemically or mechanically by methods that give to particular quality factors a specific value in terms of commodity standards.

One device recently developed measures the moisture content of grain by determining the resistance offered to an electric current passed through it. This method requires only 30 seconds, as compared with the 40 minutes necessary under the old method.

Technical tests are also employed in measuring certain quality factors in fruit. The sugar content of grapes is determined by the saccharimeter. A sugar acid test is used to ascertain the maturity of citrus fruits. A specific gravity test shows the maturity of cantaloupes.

In grading canned fruits and vegetables a pressure gage indicates the vacuum condition of the can. The density of sirups is tested with hydrometers. Salinometers are used in testing brine solutions, and penetrometers in determining the consistency of such products as canned pumpkin. Mechanical devices measure the maturity of canned corn. A fruit pressure tester has been developed to determine the maturity of plums, apples, and pears. The colorimeter measures color in hay, cotton, and honey, in which products color is an important quality factor. Cotton fiber lengths are measured with a high degree of accuracy by an improved cotton fiber sorting machine. The strength of cotton fibers may be ascertained by the bundle fiber test.

Some quality factors, such as flavor and odor, are naturally difficult to measure by technical tests, though means for doing so may some day be developed. Research on this problem is under way. The progress already made in the measurement, by technical means, of specific quality factors suggests that dependence on personal judgment or skill, though still necessary to a considerable degree, may eventually be largely eliminated. This elimination will make grading increasingly uniform throughout all seasons and areas and under varying conditions. to be so designed that whenever the lubricant is exhausted the device will become inoperable or a conspicuous warning will be given that the device is in need of refilling.

The various codes of regulations adopted by the conference do not become effective in most States solely by reason of the conference actions; usually it is not until these codes are promulgated by the State officials, under statutory authority, that their provisions become mandatory. In some States, however, adoption of a code of specifications and tolerances by the conference either automatically or indirectly results in putting such a code into effect.

FOURDRINIER WIRE CLOTH

A general conference of manufacturers, users, and others interested in Fourdrinier wire cloth for paper machines, was held in Washington, D. C., on June 2, 1931, to consider the establishment of standards of quality for this commodity.

A few suggestions were received from correspondence and from the conferees which resulted in certain constructive revisions of the recommendations as proposed by the Wire Cloth Manufacturers Association. Letters were read from interested individuals who were not represented at the conference, but who, with two exceptions, were in entire sympathy with the standardization program.

The conference voted to approve the proposed standard as revised and to recommend it for acceptance as the standard of quality for the industry.

The proposed commercial standard as approved by the conference specifies: The physical requirements for wire before weaving, requirements for wire cloth after weaving, the seam requirements, terminology, method of inspection, wording of labels, method of handling the wire cloth, including packing, storing and unpacking, installation, and care in use.

The purpose of the standard is to establish standard nomenclature and definitions, to secure a more intelligent application and use of the wire cloth; to promote a longer life, fewer shutdowns, and to increase the general satisfaction in the use of Fourdrinier wire cloth.

A standing committee with G. W. Wray, of the National Bureau of Standards, as chairman, was appointed to represent the various interests of the industry and to receive all comments and suggestions for the improvement of the commercial standard specification. The conference recommended that the standard be considered annually for revision to keep it continuously in accord with the desires of the industry and advance in the art.

The certification plan was approved by the conference for application to Fourdrinier wire cloth. The certification plan consists in the compilation and distribution of lists of manufacturers who are willing when requested to do so, to certify to purchasers that products supplied by them comply with all the requirements set forth in the commercial standard.

The commercial standard as approved by the conference has been circulated to all interests of the industry for written acceptance.

THE EXTENSION OF WEIGHTS AND MEASURES SUPERVISION

Concerted Efforts of Business and Industry Needed to Spread Protection Afforded Through Weights and Measures Supervision

By RALPH W. SMITH, National Bureau of Standards¹

A weights and measures official has two well defined classes of duties which, although directed to the same general end, are yet so distinctive that they are often separately considered. The first and more fundamental of these duties is the testing for accuracy of the actual instrumentalities of weighing and measuring, and includes the approval for commercial use of apparatus which is found to be correct, and the exclusion from commercial use of all other apparatus. The second duty is supervision over the use of approved apparatus to insure that it is of proper design for the use to which it is being put and that it is being properly used, the prevention of short weight and short measure, and the inauguration of the proper legal steps to secure the punishment of those guilty of willfully delivering less or taking more than the quantity represented. It is obvious that the exercise of the second duty must follow upon the execution of the first; but with human nature what it is, it must be equally obvious that unless the second duty is faithfully performed, the discharge of the first can effect only nominal protection to the consumer and to the competitors of that small minority of merchants who, without supervision, would indulge in dishonest practices.

This summary of the duties of a weights and measures official makes this service appear to be so fundamental and so necessary that it seems that long since it would have been established everywhere. But it is a fact that weights and measures supervision does not exist at all in some of the States, and that it is not uniformly supplied in all sections of all States where it does exist to some extent. The reasons for this condition are not readily apparent. Therefore, it is proposed briefly to analyze the general causes of this condition, and in so doing to pay especial attention to the effect on business and industry which it is considered naturally flows from a proper supervision of weights and measures, and the consequent attitude which it is conceived business and industry may well maintain toward the establishment and the support of official inspection services.

First, then, is there any conflict of interest between business and industry on the one hand, and official weights and measures supervision on the other? There appears to be no reason why the closest cooperation and harmony should not prevail between these interests. In the first place, there can be no argument that accuracy is the paramount consideration in the case of all devices used commercially to determine the weight or measure of commodities bought or sold or the value of services rendered. A scale, a weight, or a measure is procured and used for the purpose of eliminating guesswork and reaching a true value. There can be no question that the very great majority of our merchants and manufacturers desire to employ correct apparatus. Anyone who has observed the very great advances made in the last few years in the manufacture of weighing and measuring devices knows this to be a fact. Buyers are constantly demanding greater refinements and increased accuracy and are willing to pay well for apparatus having these attributes; less satisfactory apparatus is less and less in demand. One of the important functions of the weights and measures official at this stage is to protect the buyer of the apparatus, since his original inspection and approval are the guarantee to the buyer of apparatus that he has, in fact, secured the thing he desires, and for which he has paid—that is, an accurate piece of apparatus which is legal for commercial use.

If initial accuracy of apparatus is so desirable, it is axiomatic that the apparatus should be kept at all times in a condition accurately to fulfill its function; otherwise the care exercised at the time of purchase is nullified. It is a fact, however, that some persons, including many who are technically trained and should be better informed, assume that a weighing or measuring instrument is inherently accurate and will remain so until it can no longer be used, or, at least, that if it be found to be correct when new, no further attention will ever be necessary. It need not be emphasized to those whose business it is regularly to examine these devices that nothing could be further from the facts.

Weights and measures instruments are mechanical devices in the same sense as an ordinary machine; it follows that these instruments will not, in the very nature of things, continue to maintain their accuracy indefinitely without attention. Weighing and measuring apparatus will more or less frequently become inaccurate during and as a result of use. Here again the weights and measures inspector plays an important part. His periodic examinations, when resulting in approval, are insurance to the merchant that his own apparatus and also that of his competitor, is continuing to function as it should. This insurance, which is so necessary to stability of business, can in no other way be so completely secured. The official nature of the test is also of much value especially in cases of dispute. Obviously it is a corollary that when approval fails to follow an inspection-when it is found necessary to prohibit the use of improper or inaccurate equipment—such action, far from being a detriment to business and industry, is manifestly a help to these interests, since continued accuracy is every whit as important to the proper conduct of business as is initial accuracy.

Thus far one fails to find anything which should be inconsistent with enthusiastic support of weights and

¹ Paper read before the Twenty-fourth National Conference on Weights and Measures, held at the National Bureau of Standards, June 2 to 5, 1931.

measures supervision on the part of industry and business.

And now let us proceed to a brief survey of how the exercise of the second group of the weights and measures officer's duties affects business and industry. Having seen to it that the mechanical condition of the weighing and measuring apparatus in his jurisdiction meets the prescribed requirements, the official makes it his business to prevent the misuse of that apparatus, to protect the buyer and the seller from the delivery of less or the taking of more, within reasonable limits, than the represented amount, and to secure the punishment of the individual who will not conform to the law but who insists upon engaging in fraudulent and dishonest practices. What effect have these activities of the official upon the commercial life of the community?

The merchant is assured that a single standard is being demanded of all and that all are being required to meet that standard. Unfair, cutthroat competition, which descends to the systematic stealing of amounts small perhaps in a given instance, but aggregating a tremendous total, is eliminated. Carelessness in weighing and measuring and inattention to the rights of others in the matter of quantity determination, evils only less vicious by reason of the absence of the willful intent to defraud, are effectively banished. In the case of any controversy involving weighing or measuring there is available in the person of the weights and measures officer an impartial and skilled arbiter to protect the interests of both parties and to adjudicate the dispute. There is inspired in the entire community a feeling of security and confidence that their rights will be conserved, a feeling which is conducive to the stimulation of business in general. Finally those elements of the business life of the community which refuse to conform to the principles of fair and honest dealing find themselves, through the action of the courts, reduced to the necessity of discontinuing their illegal practices or transferring their operations to a section where less attention is paid to accurate weights and full measure.

Certainly there is nothing in that program which conflicts in any way with the best interests of those engaged in industry or commercial pursuits. On the contrary, such a program enhances the opportunities for progress. The conclusion appears inescapable that the character of service which is rendered by weights and measures officials is such that it should have the most hearty support of business and industry everywhere.

Our next consideration may well be to inquire as to the extent of the interest in the condition, with respect to accuracy, of a piece of weighing or measuring apparatus and in the delivery of full weight and measure. As has been pointed out, the owner and user of apparatus is vitally interested. But business is by no means alone in its interest that apparatus be correct and that correct amounts be delivered. It is obvious that the parties who buy over the apparatus directly are likewise interested. Nor does the interest stop here; it extends to the entire community. In the case of sales to the ultimate consumers of commodities, such as foodstuffs and other necessities of life, it becomes plain that every person in the community is directly concerned; and a little reflection will show that the indirect interest of all of our citizens in transactions perhaps several times removed from the ultimate sale is no less real, because unsatisfactory conditions at any point along the line of progression from producer to consumer will almost surely be reflected at the consumers' end of the journey. Moreover, a healthy condition in industry and commerce, inspired by fair dealings and the absence of controversy, reacts to the benefit of the community as a whole.

This being the case, it seems eminently logical that the supervision of the condition and use of weighing and measuring instrumentalities, which have such a close relation to the community as a whole, should be carried on by the community as a whole through the agency of an officer of the State or local government. Notwithstanding the soundness of the general princi-ple of "less government in business," nevertheless there are certain fields of activity of such a public character and of such fundamental importance that they must be subjected to official control. It is to be remembered that he who sells or buys commercially occupies a quasi public status, and that his actions affect, not himself alone, but directly or indirectly a multitude of others. Surely no fair-minded person should fail to appreciate that the control of weights and measures is a proper exercise of the police power of the State and should be supplied as a function of our State and local governments in every community in the entire country.

But if there is so great a necessity for the supervision of weights and measures, how does it happen that some of our State and local governments are lagging behind in the adoption of such regulation? It would seem that the principal reason is that some of our State and local governing bodies do not fully appreciate the conditions which actually exist within their several jurisdictions, the consequent need for comprehensive and adequate weights and measures supervision, and the tremendous savings to the people which regularly follow the establishment of such supervision. Perhaps a secondary reason, applicable to a few jurisdictions, may be the unsatisfactory results which have followed an attempt to administer an ineffective or inadequate weights and measures law, either in the jurisdiction in question or in a neighboring one; there may also have been the occasional unfortunate example of the indifferent weights and measures official who has made a farce of his administration through carelessness, inefficiency, and inattention to his duties. But such incidents, unfortunate though they are, should not result in the failure to establish or carry on supervision. Better, they should be nega-tived by the adoption of a better law or the securing of a more competent enforcement.

It is not unfair to assume that in a very large number of cases, failure of State or local governing bodies to act along any particular line is a consequence of lack of insistence of demand, properly voiced, for such action. It is the general experience that consumers are favorable to proper supervision of weights and measures. But sometimes the public, as a whole, are not well organized and thus lack the proper channels to make their desires clearly known. Business and industry are usually better equipped in this re-

0

13

spect. In view of the community of interest in weights and measures supervision it is surprising that our commercial interests have not, ere this, either in conjunction with consumers' organizations or independently, demanded and secured weights and measures supervision wherever it is lacking; for modern business in the United States is not usually backward in taking all necessary steps to protect itself and advance its interests, and it surely appears that the procurement of weights and measures supervision constitutes one of these steps.

It should be remembered in this connection that those jurisdictions which have not provided for supervision are in the minority. It is well to point out also that it is not intended to suggest by what has been said heretofore that in places where proper weights and measures supervision is now in effect business interests are inimical to this supervision, or that they have not done their full share in bringing it about. Quite the contrary is the fact. As a very general rule the business interests of the community strongly second the efforts of the official. It is questioned, only, why the business interests of the remaining communities consent to inactivity on the part of the governing authorities in the matter of making such supervision an accomplished fact.

The conclusion in this relation must be that, never having experienced the benefits to be derived, they either have not given the subject the consideration it deserves, or they fear that concomitant inconveniences will offset the good which might result from the inauguration of official weights and measures control. Such conceptions are, perhaps, not surprising, especially in view of the fact that in the past the protection of the consumer may have been overemphasized, and too little stress laid upon the advantages to be derived from competent supervision, by the business interests themselves.

The consumer being already convinced of the desirability of the service, it remains to bring the facts of the case to the attention of the business interests before it can be expected that they will come to the point of making a demand for the service in question in localities where it does not now exist. In other words, consideration may well be given to the proper method of interesting this class.

If representative business men from jurisdictions not having adequate regulation were to come to the National Conference on Weights and Measures and observe the proceedings, noting the manner in which all parties to each question are invited and encouraged to discuss the matter from their various standpoints, and marking how earnest are the attempts made to do no injustice to any group, any underlying distrust of weights and measures regulation would quickly disappear. This, then, is an excellent way to interest business.

Efforts have been made in the past to secure this very result and in consequence numerous representatives of industries very immediately concerned are accustomed to attend the conference each year. The lists of those in attendance disclose numerous representatives of manufacturers of weighing and measuring devices, of railroads, of the baking industry, of petroleum producers and distributors, and of other fundamental industries in which weighing and measuring play an extremely important part. But many, and perhaps the majority, of these men come from sections in which inspection services are already firmly established. Therefore efforts should still be carried on, especially to secure business representatives from those sections from which official representation can not as yet be secured, and in these efforts every member of the conference should share. Results may be slow, because our States rarely have appropriations from which the expenses of such delegates can be paid, and because, the importance of the matter not being understood, individuals rarely can be found who are content to consume their time and to spend their personal funds to attend a meeting which is not directly in line with their particular business interest. Again, since the conference programs must of necessity be arranged in harmony with the idea of the greatest good to the greatest number in attendance, they can not be arranged specifically to interest this groupsince it would always be a small minority of the whole attendance. To do so would work an injustice on the officials who attend in order to attain greater efficiency in their work, and who, therefore, desire a program along technical lines. However, efforts to secure such attendance should be continued, and with the cooperation of the conference membership such attendance should eventually be secured; it is reasonable to anticipate that this will be followed by an initiation of activity in those jurisdictions from which such attendance is obtained.

That country-wide weights and measures laws and their enforcement is the desirable condition is unquestionable. Primarily, business interests and consumers everywhere are entitled to benefits and protection so fundamental as this. Secondarily, our national commercial and industrial fabric is so closely woven and our interstate-commerce activities so universal, that so long as any section remains which does not regulate weights and measures its influence will, to a greater or less extent, be felt throughout the country as a whole, and those jurisdictions in which everything possible is being done to secure the best conditions will as a consequence fail to achieve entire success.

The goal, then, should be the demonstration of the advantages of supervision in so unmistakable a fashion that every jurisdiction will be convinced that it can no longer afford to lag behind. Every person who attends the national conference should constitute himself a missionary to spread the message of weights and measures protection. Especially should the representatives of business concerns and of organizations of business men lend their interest and their efforts to the movement to extend this protection to every community in the United States.

The degree of success which will follow will be dependent in large measure upon the sincerity and the earnestness and the persistence with which this program is supported. But with industry, commerce, the consuming public, and the weights and measures official standing shoulder to shoulder in a joint endeavor to bring about adequate supervision in every city and town of every State throughout the length and breadth of our country, ultimate success should surely crown these efforts.

DAIRY STANDARDS PROTECT CONSUMER

More Than 80 Per Cent of Milk and Cream Produced in California Is Graded For Quality

By G. H. HECKE, Director, Department of Agriculture, State of California

Health always enters into the subject of foods. Public health must be safeguarded jealously. Maintenance of food standards, so that the public is protected against ill health, sickness, and infection, is a protection to the consumer. Thus, a State department of agriculture has the dual function of first serving producers, and secondly, protecting consumers. The two tasks coordinate naturally.

From the many types of work performed by the California department of agriculture, the records made by its bureau of dairy control may be cited as illustrations of the protection afforded consumers through the creation and maintenance of food standards in dairy products. By elevating those standards the department has not only enhanced the value of dairy products to the consumer but to the producer as well.

The accomplishments of this department in dairycontrol work find their beginning in the enactment of the State's pure-milk law in 1916 and its reenactment in more stringent form in 1927. This law defines market milk, provides for the securing of wholesome, pure-milk supplies, prevents the sale of impure milk, empowers cities, counties, and groups of municipalities to establish milk-inspection service and provides funds to defray the expenses of the inspection service and the maintenance of laboratories. The department promulgates the rules and regulations under which the various grades of milk are produced. Both farm and commercial dairies must stand rigid examination.

The scope of this program has increased until to-day 72 inspection districts are operating under the supervision of the department, in cooperation with local health officers. These districts cover 96 per cent of the total population of the State and more than 550 cities and towns. The control of this work is carried on mainly by conducting surprise milk scoring contests. The milk is examined for bacterial analysis, flavor, and odor, sediment, milk-fat contents, acidity, and character and appearance of bottles and caps. The average quality of the graded milk in California computed on a volume basis for last year was more than 95 per cent perfect, a record of quality that will be difficult to surpass.

This program, which has developed largely of its own momentum, protects the consumer against unwholesome and unsafe milk supplies, safeguards producers and distributors against unfair competition, drives the illegitimate competitor who has no regard for public health or honest business out of the field, and furnishes assistance in the solution of trade problems for dairymen and distributors. This program has stimulated the confidence of the public in milk as a food and has resulted in increased per capita consumption of the product.

The work of the department, through its bureau of dairy control, includes more than the regulation and improvement of market milk. Its projects embrace, in addition to market milk work, the supervision of manufacturing milk and cream, butter control, cheese control, ice-cream control, general dairy products inspection, imitation licensing service, commercial testing service, a service for dairy containers in the form of an exchange, and the compilation and dissemination of reliable statistics on various phases of dairying.

The work of supervising manufacturing milk and cream, which started in 1925, has grown to such an extent that it now includes in its scope 90 plants manufacturing butter, cheese, ice cream, and evaporated milk whose raw supply comes from approximately 19,000 dairies. More than 80 per cent, therefore, of all manufacturing milk and cream produced in California, is graded for quality on a definite scientific basis.

Special attention is paid to the washing, sterilizing, and handling of equipment and the protection of the product from contamination. Raw material found to be unwholesome or unfit for consumption within the provisions of the dairy law is colored and marked for identification and returned to the producer.

By using the direct microscopic count in the grading of manufacturing milk and a standard acidity test in connection with the grading of manufacturing cream, an accurate examination is daily made of the product of hundreds of dairies. It not only furnishes reliable information relative to the quality itself, but also supplies an index to the dairies which are using faulty methods, thus enabling the inspectors to concentrate their attention on such patrons.

The department scores the butter produced in the State for commercial quality, tests it for composition, and examines the packages for labeling. Special permits are required for manufacturing butter from sour cream without the use of neutralizers. Factories found manufacturing cheese deficient in fat or containing excessive amount of moisture are instructed to conform with the requirements of California's general dairy laws.

A maximum bacterial standard of 150,000 bacteria per gram has been established for ice cream. Consumers are protected in every possible way against fraud, bad manufacturing, the use of substitutes, and misleading trade names.

The remarkable thing about the work of this division of the department is that it is practically selfsupporting. Ninety-six per cent of its total budget of \$150,000 is contributed through voluntary trust funds from various branches of the industry and receipts from licenses, and only 4 per cent is obtained directly from public funds derived from taxation.

ELECTRICAL INDUSTRY ORGANIZES FOR STANDARDIZATION WORK

Organization of Electrical Standards Committee Under the Auspices of the American Standards Association Has Been Effected

For several years there has been under way a movement having for its object the unification of the standardizing activities of the several leading agencies in the electrical industry, including the American Institute of Electrical Engineers, the National Electrical Manufacturers Association, the American Standards Association, and the United States National Committee of the International Electrotechnical Commission.

In February, 1930, the American Institute of Electrical Engineers requested the Electrical Advisory Committee of the American Standards Association to draw up plans for the organization of a joint agency in the electrical industry functioning as an integral part of the American Standards Association for the purpose of carrying out the standardizing activities of the electrical industry. At the June meeting of the council of the American

At the June meeting of the council of the American Standards Association there was presented a plan for an organized process which was formally approved by both the Electrical Advisory Committee and the council of that association. The plan was submitted in the form of a constitution for the administrative body to be organized for the execution of the plan and to be called the Electrical Standards Committee, which will deal with the standards of the electrical industry, including the standards of the science and art of electrophysics and electrical engineering, all classes of standards for electrical machinery, equipment, and materials employed in the production, distribution, and utilization of electric power or for electrical communication, and regulations for these applications of electricity when recognized as standards.

The Electrical Standards Committee will act as follows:

1. As an advisory committee to the A. S. A. for the coordination of standardization within its scope under any of the recognized procedures of the A. S. A., with the right to determine questions of sponsorship, the scopes of projects, and the personnel of sectional committees where these can be done by the unanimous consent of the advisory committee.

2. As the sponsor body for the electrical industry when this course is ordered by a unanimous vote of the committee.

COTTON GOODS FOR RUBBER AND PYROXY-LIN COATED AUTOMOTIVE FABRICS

Manufacturers, distributors, and users of cotton goods for rubber and pyroxylin-coated automotive fabrics were notified June 15, by the National Bureau of Standards that the commercial standard project for these items had been formally accepted by industry and would be considered effective as of June 15, 1931.

The chief purpose of the industry in voluntarily establishing the commercial standard is that they may have a standard specification that represents the mutual understanding of the industry; one that will be sufficiently broad and clear to insure the manufacturer 3. As a sectional committee of the electrical industry under the sponsorship defined above when this course is ordered by a unanimous vote of the committee. In this case the formulation of standards may be done by the E. S. C. itself or by delegation to working committees.

4. For the coordination of American participation in international standardization projects within its scope.

5. For any project involving other fields than the electrical industry the committee will determine or recommend a sponsor to act for the electrical industry with any other qualified body, or where its interest does not justify a sponsorship it will recommend the degree of cooperation which is desirable.

The Electrical Standards Committee will consist of representatives appointed by the following organizations:

Name of organizations	Number of repre- senta- tives
American Electric Raflway Association . American Institute of Electrical Engineers. American Society for Testing Materials. Communication Group. Electric Light and Power Group. Fire Protection Group. National Electrical Manufacturers Association. U. S. Nary. National Bureau of Standards.	1 3 1 1 3 1 3 1 1 3 1 1

The above-noted plan was unanimously approved by the A. S. A. Standards Council on June 4, 1931, and will be placed in operation when formally approved by the above-noted member bodies. The council approved also the proposal to have the personnel of the Electrical Standards Council become part of the personnel of the United States National Committee of the International Electrotechnical Commission in case this proposal proves acceptable to the United States National Committee.

All of the expenses of the Electrical Standards Committee will be defrayed by the American Standards Association, as will also those of the United States National Committee of the International Electrotechnical Commission if it approves the proposed plan of consolidation.

of the necessary data to be used in the weaving of any cloth for rubberizing that he may be called upon to make, and one that will provide the retailer or user with a basis for acceptance or rejection of all or any part of a shipment.

The specifications and requirements for this standard are rather broad and inclusive in their scope, covering in a general way the quality, width, thread count per inch, unit weight, and tensile strength, and more specifically the lengths of cuts, major and minor defects, the amount of sizing allowed, injurious chemicals and methods of inspection and test. Printed copies of the standard will be made available within a short time.

ACTIVITIES OF THE AMERICAN STANDARDS ASSOCIATION

Scope of Current Standardization Projects Reviewed

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

Test code for automatic refrigerators.—Work on a draft standard test code for automatic refrigerators will be started in the near future by the committee on tests of the sectional committee on specifications for refrigerators, which has been reorganized for the purpose. The subcommittee has recently completed a draft standard test code for ice refrigerators. The tests for automatic refrigerators will cover five principal elements of performance as follows: Ambient temperature under standardized conditions, internal temperatures, power input (electricity, gas, or other fuel, and water), proportion of time in operation, and number of cycles of operation in a unit of time.

Fire-hose couplings.—A bill making mandatory the standardization of all fire-hose couplings in the State of California in accordance with the American standard for screw threads for fire-hose couplings has just been passed by the State's legislature and approved by the governor. The action of the legislature follows serious fires in Berkeley and Mill Valley where aid sent from San Francisco was unable to function because the smaller cities used hose coupled with threads different from the San Francisco standard. The bill provides for the completion of the change-over to the standard in all California municipalities during the next five years. The work is to be carried on under the direction of the State fire commissioner. The act applies also to industrial establishments and property owners having equipment for fire protective purposes. The bill attacks the problem from another direction, making it unlawful for any firm or corporation to sell in California any fire-hose hydrant, fire engine, or other equipment with threaded parts for fire protective purposes which do not comply with the standard. A fine of from \$50 to \$200 or imprisonment from 5 to 30 days is stipulated for violation of the act.

Preferred numbers.—In order that renewed consideration may be given the subject of preferred numbers, the association will reorganize the special committee on preferred numbers into a sectional committee under American Standards Association procedure. The new committee will review the proposed system of preferred numbers which was recommended in 1927 by the special committee, together with any data which have become available regarding the application of the recommendation, and suggestions and criticisms which have been received in this respect.

The recommendation of the special committee was published in 1927 by the association with a recommendation to American industry that it be given a try out in practice, the entire subject of preferred numbers being a rather novel one. In fact, the use of preferred numbers has been given due attention only since national standardization became of importance in most industrial countries, not long after the World War, although the French colonel Renard had studied the problem as far back as 1875 with regard to cables for captive balloons. Being in charge of the military aircraft section, he found that 625 different types of cables were used for this purpose, and he reduced this number to 17 on the basis of preferred numbers.

Preferred numbers are based on the principle that in order to cover a certain range of sizes, ratings, values, etc., the most effective stepping-up of the several members of the series should be in a geometric ratio; that is, each number should be larger than the preceding one by a definite percentage. The significance of such a system will at once become apparent if visualized in connection with, say, a series of motor ratings extending from 1 to 250 horsepower. If in this series the ratings 10 and 100 appear, it is obvious that with 12.5 the next larger rating above 10 horsepower, the next larger rating above 100 horsepower should be 125. In fact, whereas a stepping-up by 2.5 horsepower means 25 per cent of the rating of the 10horsepower motor, it would hardly mean anything in the case of the larger motor.

Evidently there are many cases in engineering design and industrial production where the application of preferred numbers, although possible in principle, must give way to the requirements of existing practice for reasons of economy. It can not be expected that in setting up certain standards industry will scrap valuable tools or equipment for the sake of changing over to a new series of sizes just because this is an ideal one. On the other hand, however, there are many cases in which existing standards are revised where the series of preferred numbers can be followed without any difficulty. The purpose of the A. S. A. publication of 1927 was, therefore, to recommend that American industry first try out the use of the proposed preferred-number system in cases of the latter kind, and also in cases where standards for new objects are being set up; that is, where no existing practice limits the freedom of choice in dimensions, ratings, etc.

Although very useful and interesting applications of the preferred-number system have been made by several industrial organizations since the A. S. A. recommendation was published in 1927, it can not be said that the principle has been given as much attention as it deserves. It is for this reason that the association has decided that the subject should be given renewed consideration.

In connection with the system of preferred numbers published in 1927, a suggestion has been received by the association that it might be well to work out a series of preferred numbers in fractional sizes to be in parallel with the 1927 series which was worked out in decimal values exclusively. This, as well as any other questions which may come up, will be given attention by the new committee.

Vegetable-tanned leather belting.—The scope of the work to be undertaken by the sectional committee on standardization of leather belting will be "specifications for vegetable-tanned leather belting, including raw material, construction, marking, physical and chemical tests." The committee will use Federal specification No. 37 on vegetable-tanned leather belting as a basis for its work, incorporating certain revisions which have been considered desirable by the experts,

FOOD STANDARDS FOR THE HOUSEWIFE

A majority of men and women who enter the market place are handicapped in buying because they are uninformed. Usually all they know about the item they want to buy is what the seller tells them. The United States Government has its National Bureau of Standards to test products before they are purchased, but no such service has been available for the individual consumer.

The Kroger Grocery & Baking Co. announces a desire to change this, according to an account appearing in Advertising and Selling, which states that the president of the company has announced that his company had set aside a fund of \$1,000,000 for the establishment and maintenance of a foundation which will do for the housewife what the National Bureau of Standards does for the Government—put in her hands information which will make her a better, because a wiser, buyer.

"There has never been in the food industry," asserts the president of the company, in his announcement, "any effort to fix standards by which food values may be judged or any attempt to find better ways of growing or preparing foods. This first effort of its kind will involve the testing and analysis of every variety of food product from its source to the table."

The Kroger Foundation, though financed by the company, will function as a wholly independent organization. Again quoting the announcement, "Our only direction to the man in charge is: Search out ways and means of making food standards better and better."

MARKED INCREASE OF ACCEPTORS FOR SIMPLIFIED INVOICE FORMS

Acceptances of the simplified invoice forms, included in Simplified Practice Recommendation No. R37-28, Commercial Forms, total 1,049, according to a list of acceptors recently issued by the National Bureau of Standards. This number represents an increase of 391 acceptors, or approximately 59 per cent since July 1, 1930. Mimeographed copies of the list may be had on application to the bureau.

This recommendation was sponsored by several associations in California and Oklahoma where specific committees have been designated to carry on this the Railway Accounting Officers' Association. Since the adoption of the simplified invoice form in 1927, these associations have been actively engaged in the promotion of its use. Through the development of the recommendation for commercial forms, the thousands of miscellaneous forms in use prior thereto have been simplified to three standard forms.

Commendable results, in securing acceptances, recently have been attained by the purchasing agents associations in California and Oklahoma where specific committees have been designated to carry on this work. Inquiry and purchase order forms are as well as rules for the installation, care, and maintenance of leather belting. The latter will be added in an appendix to the standard proper, which will include the quality and test specifications for the belts comprised in the Federal specification.

included with the simplified invoice form in the recommendation.

ACCURATELY REPRODUCIBLE LIGHT STANDARD

It is possible to make the heretofore rather indefinite "candlepower" standard used in rating electric lamps, gas lights, searchlights, and other light services accurate and invariable by employing the new light standard developed at the National Bureau of Standards.

The candlepower of a source of light, such as an electric lamp, is measured by comparing it with a standard light source of some kind. The name implies comparison with a candle, and such a standard was at one time used. The particular type of candle, and the conditions under which it should be burned, had to be definitely specified. Various other flame standards have been devised and used, most of them being lamps of special design, burning certain liquids under specified conditions. In general, the lamps were an improvement on the candle, but at best were unsatisfactory, since the flame could not be reproduced at different times with sufficient accuracy.

In view of the unsatisfactory conditions resulting from a multiplicity of poor light standards, certain nations, including the United States, reached an agreement in 1909 whereby the candle was defined in terms of the light given off by certain carbon-filament electric lamps deposited in the official laboratories of the various nations. The candle so defined was called the International Candle. The electric lamp standard, however, are not reproducible. The International Candle is therefore subject to such changes as time or use may cause to take place in the standard lamps.

A paper in the June number of the BUREAU OF STANDARDS JOURNAL OF RESEARCH describes the results of experiments in the development of accurately reproducible light standards. The source of light used in establishing the new standard was the open end of a small tube closed at the other end and maintained at a definite high temperature. The amount of light emitted from the interior of the tube through the open end is not effected by the material of which the tube is made, but depends only on the temperature. The tube actually used was composed of thorium oxide, a very refractory material, and was kept at a definite and reproducible high temperature by immersing it, closed end down, in a crucible of molten platinum. When the platinum begins to solidify, the immersed tube is at a definite temperature (3,224° F.) and remains at this point as long as any liquid platinum is left. The brightness of this source was compared, using an instrument known as a photometer, with the standard electric lamps of the bureau. Many comparisons were made, and it was found that the proposed standard was accurately reproducible. The actual intensity of light from a square centimeter of this source was found to be 58.84 candles.

MINING STANDARDIZATION

Clearing House of Ideas Needed to Formulate National Standards in Mining Practice and Equipment

By LUCIEN EATON, Mining Engineer, Rhodesian Selection Trust Co.¹

Even in these days, when the standardization movement has had so much publicity and has made so much progress in this country, there are people who consider it a new fad. They do not realize that, consciously or unconsciously, standardization has been practiced by humanity ever since mankind emerged from barbarism, and even before that time.

The standardization of certain sounds to carry certain meanings was the origin of speech, and the standardization of certain marks to represent those sounds was the basis of communication by the written word. Standardization of currency and of weights and measures raised the trade of the world from barter and exchange to its present high degree of development.

All of these standards: Speech, writing, currency, weights, and measures, and so on, were developed to a greater or less degree, more or less simultaneously all over the world; and the result, as we all know, is quite confusing. How much simpler foreign travel would be, if we could all speak Esperanto, for example, and all measurements were in the metric system. In much the same way different mining districts have, by reason of their isolation and of the peculiar conditions under which their ores occur, developed their own standards of equipment and of mining methods, not to mention mining terms, and these have become so deep rooted in the minds of many of the men in each district that they are considered to be the proper standards to be used under all circumstances. When, however, they are transplanted bodily to another district and a different set of conditions, they are often dismal failures.

If the essential principles of these district standards could be separated from the local variations, which are often due to tradition or are the outgrowth of habit, and if a clearing house of ideas, as it were, could be established, how much simpler it would be to avoid these mistakes and to profit by the experiences of others. Just as we know that Esperanto will never be the universal language so do we know that international standards in mining are impossible. Nevertheless, national standards are possible, and the conditions surrounding metal mining in the United States are so varied that national standards adopted here may be applied with a minimum of change to mining in the rest of the world.

About 30 years ago we attained a high degree of standardization in mining practice and equipment in the narrow veins of high-grade ore in our Western States, and from these mines the standards spread to other territories, and they are found to-day in many places here and abroad. Since the veins were narrow, and since it was desirable to break as little of the barren wall-rock as possible, narrow drifts were driven, and the cars were made high and narrow to fit the drifts. Small tonnages only of ore were required, and tramming was done by hand in 1-ton cars. Ore passes

¹ Used by special permission of the Mining Congress Journal.

and chutes were made small to fit the cars, and worked satisfactorily, because the stopes also were small and the ore was broken in small pieces. Shafts, slips, and cages were also small, for the small tonnage required could easily be hoisted from the shallow depths mined.

With the exhaustion of the narrow veins of highgrade ores, attention was turned to the large, lowgrade ore bodies, of which the porphyry copper mines are the most conspicuous examples. In order to mine these ores successfully large tonnages had to be produced at low cost, and larger equipment was needed. In order to reduce cost of equipment as well as of production, it was early seen that both equipment and mining methods must be standardized, and much has been accomplished along these lines.

In the Lake Superior district high taxation and low prices for iron ore and copper have compelled the operators to work along the same lines within the limits imposed by the conditions under which their mining must be carried on. The same trend is apparent in other mining districts as seen in Birmingham, Ala., and in southeastern Missouri. In the deep mines of the world, even though the ore may be mined in narrow veins or reefs, large units of production and transportation must be used, and a high degree of standardization is required for successful operation.

Probably the highest degree of standardization in the mining industry exists in the equipment and practice on surface and underground in the tri-State zinc district, and the low costs obtained in that district are largely due to this standardization. Other examples of low costs and high development of standardization are found on the Witwatersrand and in the diamond mines of South Africa.

The standardization campaign inaugurated and carried on by the American Mining Congress is an endeavor to coordinate the work done in the different districts, so that each may have the benefit of the others' experience and that the benefits of uniformity and simplicity in design of equipment and in its use, in so far as local conditions will permit, may be enjoyed by all.

Not content to wait for the development of national standards many of the large mining companies have developed standards of their own, covering different phases of the mining operation. This movement was stimulated by the campaign for industrial safety, and it was found that success in accident prevention was so closely connected with economy of operation that the adoption of operating standards, even though of a temporary character, was imperative.

Probably the first attempt at a national standard in metal mining was the safety code drawn up by representatives from the national societies about 20 years ago. This code was not formally adopted. Nevertheless, it has been the basis of most of the safety rules of the large mining companies. Of late, however, because of the close connection between safety and economical practice, it has been the custom to incorporate the necessary safety provisions in the standards of recommended practice for the different kinds of mining work.

Although it was one of the first subjects to be studied, it is only recently that a satisfactory standard code for fire prevention in metal mines and for minerescue work has been adopted by the American Standards Association. Standards of practice which have also been drawn up for installing and using electrical equipment in metal mines, are in process of adoption by the American Standards Association.

In 1928 a standard of recommended practice for mechanical loading underground was adopted by the American Engineering Standards Committee, predecessor of the American Standards Association. A standard for underground transportation was also drawn up and adopted. The scope of this standard is to be enlarged, and recommendations of practice are to be added, before it is submitted to the American Standards Association for adoption.

Preliminary reports have been prepared on standardization of practice in methods of sampling, recording geological data, and estimation of ore reserves; on metal mine accounting, drills, and drill steel, mine timbering and timber treatment, and ventilation; others are in process of preparation. When completed, these standards will form a skeleton, upon which the development and equipment of a metal mine can be based with a minimum of waste in money and effort.

In actual mining practice changes are going on continuously. It is always the endeavor to establish a standard cycle of operations for each 24 hours, or for each shift. In drifting it may be desired at first to drill and blast and muck out one round once in 24 hours. By speeding up the drilling and mucking,

BUILDING CODE SITUATION

Committee Reviews Status of Building Codes and Plumbing Codes

In connection with its work of preparing recommendation for use in local building codes the Department of Commerce Building Code Committee, which functions in connection with the division of building and housing of the National Bureau of Standards, has conducted a survey of the present status of building and plumbing codes. Local officials in every city and town of 1,000 population or more by the 1930 census were asked to give the date of the code in current use and other information. It was found that in the group of municipalities having a population of 5,000 or over, 1,135 have building codes and 811 have plumbing codes. In the group of municipalities of population from 1,000 to 5,000, 466 communities reported that they have building codes and 458 plumbing codes.

Some interesting facts on the life expectancy of codes were brought out. For instance, in the group of 5,000 population and over it was reported that 87 cities have building codes and 80 have plumbing codes 20 years old or more. In this group 126 have building codes and 104 have plumbing codes from 15 to 20 years old, 161 have building codes and 97 have plumbing codes from 10 to 15 years old, 341 have building codes and 208 have plumbing codes from 5 to 10 years

deeper and deeper rounds are drilled—up to the limit of practicability-and then a shorter round per shift is sought, until finally the limit seems to have been reached in two rounds per shift. Standard rounds for drilling in driffs, raises, and shafts have been worked out for different kinds of ground and different sizes of opening, and have been given a good deal of publicity, but new ideas are being tried that may result in deeper holes and larger blasts. All changes in practice are toward larger units and more rapid progress. Reduction in the number of different ways of drilling a round, in the difference of spacing, direction, and depth of holes, will lead to greater efficiency on the part of the miners, and to greater speed in development. Greater speed in development means that development need not be kept so far ahead of stoping, or that safer and better methods of stoping, which require more elaborate development, may be made possible.

By the adoption of standard methods of drilling and blasting, of standard sizes of stopes, standard spacing and sizes of pull holes, bulldozing chambers, chutes, and so forth, the work of development and of mining may be divided among groups of men, each of which is especially skillful along its own lines, and great economies will result. It is not to be expected that such matters can be so standardized that they will suit all conditions, for it is most unusual even in the same district to find two mines in which conditions are exactly alike.

Mining is an art, not an exact science, but the tools with which the work is to be done and the manner in which they should be used can be standardized to a great extent. The application of those standards to the problem in hand must be left in each case to the judgment of the engineer or operator.

old, 420 have building codes and 322 have plumbing codes less than 5 years old.

Many municipalities report they have no codes, but this does not necessarily mean that they are without regulations of some sort. In a number of States there are State laws which apply.

Considerable activity is being manifested in the revision of local codes, 166 municipalities reporting building code revision under way and 122 reporting plumbing code revision. This process is a slow and expensive one, but is becoming less difficult because of availability of authoritative recommendations. The Building Code Committee has already published seven reports dealing with various phases of building regulations, and professional and scientific bodies have information available to local officials and committees. This is far different from the situation some years ago when engineering handbooks, existing codes, and rule-of-thumb information were the principal sources. In the present survey, 281 municipalities reported the use of the Building Code Committee's recommendations in revision work now completed or going on and 183 reported a similar use of plumbing recommendations. The use of these recommendations extends considerably beyond these figures, for a number of States have made use of them in State codes and the reports are constantly consulted by local enforcing officials in connection with their work. Several recent codes of large cities have shown to a marked degree the influence of the committee's recommendations.

STANDARDIZATION OF BIOLOGICAL PRODUCTS

Unit for Toxins and Antitoxins Based Upon the Requirements of the U.S. Pharmacopæia

By G. W. McCoy, Medical Director, National Institute of Health

Biological products are standardized as to purity and potency in order that the manufacturer may prepare safe and useful preparations, and that the physician may use such preparations with confidence that he will secure the prophylactic or therapeutic result desired.

Standardization of preparations intended for medicinal use generally is based upon the requirement of the U. S. Pharmacopœia. We will deal here only with the preparations which fall under the provisions of the law of July 1, 1902, the standardization of which is carried out by the National Institute of Health (formerly the Hygienic Laboratory) of the United States Public Health Service.

There are certain activities in connection with standardization of biological products carried on by the Permanent Standards Committee of the health section of the League of Nations. Up to the present time the League of Nations standard unit and the United States standard unit are identical for diphtheria antitoxin, and substantially so for scarlet fever streptococcus antitoxin.

Standardization according to current American practice may, for the sake of convenience, be divided into that carried on by the use of standard units of potency; and secondly, that carried on by comparison of the preparation under test with a control preparation not designated as a standard.

The best examples of the first of these divisions are diphtheria antitoxin and tetanus antitoxin. The theoretical considerations and the details of practical application need not be considered here.

The standard unit for diphtheria antitoxin employed in America is the measure of strength for the preparation that was established by Ehrlich soon after diphtheria antitoxin came into use. This unit may be defined as the quantity of a standard serum, or unit, which will preserve the life of a guinea pig for approximately 96 hours after the administration to the guinea pig of a mixture of the standard serum and an adequate dose of diphtheria toxin. The dose of the toxin is so adjusted that when combined with less than one unit of antitoxin it will surely kill a guinea pig in less than 96 hours.

The standard unit for tetanus antitoxin is essentially similar to that for diphtheria antitoxin, save that in the interest of convenience and economy the test quantities employed of standard serum and standard toxin represent one-tenth of the unit.

The standard unit for scarlet fever streptococcus antitoxin is based not upon tests on lower animals, but upon the ability of the antitoxin to neutralize scarlet fever streptococcus toxin when the two are mixed and the material is injected into the skin of a susceptible human being. For practical purposes, the unit may be defined as the amount of antitoxin which will neutralize 50 times the dose of toxin necessary to produce a certain reaction in a susceptible individual.

Antitoxins for conditions produced by certain anaerobic microorganisms have been standardized more or less satisfactorily, but are not of sufficient importance for discussion here.

Standardization of antitoxins in accordance with the practices involved in the preparations that have been discussed is satisfactory and yields quite consistent results; indeed, two operators will be able to test preparations and attain results that are nearly identical.

When we leave the field of antitoxin the procedures are decidedly less satisfactory, and leave much to be desired in the way of accuracy; but they do serve to give some measure of the potency, at least in an experimental way, of the material under test.

We will now consider a few of the preparations standardized by less satisfactory methods.

Typhoid vaccine made in a standardized manner is distributed to manufacturers, who utilize the preparation for immunizing rabbits, making a similar immunization of animals with their own preparations. The resulting titer of agglutinins of the two groups of animals is compared and it is required that the new preparation for commercial distribution shall be of substantially the same antigenic value in this respect as the control that is distributed.

Antimeningococcic serum is compared for agglutinin content with a control serum and is required to be substantially identical with the latter.

The test for antipneumococci serum is based on the survival of mice injected with otherwise fatal doses of pneumococci, the test always being run in comparison with a control serum of known strength.

Diphtheria toxin-antitoxin mixture is standardized by requiring a range of toxicity which permits guinea pigs given a single human dose to survive, and requires that those given five human doses shall show pronounced evidence of diphtheria poisoning.

Diphtheria toxoid, which has now come into such wide use in the prevention of diphtheria, is standardized by requiring that it shall not be harmful to guinea pigs when given in amounts equivalent to five times the human dose, and that a single human dose shall immunize guinea pigs against five otherwise fatal doses of diphtheria toxin.

Diphtheria toxin for the Schick test is standardized so as to require that 40 or 50 test doses, depending on the particular preparation employed, shall be fatal to guinea pigs in four days.

Scarlet fever streptococcus toxin for the Dick test is standardized on human beings and is required to be of such strength that in susceptible individuals one test dose shall produce a specified reaction when injected into the skin.

Smallpox vaccine is tested on animals and persons to determine that it is capable of giving rise to characteristic reactions.

In addition to the preparations that have been mentioned, there are a large number of serums and vaccines for which there are no satisfactory methods of control or standardization. Examples of these are ordinary antistreptococcic serums and many bacterial vaccines.

Members of the arsenic group of preparations of the arseno-benzol, or arsphenamine type, while strictly speaking are not biological products. are tested at the National Institute of Health. In the case of these preparations, the only requirement is that the preparation shall permit the survival of at least 60 per cent of the test animals (usually rats) when administered in a prescribed dose and in a prescribed manner. Practicable tests to determine the efficiency of each batch of the preparation remains to be developed.

It has been found by experience in connection with all standardization work of the nature referred to above that standardized test animals are very important. For example, the observation has been made

TESTING CAPACITY OF CONTAINERS

Baskets and hampers used for marketing fruits and vegetables are tested by the United States Department of Agriculture to determine whether or not they conform to the standards established by Federal law. Manufacturers of certain types of baskets and ham-



pers must receive the approval of the Secretary of Agriculture on the specifications for these containers before they may be legally sold. The equipment shown above is specially designed for the testing of containers ranging in size from one-half pint to 2 bushels. Rape seed is used as the testing medium. The hopper funnel that white rats coming from different sources will give vastly different results with the same arsenic preparation. So wide a variation is there, depending merely on the source of the animal, irrespective of any other factor that can be evaluated, that a given arsphenamine preparation may pass the test on one group of rats and fail on another.

In addition to tests for potency, it is required that nearly all products shall be tested to determine the absence of bacterial contamination. In the case of smallpox vaccine where absolute freedom from bacteria is not to be expected, a limit is placed upon the number of organisms permitted.

The field of standardization of biological products is a very active one, and research is constantly developing new methods.

is utilized to produce a uniform fall or drop of the seed. An amount of seed in excess of the nominal capacity of the container under test is first determined by the use of standard capacity measures, after which this is introduced into the container under test. After the excess of seed has been carefully "struck off," this falls through the grating to a drawer below, from which it is recovered and measured; the error of the container, in excess or deficiency, is computed from these figures.

COLORS FOR SANITARY WARE

Signed acceptances having been received from a number of manufacturers, distributors, and users estimated to represent a satisfactory majority of monoline production, the commercial standard for colors for sanitary ware has been announced as effective for new production and clearance of existing stocks on July 1, 1931.

The standard lists six standard colors, namely, green, orchid, ivory, blue, light brown, and black to be used as a guide in the production of sanitary ware, which includes plumbing fixtures and allied products made of vitreous china, porcelain (all-clay), enameled iron, metal, wood, or glass.

The chief aims of the industry in the voluntary establishment of this commercial standard are to improve marketing conditions by providing an authoritative basis for determining and checking colors for sanitary ware and to protect the purchaser against a lack of color harmony, especially when one manufacturer supplies, for example, the vitreous china lavatory, another the enameled iron bath tub, and still another the seat for the water-closet bowl.

It is not the purpose of the standard to retard initiative on the part of individual producers or to hinder the introduction of new colors. It is intended to provide an authoritative reference to the recommendations of the industry as a whole based on the composite experience.

Standard color samples, with light and dark limits of shades for each color are retained at the National Bureau of Standards for reference. Duplicate reference samples may be obtained from the secretary of the Manufacturers Advisory Committee on Colored Sanitary Ware (G. W. Wray, National Bureau of Standards) as a basis for production control.

PURCHASING RAILROAD MATERIAL BY SPECIFICATION

Increasing Use of Purchase Specifications Gives the Bidders a Clear and Detailed Idea of What is Wanted

By F. H. HARDIN, Assistant to the President, New York Central Lines

The purchase of supplies for any large organization must obviously be conducted in a systematic manner, if material is to be obtained promptly, at reasonable prices, and if overstocks and shortages are to be avoided. A suitable system of standard stock lists, inventories, requisitions, and purchase orders, is essential.

It is also apparent that efficient purchasing involves obtaining competitive bids from a number of manufacturers or dealers. If these bids are to be intelligent and of the greatest benefit to the purchaser, the bidders must be given a clear, detailed, and correct description of the kind, grade, and quality of material desired. Any such description, whether it be a reference to a catalogue, or requirements written on the order, or a more formal and complete separate document, is really a specification. For the larger transactions a separate document is generally preferable.

A specification should include all details which are desirable and essential, as well as those which are objectionable. The preparation of such a description is not always easy. It requires a knowledge of the raw materials and processes for the manufacture of the material, full information regarding the conditions of its use, and the properties necessary to meet these conditions, and finally, a knowledge of the methods of testing and test results which will enable the purchaser to determine quickly whether individual shipments will meet the required conditions.

The causes which lead to the use of a specification for any particular article are various. The article may have been purchased informally for a considerable time and, under the influence of competitive bidding, the quality has depreciated to such an extent that the service is impaired. Or the material may still be of its original quality, but have become unsatisfactory because the conditions of service have changed. Or again, an article, originally proprietary and kept at a satisfactory standard of quality, later becomes more generally manufactured and at lower prices which may cause a departure from the original proprietary standard.

When taking up the writing of a specification for any particular material, it is desirable first to consult the departments in which the material is used. One should learn fully the purposes for which the material is used, how it is fabricated in the shop and applied and employed in service, and inquire whether the material in regular use is entirely successful in all particulars, as well as durable.

One should obtain abundant and carefully selected representative samples of both satisfactory and unsatisfactory material and test, analyze, and otherwise study them very thoroughly. It is obviously important to learn what differences in composition or properties measure the difference between success and failure in service. A careful study of the material in the scrap pile is very useful.

In a large organization, a given material may be used in several shops or departments. All should be consulted. There are very likely to be differences of opinion among them, regarding the merits of different varieties or the requirements of the service. These differences must be investigated and reconciled.

Having the purchaser's needs thoroughly in mind it is next desirable to visit plants where the material is manufactured. A good general idea of the raw material and the processes and particularly their possibilities and limitations as related to the purposes of the purchaser should be obtained. A study should be made of the problem from both the maker's and the user's viewpoint.

The arranging of a system of acceptance tests which will quickly, simply, and thoroughly determine the suitability of shipments of the material is not always easy. The specification writer must be well informed, not only on all available methods of test and analysis, but also on their importance and significance with reference to the practical efficiency of the material.

With all this information in hand, the specification may be written. It should begin with a brief general description of the article. The manufacturer will be aided by mention of the uses for which the material is intended. In some cases the process of manufacture should be indicated. The list of tests should be kept as short as possible by including only those which are essential. If any of the tests are of an empirical nature or the methods are not well established and generally known, the methods of test should be indicated in sufficient detail.

In the practical use of specifications, some allowance for variation is often needed. If a paint vehicle is to be composed of 85 per cent linseed oil and 15 per cent naphtha, how much below 85 per cent may be the linseed oil run before the paint should be rejected? Permissible variations should often be given in the specification, but even when this is done the chemist may need to make a slight further allowance to cover variations in sampling and testing. It is unwise to reject a shipment for an unimportant few tenths of a per cent deviation from the specification requirements. Such action would result in unprofitable and time-consuming controversy. The specification limits should be written with sufficient margin to cover this detail. On the other hand, the wise manufacturer will not attempt to run to the very limit of the specification. By doing so he would be very likely to overstep the limit at times and, all told, such a policy will injure the general standing of his product.

Specifications are being applied to a continually increasing list of products and are being used by a larger number of industries and individual purchasers. The specifications themselves are being constantly reviewed and improved to keep pace with industrial developments and make them more generally useful. The study of the properties and service of material may bring out the need of improvements or, on the other hand, show that simpler or cheaper material or devices, properly used, will be equally satisfactory. In railroad operation large quantities and a great variety of materials are needed. The purchase of these materials to specifications is now the generally accepted method.

STANDARDIZING ROAD MATERIALS IN IDAHO

State Has Made Considerable Progress With its Standardization Program in Which the Accepted Standards or Specifications are Used

By W. L. LESHER, Materials Engineer, Idaho Department of Public Works

Standardization in highway work in Idaho as regards materials, specifications, and tests has made considerable progress, but there is yet much to be accomplished in this direction. With Idaho, as with most State highway departments, the greatest standardizing agencies are the National Bureau of Standards, American Society for Testing Materials, and the American Association of State Highway Officials. Among States in this section the "Portland conference" on road oils has been of considerable help in simplifying specification of this one type of material.

Tests as developed and specified as the American Society for Testing Materials are the standard for all laboratory and field tests made. Uniform and definite instructions for sampling materials during progress of the work are issued to all field men throughout the State in the form of an inspector's manual. Field kits containing testing apparatus necessary for field control of aggregates are maintained and furnished to the construction inspectors by the testing laboratory, so that the proper equipment will be available. These kits are recalled to the laboratory from time to time for checking and replacement.

Uniform practice in sampling new local materials deposits is obtained by sending men trained in the testing laboratory to the various districts in the State to work with the locating engineers on new projects.

Materials specifications are based on similar specifications of the United States Bureau of Public Roads and the American Association of State Highway Officials, adjusted to our own conditions in the State. A quite successful effort at standardization of specifications for a particular type of material has been accomplished by the "Portland conference" among several States in this section of the country in the specifications for road oil, or as designated in some States, fuel oil. This is the asphaltic oil used in the plant mix, and mixed in place type of road surfacing in the Western States. A conference was called in 1929 and again in 1930 at Portland, Oreg., and was attended by representatives of a number of highway departments and producers interested in this type of material.

The percentage of asphalt contained in the oil, the viscosity, the purity desired, and other physical characteristics of the oil were discussed, and uniform specifications for the different grades of the road oil decided upon. This procedure permitted the producing companies to carry larger stocks of fewer grades of this material with a resulting greater dependability of supply to the highway departments.

At the present time the United States Bureau of Public Roads is promoting a series of regional conferences and finally a national conference for the purpose of reducing the number of tests required on liquid asphalt products, commonly known as road oils and cut-back asphalts, and also reducing the variations of these tests that have grown up in the different State highway departments. A successful completion of this movement will, of course, result in a better understanding between producing and purchasing organizations.

There is a great need for a standardizing service in the commercial, State, and plant asphalt-testing laboratories, such as rendered by the Cement Reference Laboratory, discussed later in this article. The need for this service arises from the fact that various types of equipment are being used for the same test, and while they each follow the originator's interpretation of the standard he planned to follow, they are considerably different in action. Equally important is the matter of laboratory technique and procedure of making tests. The variations in apparatus and procedure can best be pointed out by a disinterested organization of recognized standing.

A service was enjoyed this season by the Idaho department of public works laboratory, and was available to any laboratory testing cement inviting such services, that should result in more uniform laboratory technique and in the use of more standard equipment in all the cement laboratories of the country.

This service was rendered by the Cement Reference Laboratory of the National Bureau of Standards and consisted of an inspector from that laboratory checking all cement-testing apparatus in the laboratory he was visiting against the bureau's tolerances for such equipment. He also demonstrated the bureau's procedure and technique in carrying out cement tests. The confidential report of his inspection certified equipment that was within tolerances and pointed out variations from standard procedure.

Correct standardization of material tests and specifications will reduce cost of highway-construction materials, simplify production, increase the dependability, and uniformity of supply, simplify the training of inspectors, reduce costs of testing, and result in a better understanding between the producing organizations and the highway departments.

ASSOCIATION BELGE DE STANDARDIZATION

Scope and Function of Standardization Program in Belgium Reviewed

The Association Belge de Standardization (A. B. S.) was founded April 1, 1919, for the purpose of studying standardization from both the technical and commercial points of view, and in all branches of industry; also to make known and coordinate similar work outside of the association.

The association, emanating from industrial and technical associations of Belgium, is managed by a general committee formed by the delegates of the industrial associations and engineering societies. This committee examines and considers proposals for standardization, also appoints industrial and technical committees. However, when a problem is of public interest, as, for instance, to the ministries, provincial, or communal administrations, these committees are requested to send one or more representatives. In this way a collaboration is established between public authorities and private enterprise.

The technical committees choose their own officers and regulate their work. They may be divided into subcommittees for the study of particular questions and sometimes affiliate themselves with other subcommittees. The work of the technical committees is submitted to the general commission which, in turn, considers particularly whether the trend of the studies appears rational and if the representation of the different parties interested has been adequate. It can, in agreement with the competent technical committees, decide what reports will be published.

The Association Belge de Standardization is a private organization, being financed by industrial groups, and since its reorganization in 1924, the assessments are generally calculated on the basis of the number of workmen occupied in each branch. The importance of standardization to each industry is also taken into consideration. The public administration furnishes certain subsidies, and the association also received subscriptions from industrial firms.

WROUGHT-IRON PIPE NIPPLES

The commercial standard for wrought-iron pipe nipples (CS6-31) issued by the National Bureau of Standards, represents the culmination of effort on the part of representative manufacturers, distributors, and users to establish dimensions and tolerances as a basis for the manufacture and sale of wrought-iron pipe nipples.

The standard includes dimensions and tolerances, as well as stock sizes and lengths, of standard weight, extra strong, and double extra strong pipe, and dimensions for taper pipe threads. A table of sizes and number packed in cartons is also given for standard weight black or galvanized nipples.

The standard was originally published as CS6-29, but on the recommendation of the standing committee in charge of the project, which considered the criticisms and suggestions received as a result of a survey of adherence, the standard was reviewed to include Technical advice of members of the committees is given free of charge, and the firms delegated by the associations collaborate in the research work and tests and in the preparation and reproduction of documents.

Up to the present time the association has published 33 reports on the following subjects: Regulations for the construction of bridges, metal frame work and metallic reservoirs, and reinforced concrete work; standardization of bolts and rivets; copper rivets; screws; transmission arms and pulleys; metallic chains and cables; cast-iron pipes; structural steel; stone materials; methods of sampling and analyzing zinc ores; tolerances; and standardization of sizes of paper.

In addition, 16 publications have been released in the field of electricity, on the initiative of the Comité Electrotechnique Belge (the Belgian Electrotechnical Committee). This committee functioned before the formation of the Association Belge de Standardization. However, it has agreed, with a view to unification, to publish the results of its studies under the patronage of the association.

The most important reports published by the Association Belge de Standardization are, perhaps, the regulations for the construction of metal frame work and instructions regarding work in reinforced concrete, the application of which has become so widespread that they may be considered as national practice. The association does not publish its own periodical. Its official organ is the weekly bulletin of the Comité Central Industriel de Belgique.

The following subjects are now under consideration: Standardization of concrete pipes; threading of pipes and pipe fixtures; automobile parts; special charges for industrial zinc; sampling and analysis of lubricating oils and greases; coal; phosphates products; standardization of designs and technical documents and commercial formulas; and recommended practices for export packing.

(1) a definition for wrought iron as set forth in the American Society for Testing Materials specification A72–30 for welded wrought-iron pipe, and (2) changes in actual thickness and inside diameters of pipe on the basis of the actual density of wrought iron, instead of steel as formerly.

The chief purposes of the industry in the voluntary establishment of this commercial standard are as follows: (1) To provide a basis for user rejection of pipe nipples made from scrap or used pipe, (2) to establish a minimum specification as a basis for certification of quality in daily trade, (3) to set up standard sizes and lengths which may be considered staple, and (4) generally to improve the understanding between buyer and seller.

The standard will become effective for new production and clearance of existing stocks on May 1, 1931. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents each.

FEDERAL SPECIFICATIONS

During the month of June the Federal Specifications Board considered 34 specifications, of which 23 were proposed for revision and 11 were proposals for consideration. Copies of these specifications (in mimeographed form) and further information can be obtained from the Federal Specifications Board, National Bureau of Standards, Washington, D. C.

New designation	Specifications under revision	Federal specifica- tion No.
P-P-551	Polish metal liquid	341
EE-L-101	Lard substitutes (including shortening vegeta- ble)	603b
GG-B-101	Bandages, plaster of Paris	300
HH-P-156	Packings and gaskets, rubber (molded, sheet,	111b
ZZV51	Valves, ruhher	114a
ССС-В-811	Burlap, jute	499
CCC-C-271	Cheesecloth, bleached	253h
CCC-C-281	Cheesecloth, unhleached	252h
CCC-C-411	Cloth, birdseye (diaper), in holts	612
CCC-D-651	Drill, unhleached	557
CCC-D-771	Duck tent khaki	160
CCC-G-101	Gauze plain	289
CCC-P-191	Percale	556
DDD-P 61	Bondoges gouze roller plain	200
	Badeproade arinklo	620
DDD-B-191	Beuspieaus, critikie	020
DDD-W-101	Waste, cotton, colored	203a
DDD-W-106	Waste, cotton, white	262a
	Apricots, evaporated (or dried)	634a
	Currents, dried	634a
	Wiping cloths, cotton, white, for machinery	261a
	Cloth hirdseve (diaper) made up	612
	Loothor rigging	1839
	Towaling action glass	616
	Towening, cotton, glass	010
	SPECIFICATIONS PROPOSED	
•	Raspherries (buckleberries) canned	
	Plums conned	
	Carrots, canned	
	Loganherries, canned	
	Blackherries, canned	
	Grape juice	
	Potatoes, sweet, canned	

Grape juice ______ Potatoes, sweet, canned ______ Stone, architectural, cast ______ WW-C-626 ______ Couplings, hose, oil suction and discharge ______ Squash, canned ______ Tomato puree, canned ______

STANDARD "SUN TEST" FOR DYED TEXTILES

The National Bureau of Standards has been cooperating with the American Association of Textile Chemists and Colorists for the past seven years in the development of standard methods for testing the fastness to light of dyed textiles. Six papers on different phases of this work have been published. A seventh, entitled "Classification of the Fastness of Dyed Textiles in the Standard Sunlight Exposure Test," has been prepared by William H. Cady, William C. Smith, and William D. Appel.

tiles in the Standard Sunlight Exposure Test," has been prepared by William H. Cady, William C. Smith, and William D. Appel. In this paper is given the relative fastness to light of 1,197 cotton, wool, silk, and weighted silk dyeings representing 366 dyestuffs when exposed to sunlight in the standard "sun test" of the association. Tables showing the classification of the dyeings into seven fastness classes and an exposition of the method of classification are given. Briefly, the dyeings were exposed at an angle of 45° from the horizontal facing south between 9 a. m. and 3 p. m. on sunny days only in cabinets covered with a good grade of window glass approximately one-eighth inch thick and open at the sides in such a way as to allow free access of air to the samples. The distance between the samples and the glass was one-half inch.

Each sample was exposed for four different periods of time, each period being double that of the next shorter period. The most fugitive samples were exposed for 6, 12, 24, and 48 hours. Depending on the fastness of the color, other samples were exposed for longer periods of time up to 768 hours.

The samples were then classified. Dyeings which showed an appreciable alteration in color when exposed for 6 hours were assigned to the lowest class, class 0. Dyeings which showed little or no alteration in color when exposed for 6 hours, but which showed an appreciable alteration in 12 hours were assigned to class 1. Other dyeings were assigned to classes 2 to 6 on a similar general basis. In order to eliminate the uncertainty inherent in the terms "appreciable" and "little" dyeings were selected to represent the mini-mum requirements for classes 1 to 6. The use of these standards of fastness made it possible to take into account the changes in color of dyeings in the longer exposures, changes which can not be adequately described in the classification scheme, outlined above. The choice of standards for general use is an important outcome of the work that is receiving further attention.

The paper in question should be of special interest to producers and users of dyeings. It is expected that the classification will be of greatest service to those who are already familiar with the utility of some of the dyes for their specific purposes.

NEW MAGAZINE ON RUSSIAN STANDARDI-ZATION

Russian standardization is receiving active encouragement from a new monthly publication, Standard, the first issue of which appeared in January of this year.

This periodical is attempting to popularize the standardization movement, and to encourage mass rationalization in commerce, manufacture, and agriculture. It calls attention to the necessity for industrial specialization and cooperation. Its readers are made acquainted with modern technics of the more highly developed countries, which may be used to advantage in their own collective standardization program.

Standart is especially interested in the maintenance of quality in Soviet manufactures, in the elimination of waste from industry, and other aspects of standardization. In the first two issues of the publication articles have appeared on such subjects as Stalin's statement before the first conference of responsible colaborers of Russian industrial management, the program of Russian standardization for 1931, quality standards for coal, rationalization and the elimination of waste, harmful industrial practices, standard weights for bread, standardization in the factories of the Ural Mountain district, quality testing of materials, and American rationalization.

THICKNESS GAGE FOR FABRICS

A gage has been developed for measuring the thickness of carpets during tests on the carpet-wear testing machine at the National Bureau of Standards. It is believed that the gage will be found suitable for measuring the thickness of other fabrics, since it provides a ready means of measuring thickness under an extremely small-known load and under a series of different loads. Thus a measure of the softness or hardness of the fabric can be obtained. The recovery after the application of a load for any period of time can also be determined readily with this gage and thus the "compressive elasticity" can be evaluated.

The gage consists of a delicately balanced arm on one end of which can be placed a "foot" of any desired cross-sectional end area of contact. By placing



weights on the foot the load on the fabric can be adjusted to suit conditions. The support of the knifeedge on which the arm rests can be raised or lowered by means of a micrometer screw. This movement is indicated on a dial which is graduated in thousandths of an inch. The difference in reading obtained when the foot is lowered onto a fabric till the arm just balances and a similar reading obtained with the fabric removed gives the thickness of the fabric.

Recently a pressure gage has been designed to be used with the thickness tester. By using this gage the thickness can be read directly for any pressure on the fabric from zero to a given maximum. The pressure on the fabric is indicated on a dial, over which moves an indicator actuated by the balance arm of the thickness gage.

FEDERAL GRADE LABEL FOR PACKAGED MEATS

Labeling of packaged meats with a United States Department of Agriculture certificate of quality is the latest innovation in the retailing of meats. Retail sales under this new system which is used by a group of 85 food stores in New York have been reported to officials of the department as having increased from 20 to 40 per cent in the individual stores.

The meat is examined by a Government grader at a central plant where each wholesale cut is stamped with the appropriate "U. S." grade. Each cut is placed in a sanitary package or carton covered with a transparent wrapper and a Government grade label is affixed so that the consumer may see at a glance the Government certificate of quality. The packages are then placed in a special refrigerated container and distributed among retail stores.

This innovation is an extension of the beef grading and stamping service inaugurated by the Bureau of Agricultural Economics several years ago for the purpose of carrying the grade designation from packer to consumer. Consumers in a dozen or more cities now can buy individual cuts of beef and lamb stamped with a Government certificate of quality. The service is self-supporting from the standpoint of Federal expense as it is paid for by the packers and dealers who use it. Indicative of its growing popularity is the fact that in the last month more than 12,000,000 pounds of beef was Government graded and stamped.

STEEL BONE PLATES AND SCREWS

A general conference on steel bone plates and screws, used in the reduction of bone fractures, was held at the Benjamin Franklin Hotel, Philadelphia on June 18, 1931. This conference recommended a commercial standard for this commodity based on a tentative draft proposed by the American College of Surgeons.

For a number of years steel bone plates and screws that were defective in material and construction have been on the market and sold to hospitals and physicians, resulting in numerous cases of permanent harm to patients. The situation became so serious that in 1929 the American College of Surgeons appointed a committee to conduct an investigation and recommend a remedy. Last December this committee approached the National Bureau of Standards requesting assistance in the establishment of a commercial standard.

ance in the establishment of a commercial standard. The specifications adopted by this conference requires that chrome-vanadium steel S. A. E. No. 6150 be used and heat treated to a Rockwell C hardness not less than 43 nor more than 53. It also specifies that every plate sold be tested for hardness and packaged in a sealed envelope bearing a guarantee label. Details of design and workmanship for both plates and screws are covered.

It was stated at this meeting that this project is expected to be a forerunner of an era of similar standardization for surgical equipment, materials, and methods that will be of inestimable value to the surgical profession and the public.

KNIT UNDERWEAR (EXCLUSIVE OF RAYON)

On June 18, a circular letter to the manufacturers, distributors, and users of knit underwear (exclusive of rayon) announced the success of the commercial standard project and indicated that since a satisfactory number of signed acceptances have been received, the standard will be considered effective as of January 1, 1932.

The chief purpose of the industry in voluntarily establishing the commercial standard is to provide standard measurements and methods of measuring that represent the mutual understanding of the industry; one that will be sufficiently broad and clear to insure the manufacturer the necessary data for knitting any staple garment that he may be called upon to make; and one that will provide the retailer or user with a basis for acceptance or rejection of either an individual garment or a whole shipment. The specifications and measurements embraced in this pamphlet cover the method of measuring and measurements for boys' flat knit ribbed drawers; flat knit, athletic ribbed union suits; flat knit athletic shirts; children's flat knit, and ribbed union suits; flat and ribbed knit cotton pants, sleeping garments and vests; infants' bands and double breasted or button front shirts; men's drawers, flat and ribbed knit, athletic, polo, and pullover shirts; athletic, fleece, ribbed and flat knit union suits; women's knee length ribbed drawers; ribbed union suits; ribbed cotton shaped vests and shoulder straps; as well as box sizes; methods of washing rayon, cotton wool, and wool-cotton underwear; and a recommended system whereby the number of single yarn can be recognized by the color of the cone.

Printed copies of the commercial standard will be available in due course.

FEDERAL CATALOGUE CONTAINS COLOR CODES FOR MARKING METAL BARS

The Federal Standard Stock Catalogue will contain several codes for color marking for both ferrous and nonferrous metals. The ends of bars having a diameter of one-half inch or more will be painted in accord with the requirements of the code, while the smaller bars may have metal tags bearing the color designation wired to bundles composed of several bars. The catalogue also provides that the color designation may be painted on the circumference of the bar close to the end. There is no conflict in the color combinations used for marking bars of ferrous and nonferrous metals.

Code No. 1 (for ferrous metals) comprises a list of the Society of Automotive Engineers steels arranged alphabetically by chemical compositions showing the assignment of specification series numbers thereto and the significance of stripe colors.

Code No. 2 (for ferrous metals) was compiled by the national committee on iron and steel of the Na-tional Association of Purchasing Agents, and approved by the association, at its sixteenth annual convention held last month at Toronto, Canada, for marking steel. This code has also been adopted for Government use in identifying metals listed in the Federal Standard Stock Catalogue. This code covers only those Society of Automotive Engineers specification steels which, in the opinion of the compilers, comprehend the steels most widely used industrially. The assignment of a single background color to each numbered series (except in the case of carbon steels), together with the identification of carbon content by color of the stripe (wherever practicable) enhances the value of the code and materially facilitates its use. Dots instead of stripes were utilized in three instances to avoid conflict with the general plan.

To meet the needs of the Government for a more comprehensive code for color marking to identify metals not included in the commercial code (No. 2) adopted by the National Association of Purchasing Agents, there has been developed a third code, in which is contained an amplification of the commercial code. All Society of Automotive Engineers specification metals listed in this code are identified by the same color marking as that provided in code No. 2. These two codes provide color markings for all ferrous metals listed in class 46 of the Federal Standard Stock Catalogue, which is headed "Metal in bars (flat; hexagon; octagon; round; square): Billets; ingots; pigs; slabs."

A fourth code, which lists nonferrous metals, arranged alphabetically, has been compiled for Government use.

For the ready identification of metals in storehouses by the color marking of each, there is a fifth code provided for by the catalogue, which contains a list of all of the color markings which are included in the other four codes. This list is arranged alphabetically by (a) background colors and (b) stripe colors.

MEASURES MINUTE ELECTRIC CURRENTS

For measuring minute quantities of electric current, the National Bureau of Standards has devised a portable system of extremely high sensitivity for laboratory experimentation which is to be used in making the forthcoming international X-ray comparisons in Europe. The apparatus is so constructed that it may be readily calibrated with an accuracy ten times better than any other similar device so far developed; also,



the calibration can not be easily disturbed by rough handling in packing and transportation. The horizontal oblong case contains batteries, rheostats, and a standard condenser. At the right of the case is an electric cable connecting with an ionization chamber. Current is measured by the electrometer, the instrument which stands upright upon the case and which is fitted with a telescope for reading the record.

STANDARDIZATION BRIEFS

Specifications for processing in an enamel plant.— Instructions and specifications for processing in enamel plants, presented by R. D. Beck in Ceramic Industry, which have been in actual use in enamel plant, are now offered as a model for plants which have never used a system.

Utilization of index numbers.—Standardized index numbers are increasingly used by statisticians, by the statistical departments of banks, by business men, and, in recent years, even by the general public. A number of commercial houses and some official agencies have adjusted wages by an index of the cost of living.

Reducing railroad inventory.—How 8,001 items of materials carried by the Atlantic Coast Line Railroad in its maintenance service was eliminated is told in a review published in the May, 1931, issue of Railway Purchases and Stores, by J. V. King, general storekeeper of the railroad. The reduction in inventory was accomplished without additional pay-roll expense.

Standard sales agreement approved.—The standard sales agreement and trade customs adopted by the gray iron industry received the formal approval of the National Association of Purchasing Agents at its sixteenth annual convention held last month at Toronto, Canada. The convention went on record as urging the general adoption of the agreement and trade customs by the entire industry.

Hydraulic book revised.—The Hydraulic Society of New York has issued the sixth edition of its standards. New material consists of an index, new definitions, and illustrations of thrust bearings, illustrations of correct and incorrect methods of connecting suction pipe to a centrifugal pump, and revision of recommendations of materials for pumping special liquids.

Standard color code for control cable.—Following an extensive review of questionnaires sent to 26 leading American utility companies and a survey of field tests conducted by a joint committee of N. E. L. A. and N. E. M. A., a standard color code for control cable was formulated. The details were published by G. Sutherland in Power Plant Engineering, vol. 35, No. 7, April 1, 1931.

Boys' blouses.—The commercial standard covering minimum measurements for boys' blouses, button-on waists, shirts, and junior shirts, is now available in printed form at the Superintendent of Documents, Government Printing Office, Washington, D. C., at a cost of 5 cents each. The document contains several drawings illustrating the method of making the measurements. This standard applies to finished garments.

List of United States Government publications.— Readers of the COMMERCIAL STANDARDS MONTHLY will be interested to learn that a weekly list of United States Government publications is available for free distribution from the office of the Superintendent of Documents, Government Printing Office, Washington, D. C. This is a selected list of all Government publications, with brief abstracts of each, showing the nature of the contents.

Some approximate equations for the standard atmosphere.—This report, which was prepared for publication by the National Advisory Committee for Aeronautics, Washington, D. C., contains the derivation of a series of simple approximate equations for density ratios and for the pressure ratio in the standard atmosphere. The accuracy of the various equations is discussed and the limits of applications are given. Several of these equations are in excellent agreement with the standard values.

Canadian Yearbook for 1930.—A review of standardization during the calendar year 1930 as carried on in Canada under the auspices of the Canadian Engineering Standards Association, is contained in the association's 1930 yearbook released last month. This book constitutes the annual report of the association and presents detailed information on the different projects now under consideration. A feature of this edition is the listing of members of all active committees.

Well organized trade associations essential to industry.—Well organized and properly conducted trade associations are essential to commerce and trade. On several occasions the Chamber of Commerce of the United States has indorsed the work of these associations, and at the nineteenth annual meeting of the chamber held in May reaffirmed the indorsement and at the same time commended their support to business institutions and business men. The chamber also gave approval to the work of the National Conference on Street and Highway Safety and the Federal Trade Commission.

Standard system for grading tobacco.—A standard system for grading tobacco offered for sale, to be promulgated by the Secretary of Agriculture, is recommended by the examiner of the Federal Trade Commission, who conducted the recent investigation into alleged collusion among tobacco manufacturers in price fixing, which was found to be nonexistent. It was found, however, that antiquated and inadequate marketing methods worked almost entirely in favor of the manufacturer. A standard grading system as recommended is expected to correct the existing marketing conditions.

Separate definitions of "f. o. b." terms.—Separate definitions of the terms "f. o. b." "f. o. b. acceptance," and "f. o. b. acceptance final," for inclusion in proposed standard rules and definitions of trade terms under the produce agency act were suggested by representatives of the produce and vegetable trade at a meeting with officials of the Department of Agriculture on June 3. Trade representatives also suggested a definition for the term "suitable shipping condition." Standard rules and definitions of trade terms were recently proposed by the Department of Agriculture for inclusion in the act. The department's decision will be announced later.

Standard for red cedar shingles approved.—Under date of June 15 the division of trade standards at the National Bureau of Standards announced the success of the project dealing with the standardization of red cedar shingles. The quality standard as developed by the Red Cedar Shingle Bureau has received almost unanimous support from manufacturers, as well as numerous distributors and users, and sets up a standard upon which the self-certifying label may be based for the guidance of the consumer, who is desirous of receiving the most satisfactory grade of red cedar shingles. The effective date for new production under this standard was fixed at July 1, 1931.

Standardization in the Soviet Union.—The work of standardization is being intensely pushed, and is proceeding on an ever-widening scale in the Soviet Union. Not only are individual products and parts being standardized but whole installations and buildings are coming within the orbit of the movement. For instance, in the metal industry, blast furnaces and openhearth plants are being designed on standard lines, the sizes and shapes of metal products are being standardized, and so on, to the machine building and construction industries which use these products. Not only are parts and accessories of industrial and residential buildings being standardized but a start has been made in the design of entirely standardized structures.

Grading canned foods.—After July 1, 1931, when a new system of Federal inspection of canned foods begins, the housewife can demand and receive from her grocer information on the exact grade of canned foods which she buys, and eventually it is hoped that many of the labels will show the exact grade, according to Wells A. Sherman, in charge of the division of fruits and vegetables, Bureau of Agricultural Economics, Department of Agriculture, in a radio address June 4, 1931. There is considerable variation from day to day in the quality of the foods packed even at the same cannery and under the same label, Mr. Sherman said, and canners should take care to show these variations in quality.

Standard schedule of colors for ready-mixed paints.—A standard schedule of colors for readymixed paints has been prepared by the British Engineering Standards Association. In preliminary studies in connection with drafting the schedule, it was found that there were in use about 3,000 different colors, and many hundreds of different shades of some of the colors. In addition, there were many names for the same colors. The standard schedule just announced contains 57 color patterns with agreed color names. Appendices give the colorimetric value of each color, measured at the National Physical Laboratory on the Guild Colorimeter, and also a specification of the celluloid used to mount the colors. Safety in aeronautics.—A safety code for aeronautics has been approved by the board of governors of the Aeronautical Chamber of Commerce of America (Inc.). The code has been prepared by a committee that has been considering safety in aeronautics under the auspices of the Aeronautical Chamber of Commerce, and is in agreement with the regulations for safety of the Aeronautics Branch, Department of Commerce. The present code, however, in many respects goes further than the minimum requirements of the Air Regulations. A permanent committee is formed to continue the study and promulgation of recommended safety practices and standards.

Bulletin for air navigation.—Official Bulletin No. 18 of the Commission Internationale de Navigation Aerienne, November, 1930, is now available. This International Commission was constituted by the convention relating to the Regulation of Aerial Navigation dated October 13, 1919. Among other duties, it is charged with the promulgation of technical requirements for aircraft. This bulletin reports a number of actions of this commission of technical significance and also includes a large number of standard definitions of aeronautical terms. Resolution No. 520 sets up materially modified standards for traffic or running lights to be carried by aircraft. These standards approach closely to those in use by night-flying aircraft in the United States.

British standard apparatus for testing magnets.—A specification entitled "Apparatus for Workshop Testing of Permanent Magnets," and designated No. 4–6–1931, has been published by the British Engineering Standards Association. This publication, which is the result of over 10 years' work and has involved a considerable amount of research, deals with the essential details of the construction and working of apparatus suitable for use in workshops for the testing of permanent magnets of uniform cross section, fitted for magneto generators, and of other magnets the dimensions of which are within specified limits. The specification should prove useful to those who desire to make the necessary apparatus, and also to those who are engaged in testing magnets.

Traffic sign code adopted in Europe.—A traffic sign system designed to facilitate international tourist traffic throughout Europe was adopted March 30, 1931, by the International Convention on Unification of Road Signals which met at Geneva, as announced in advices made public by the Department of State. Charts of the signs have been received by the Department of State. The agreement signed at Geneva provides that the color red shall be used in traffic signs only to denote an obligation. Thus all signs denoting speed or prohibition of parking, etc., are in the form of a red circle. This entire system is different from the signs used in the United States, the principal shapes being the triangle and the circle.

Current aircraft standardization.—Coincident with the nineteenth National Aeronautic Meeting of the Society of Automotive Engineers in Detroit, important progress is being made in standardization affecting both aircraft and aircraft engines. Within the last two years much has been accomplished in the standardization of materials, such as extruded structural shapes, rivets, mountings for aeronautical instruments, etc. The aircraft division of the Standards Committee is now formulating complete standards for both streamline and circular structural tubing among other subjects in progress. The ball and roller bearing division of the Standards Committee is also developing a standard for a narrow-type light series of annular ball bearings in the use of which a saving in weight is a prime consideration.

Weights and measures law for Iraq.—Iraq, an independent kingdom adjoining Persia, has no standard system of weights and measures, and various commodities are sold according to a system of weights and measures which varies with the commodity and also varies in details in different sections of the country. However, on March 19, 1931, the Iraq Parliament passed a law by which it is ordered that the metric system of weights and measures will be adopted by all Government departments, municipalities, and administrative councils in the country within six months from that date. The standards of weights and measures under the new law are: The international meter, the international kilogram, the international liter, and standard measures of surface; that is, the square meter and the donum and/or mishara (2,500 square meters).

Diesel-engine testing forms available.—The standard testing forms for Diesel engines that were approved by the Society of Automotive Engineers last January are now available. The set consists of seven sheets: General rules and directions, sheet A; specifications, sheet B; log, sheet C; and four curve sheets, of which No. 1 is for low and medium speed low-power engines; No. 2 for low and medium speed mediumpower engines; No. 3 for low and medium speed high-power engines; and No. 4 a blank sheet for miscellaneous speed and power engines. These testing forms will prove of great value to the Diesel-engine manufacturers and users by enabling them to completely standardize the records of the performance characteristics of their engines and to at any time make direct comparison with any other engines without having to transcribe or replot these data.

Wiring the home.—Recognizing the need for a standard specification outline on electrical wiring in the ordinary construction of home and apartment dwellings, the Electric Association (Chicago) produced such an outline under the direction and with the assistance of the joint committee on materials and methods of the Chicago chapter, American Institute of Architects, and the Illinois Society of Architects. The work does not cover nor touch upon the idea of wiring adequacy in any manner. It is intended to present simply the logical outline of an electrical specification from the service entry to the last outlet, and it is hoped that its use will result in simpler, clearer, and more concise specifications to obviate in great degree the misunderstandings arising from present statement of requirements, many of which are poorly and meagerly prepared.

British specification for steel gas cylinders.—The British Engineering Standards Association has issued three specifications relating to steel cylinders for the storage and transport of gases, namely, No. 399–1930, which deals with high-carbon steel cylinders for permanent gases; No. 400–1931, which refers to lowcarbon steel cylinders for permanent gases; and No. 401–1931, which deals with steel cylinders for liquefiable gases. These specifications are based on the reports of the Gas Cylinders Research Committee of the Department of Scientific and Industrial Research. The specifications include particulars of tensile, impact, flattening, and hydraulic stretch and pressure tests, together with a formula for the determination of the minimum thickness of the cylinder walls.

Australian classification for building materials.— The Standards Association of Australia has recently issued its Simplified Practice Recommendation No. R2-1931, containing a standard classification for building materials and equipment. Careful consideration of national requirements showed that the classification of the American Institute of Architects could be adapted readily for use in Australia, slight changes in nomenclature only being necessary. On being approached, the American Institute of Architects gave permission to the Standards Association of Australia to adopt its standard filing system as a basis for an Australian Standard Classification for Building Materials and Equipment. The classification was developed along these lines, and it is expected that its general adoption in offices in Australia controlling building construction will lead to an intelligent and efficient classification of all relative data, and thus assist greatly in the elimination of waste, one of the principal objects of the Standards Association of Australia.

British standard specification for porcelain insu-lators.--The British Engineering Standards Association has issued an important revision of its specification for porcelain insulators for overhead power lines. The 1922 edition was limited in scope to insulators suitable for use on lines of voltages up to 150 kilovolts, whereas the new specification is application for voltages up to 350 kilovolts. The insulators are identified by arbitrary "rating numbers," for each of which a series of tests has been laid down. The table does not attempt to establish a rigid relationship between the test voltage and the working voltage, since in practice this relationship is a variable factor, largely influenced by climatic conditions. In a separate table, however, a recommendation is given regarding the circuit voltages, for which the lower-voltage sizes of insulators are suitable, since experience has shown that for these particular sizes normally the insulators may be satisfactorily assigned to certain definite circuit voltages.

Hospital beds standardized in Germany.—Is it necessary to have 50 different types and sizes of beds for children? In the May, 1931, issue of the American Standards Association Bulletin, John Gaillard states that "the German doctors and hospital experts, supporting the national standardization movement which has developed strongly since 1918 under the auspices of the German Standards Committee, have firmly answered this question in the negative. Two types of children's beds will do, they have decided, one having a size of 100 by 65 centimeters (about 40 by 26 inches), and the other one, of simpler construction, a size of 90 by 50 centimeters (about 36 by 20 inches)." In the United States the hospital industry has simplified the variety of hospital bed lengths from 33 to 1; widths from 34 to 1; and heights from 44 to 1. The elimination of these superfluous varieties was caused by the promulgation of simplified practice recommendation No. 24, under the auspices of the National Bureau of Standards.

Revised standardization program for gear makers.-At the annual meeting of gear makers, A. A. Ross, chairman of the general standards committee, presented a revised standardization program. The original standardization program was adopted in June, 1921, at which time a list of items to be dealt with by each subcommittee was set up. This program was revised in January, 1924, and again in January, 1931. It is being carried on in cooperation with the American Standards Association. Prof. G. M. Bartlett, of Purdue University, reported for the sprocket committee, of which he is chairman. This committee plans to add nine items to its program, including the following: Uniformity in character of specification sheet; a table of load factors for use in connection with the horsepower and the work-load table in the present American Gear Manufacturers' Association, uniform instructions regarding the selection of chain drives, and a simple chart for the selection of chain drives. D. T. Hamilton presented the report of the nomenclature committee, which embodies a complete nomenclature for gearing of all types, including 118 terms with symbols, abbreviations, definitions, and in a few cases equations, where these help to explain the meaning of the term.

Classifying fractures in hardened tool steel.-A method for testing the quality of tool steel by examining the fracture of quenched specimens was developed by Dr. Ragnar Arpi, of Hagfors Jernverk (Hagfors Iron Works). Manufacture of high-quality steel being of a relatively greater importance to the Swedish steel industry than to that of most other countries, it is no wonder that a good deal of work has been done lately on methods of testing tool steel. While it is, of course, recognized that the only reliable method of ascertaining the quality of a tool steel is to test tools made from the steel in question under carefully standardized working conditions, such a procedure must necessarily require considerable time. A rapid and reliable method of testing is therefore greatly needed, and the method must permit grading the material. Doctor Arpi has prepared a scale of fracture classes, zero designating a very coarse-grained fracture, and 10 the finest fracture obtainable. The test is made on a number of notched bars which are quenched in water from different temperatures, such as 750°, 770°, 800°, 830°, 860°, and 890° C. The bars are then fractured and classified by comparison with standards.

"A guide to the literature on rubber."-Letter Circular No. 305 of the National Bureau of Standards, entitled "A Guide to the Literature on Rubber," has been prepared to tell those who may be concerned with this subject, where to find recent and authentic information about rubber and rubber products. A number of books on rubber are listed in this letter circular with a brief characterization of the contents of each. Rubber journals, one or more of which are published in each of the leading industrial countries of the world, describe current developments in the production of rubber and in the manufacture and testing of rubber products. Special publications on rubber cov-ering a wide and varied subject matter are issued by Government departments in the United States and abroad, and by testing societies, private institutions, and commercial organizations. It is anticipated that this letter circular will be of particular interest to teachers, students, and investigators in fields other than rubber. Letter circulars are designed primarily to answer specific inquiries and are sent free upon request to the bureau. No mailing list is maintained for these letter circulars.

Uniform street and sanitation records .-- The Committee on Uniform Street Sanitation Records has just completed, in Kenosha, Wis., the second of its demon-stration installations which it is making in various cities throughout the country. The purpose of this installation is to demonstrate how the standards and records prepared by the committee can be applied in cities between 25,000 and 500,000 inhabitants. A complete manual of this Kenosha installation, together with the forms employed, is now being prepared and distributed to 1,600 city officials through the country with the recommendation that they adopt all appropriate portions in their respective cities. Kenosha was selected as the demonstration city in the 50,000 class because of the splendid administrative methods employed. This city, in the opinion of the committee, maintains one of the best, as well as one of the simplest, general accounting systems in the country. and already monthly statements are being submitted to department heads showing the exact condition of each appropriation. Similarly, the purchasing system and central stores control was found to be a model one and required no changes whatever in the installation.

British standard for road tar.—The British Engineering Standards Association has published a further specification for road tar, designated "tar No. 3." This specification, the draft of which was prepared by the British Road Tar Association, provides for a tar suitable for the manufacture of tarmacadam laid by the hot or semihot process, as an alternative to tar No. 2, contained in specification No. 76–1930, and the viscosity of tar No. 3 is higher than that of the former tar. The methods of testing and the specifications for apparatus, which are given as appendices, have been prepared by the Standardization of Tar Products Tests Committee, and are based on this committee's publication, "Standard Methods for Testing Tar and its Products." The Minister of Transport has decided that tar prepared in accordance with the new specification may be used on works qualifying for grant from the road fund. The precautions notified to local

authorities in Circular No. 187A (Roads), dated May 5, 1923, respecting the use of tar, should, however, still be observed in the case of tar No. 3, where rain water from road surfacings is likely to pass into streams containing fish or plant life.

Actions against misleading labels and advertising.-The Federal Trade Commission has obtained from a corporation manufacturing fiber products, including insulating board, an agreement stipulating that it will no longer carry in advertisements any words or expression suggesting that a bureau of the United States Government had officially indorsed its products, or that such bureau had stated or held that any such product is the best insulation made, or is better than any other similar product, when such is not the fact. From another corporation selling watches, the commission has obtained an agreement stipulating that it will no longer carry as a label words which would indicate that the watches are made in accordance with Government specifications when such is not the fact, or use the picture of a military cadet in uniform, or words to indicate to the public that the watches have been adopted by the War Department for use at the West Point Military Academy, when this is not the fact.

White-pine labeling for yellow pine barred.—The Federal Trade Commission has ordered 39 lumber producers to discontinue, in advertising and selling yellow-pine lumber of the species *Pinus ponderosa*, the use of the word "white" in connection with the word "pine" or with other words used in combination with the word "pine." Pine trees have been divided by wood technologists into two groups, the "white pine" and the "yellow pine." In its decision the Federal Trade Commission pointed out that white pine has a high degree of uniformity of lumber qualities, averaging high in durability under exposure to weather, lightness of color and weight, softness and evenness of texture, closeness and fineness of grain, freedom from resinous content and from shrinkage, and that white pine has great ability to stay in place and exceptional ease of working. On the other hand, said the announcement of the commission, the yellowpine products generally are harder, heavier, stronger, more subject to shrinkage and warping, darker in color, more resinous, denser in fiber, coarser and more difficult to work than members of the white-pine group. Typical species of the yellow-pine group are valuable where structural strength of timber is re-quired. The white pines are not adapted to heavy construction. In contrast with the white pines the vellow pines vary widely.

0



Now is the best time to Repair Your Home

To aid you—

The U.S. Department of Commerce Bureau of Standards Division of Building and Housing has issued a new handbook—

Care and Repair of the House

A nail in time saves nine

Do you want —

- To paint the walls, the down spouts, and the window frames?
- To repair the roof, and the cracks in the plaster?
- To fit new glass in the window frames, and paint and hang the screens?
- This new book tells how to repair all parts of the house and equipment, and maintain them in the most useful condition.

It will enable the home owner to do much of his own repair work. It suggests when he can safely undertake the work, and when he should call in a skilled mechanic.

It should be useful to householders; to dealers in tools and materials; to all who are interested in making homes well equipped, thoroughly repaired, comfortable, and attractive.

Pay 20 cents toward improving your home in 100 different ways.

By V. B. PHELAN

Popular edition Paper bound 121 pages 30 illustrations Size approximately 6 by 9 inches

For sale by the Superintendent of Documents, United States Government Printing Office Washington, D. C.

Price 20 cents

[For foreign countries (other than Canada, Cuba, Mexico, Newfoundland, and the Republic of Panama) add one-third.]

THE UNITED STATES DEPARTMENT OF COMMERCE

R. P. LAMONT, Secretary of Commerce

"* * * this department * * * is devoted solely to aiding and fostering the development of higher standards of living and comfort of our people * * * its ideals are clear: That by cooperation and not by compulsion it should seek to assist in maintaining and giving the impulse of progress to commerce and industry in a nation whose successful economic life underlies advancement in every other field." -President Hoover, at the laying of the corner stone of the new building of the U.S. Department of Commerce, June 10, 1929.

rngungr E.E.E. TETT 同日間 医医疗发展 下官 RAN 2月1日日日 MADR 5 F F F F FARFAR

AERONAUTICS BRANCH, CLARENCE M. YOUNG, Assistant BUREAU OF MINES-Continued. Secretary of Commerce for Aeronautics.

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

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

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

Compilation of statistics of marriage, divorce, births, deaths, and penal and other institutions annually, and of death rates in

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

BUREAU OF FOREIGN AND DOMESTIC COMMERCE, WILLIAM L. COOPER, Director.

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

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

The study of the processes of domestic trade and commerce.

BUREAU OF STANDARDS, GEORGE K. BURGESS, Director.

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

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

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

BUREAU OF MINES, SCOTT TURNER, Director.

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

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

Research on helium and operation of plants producing it.

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

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

BUREAU OF FISHERIES, HENRY O'MALLEY, Commissioner.

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

BUREAU OF LIGHTHOUSES, GEORGE R. PUTNAM, Commissioner.

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

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

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

BUREAU OF NAVIGATION, ARTHUR J. TYRER, Commissioner.

Superintendence of commercial marine and merchant seamen. Supervision of registering, enrolling, licensing, numbering, etc., of vessels under the United States flag, and the annual

publication of a list of such vessels. Enforcement of the navigation and steamboat inspection laws, including imposition of fees, fines, tonnage taxes, etc.

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

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

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

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

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

RADIO DIVISION, W. D. TERRELL, Chief.

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