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STANDARDS AS PUBLIC, COLLECTIVE AND PRIVATE GOODS*

by

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Written at a distance from my notebooks so that
references are incomplete and facts require checking.

*This paper brings together, extends and generalizes a number
of previous observations on the subject (Kindleberger, 1964,
pp. 149-52; 1978a, pp. 137, 228ff; 1978b, pp. 6-7; 1982, pp.
). The analysis and illustrations accordingly are to
a considerable extent repetitious.

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Adam Smith postulated three types of public goods: safety, justice and public works which it would not pay private individuals to produce, all three summed up in the word "magistracy", which was the necessary prerequisite for free trade (1776, pp. 653, 669, 681-2). Magistracy can be extended from this group or made to include within it such elusive "goods" as macro-economic stability, redistribution of national income, the monetary system, and of interest here, standards of various sorts. Standards of measurement - whether linear, weight, bulk, temperature, time or value (i.e. the unit-of-account function of money) clearly fall within Samuelson's definition of public goods in that they are available for use by all and that use by any one economic actor does not reduce the amount available to others (1954). In fact they are a strong form of public good in that they have economies of scale. The more producers and consumers use a given standard, the more each gains from use by others through gains in comparability and interchangeability.

My concern goes beyond standards of weights, measures, temperature, time and value, though they play important roles in what follows, to include standards determined by various groups - governments, trade or professional associations, and even companies - limiting the characteristics of goods or products, and to deal with the setting, diffusion, and changing of standards.

II

At least two classes of standards can be distinguished: those designed to reduce transactions costs, and those in which there are physical economies external to the firm. Under transactions costs can be included not only the ease of concluding transactions

because both parties to a deal mutually recognize what is being dealt in, but also the prevention of adulteration, short measure, or short weight, debasement and the like that may make a transaction unsatisfactory to one of the parties. In recent times the state has set standards of weights and measures and maintained surveillance to see that they were adhered to. In the Middle Ages, the cloth guild of Florence controlled yardsticks (Origo, 1957, p. 77). Linear measure in retail trade is today probably left to the consumer to patrol, but most cities check up on the more complex machines to weigh, say, meat, to ensure against short weight. Quality counts as well as quantity. In the Middle Ages most trade was conducted on consignment because the buyer wanted to inspect the merchandise to check for quality (deRoover, 1966, p. 143). Some goods today are incapable of being described in a standard designation because of the unevenness of nature or man-made uniqueness. On this account diamonds, furs, wool, race horses, art and antiques are sold in quantity only at auctions after inspections. Where possible, however, transaction costs on commodities are reduced by standardizing quality by grades. At a primitive stage of international trade, India sold cotton in the famine created by the American Civil War full of dirt (Landes, 1958, p.

), and Turkish wheat entering world markets for the first time in the early 1950s was said to suffer from an admixture of stones and dead mice. Standardization and grading, resulting in such short-hand descriptions as middling cotton, 1 3/8ths inch staple, No 2 medium-grain rice, Straits quality tin, Santos No. 4 coffee, prime western slab zinc, etc. save time in description, allow for conventional discounts or premiums for divergences from the standard, and permit trading over distance without inspec-

tion. There may be provision for testing, as in taking a core sample of a loaded railway car of wheat. Where standards of quality can be established, however, trade is expedited and transaction costs reduced.

Some standards are imposed by government in the interest of the consumer, notably in the testing of drugs and inspection of meat. For the most part, however, standardization was originally undertaken by merchants. In a previous paper, I have suggested that a distinction could be made between the gains-from-trade merchant who arbitrated goods in their existing condition, ~~buying cheap and selling dear, and the value-added merchant who~~ was especially interested in upgrading and controlling quality (1978, pp. 37-8). These are ideal types and in actual practice most merchants combined the two functions. Part of the value added of such a stapling center as Amsterdam in the seventeenth and eighteenth centuries was the sorting, grading, packing and storing undertaken by the Second Hand after the First Hand of great merchants had brought the goods to the entrepot center. Adam Smith's belief that the merchant exchanging corn from Königsberg for wine from Portugal brought both to Amsterdam because he felt uneasy separated from his capital and wanted to see it badly enough to be willing to pay the double charge of loading and unloading (1776, pp. 421-2) was based on a complete misunderstanding of this central point. The merchant had a strong interest in ensuring that the goods were sorted by grade and conformed to the qualities demanded. The "gentlemen merchants" of Leeds paid more attention to quality of the woollens they bought than to price (Wilson, 1971, pp. 56-7). It had been especially efficient to do so two to three centuries earlier at a time when

goods were sold at semi-annual or quarterly fairs, or shipped in an annual convoy to such a destination as Newfoundland, since goods rejected by the buyer would tie up the merchant's capital for an extended period.

The function of the merchant in commercial development in fixing and maintaining standards of quality is underlined when one contemplates the difficulties encountered in quality by Socialist countries, where producer performance and bonuses are usually related to quantities of output, which, given goods shortages, does not have to meet a rigorous quality test in the market. Competitive markets that clear allow consumers to reject altogether or to price down low-quality output, and thus provide strong incentives to merchants to enforce quality control on producers.

Governments and merchants are of course not the only instruments for standardization. When Denmark entered the international (largely British) market for butter at the end of the nineteenth century, much of its output was so-called "peasant butter" of uneven taste and texture. Before this could be sold in quantity abroad, it had to be upgraded to the quality of "manor butter", a process carried out, after the invention of the cream separator, through a newly-created institution, the marketing co-operative. This had the advantage of allowing production to continue on a small labor-intensive scale of the family farm, while marketing, after standardization and grading, of eggs, bacon, cheese as well as butter, was done on an efficient large scale (Faber, 1931). These standards were of course collective as contrasted with public, goods or the quasi-private goods of merchant standards. The

twentieth-century equivalent of such collective goods is the control by wine-growers of the labelling of champagne and other "appellations contrôlées" lines from particular regions. Here the standards are set by the vintners but enforced by government in an effort to protect consumers from adulteration on the one hand and to limit competition on the other.

After a certain stage of development and for certain classes of goods the efforts of merchants to standardize and grade outputs could become dysfunctional. It was said that the wholesale merchants dealing in cotton goods in Lancashire in the twentieth century maintained 34 grades of poplins when the ultimate user could distinguish at most three different qualities (Robson, 1957, pp. 92-5). In the British machine-tool trade, merchants have been regarded as inhibiting quality change and the development of new tools by standing between the producer and the consumer, telling the producer with an idea for a new machine "They don't want them like that", and the customer looking for a new device "They don't make them like that" (Beesley and Throup, 1958, pp. 380ff).

Chandler notes that when the local and regional corporation in the United States grew to national size at the end of the nineteenth century, it gave up the services of independent wholesalers and jobbers and drew the marketing function back into the firm so as to maintain direct contact with customers. Without the interposition of the merchant, it was possible for producer and consumer to explore together possible improvements and their costs and benefits. This gain seems to have outweighed the diseconomies of scale in administration from combining in one company such different functions as production and marketing.

Machine tools were long an industry in transition from standardized lathes, milling machines, grinders and the like to special machines for special purposes. Between these limits a large and growing class of goods exists in which the hardware is standardized but requires instruction or software for its effective use. The claim has been made that the need for software first developed in the chemical industry at the end of the nineteenth century as instruction in the use of nitrate fertilizers was necessary to prevent the peasant-farmer from blowing himself up (Hohenberg, 1967). In today's world complex manufactured products lead naturally to the spread of the multi-national corporation as products require instruction in use and repair, plus depots of spare parts, both leading to the creation in each national market of subsidiaries that evolve with some high degree of probability into local manufacture (Carlson, 1978). The standards set by makers of automobiles, electrical appliances, other durable consumers goods and industrial equipment are private goods, supported by advertizing to reinforce the claims for quality, rather than collective or public goods. The maintenance of these quality standards has perhaps little effect in economizing on transactions costs except where a customer satisfied with a given product is content to replace it with the same item from the same producer without search.

Where government lays down standards for the protection of ignorant consumers it may do so in the interest of producers, as Lindblom asserts was true both for meat inspection and for pure food and drugs, with policy formulated by business control parading as democratic reform without an important contribution from popular

demand (1977, p. 191). If this be true, an ostensible public good is effectively a collective good, although the two sorts of good can be complementary. Similar examples can be found in land zoning, with perhaps different private groups having different interests in the outcome of zoning decisions, and policy leading to standards with costs and benefits that have particular distributions. Governmental standards may also turn out to be dubious public goods and at the same time collective bads, as in building codes designed to protect the public from shoddy construction, but frequently piling up requirements, such as provision for handicapped persons in areas where few if any exist, at costs which are only casually considered and prove to be exorbitant. Governmental standards of this sort for the protection of consumers or investors are difficult to bring under the rubric of "reducing transactions costs" and perhaps deserve a separate category.

To return to standards set directly by producer or marketer, they save transactions costs in improving recognition and avoiding buyer dissatisfaction, with perhaps the disability of impeding quality changes if merchants inhibit exchange of information between producer and consumer. But standardization can reduce transaction costs in other ways, notably in standardization of working time, of statistics, and of monies. The saving in transactions costs, it may be noted, may well involve other types of costs which in particular cases exceed the transactions benefit.

Milton Friedman once applied the analogy of daylight saving time to flexible exchange rates. Instead of changing our habits when we wish to extend the hours of daylight, we change our clocks.

By the same token we should change exchange rates instead of trying to change prices and wages (1953). He neglected to point out that to be efficient, daylight saving time has to be adopted for an entire time zone at once, and optimally for all time zones around the world by the same amount on the same day of the year. When New York is in touch with London or San Francisco or Singapore or Bahrein, exchange rates for time zones must be fixed (Kindleberger, 1981, pp.   ). The point can be generalized: standardization of working time facilitates transactions by having people on the assembly line or in offices that need to interact available to work together. There is no such necessity for novelists or scholars, but for factory or office workers there is likely to be, despite the heavy costs in excess capacity in buildings and equipment, in transport congestion, and to the extent that everyone takes a holiday in the same weeks or month, in resort facilities. The Soviet Union experiment with varying the day or days of rest within the week, and currently popular proposals in the west for "flextime" working arrangements focus on one cost of standardized work days, weeks, months and years, but neglect the benefits. Standardized worktime in the factory makes possible the simultaneous or sequential application of labor to materials; in urban occupations where interpersonal communication at a high level is needed, as in advertizing, law, finance and administration, it makes it likely that the person needed will be found when sought at his or her desk (Vernon, 1960; Winston, 1982).

Standardization of economic information reduces transactions costs in various ways for the most part too obvious to require illustration. The European Economic Community had to establish

a common tariff nomenclature before it could impose a common tariff. Comparison and aggregation of national trade data require standardization of trade statistics whether by the Hague convention of 1913, the interwar League of Nations standard, or the United Nations Standard International Trade Classification (SITC). Today the United Nations and such bodies as the International Monetary Fund, the World Bank and other specialized agencies, national governments, their ministries and statistical bureaus, private research organizations, and individual scholars like Kuznets, Leontief, Friedman and Schwartz, Maizels, Bairoch, Rostow etc. spent countless hours and sums trying to make statistical series comparable both between countries and over time. The difficulty inherent in the process is that national statistics are shaped to separate country's conditions and needs, and statistical series over time encounter changes in underlying conditions of population, technology, resources and tastes which require changes in their composition. The index-number problem is insoluble both in time series and in cross-sectional analysis, despite the powerful sophisticated methods which have been brought to bear on it.

Finally in this listing is the need for money as a measure and as a medium of exchange. As a unit of account, money reduces transactions costs by assisting comparisons, converting, as is well known, the $N(N-1)/2$ comparisons of a barter system to $N-1$. Hayek (1977) and Vaupel (1979) neglect the unit-of-account function of money when they recommend the innovation of private competitive monies. They believe they take care of the objection to more than one money that they would be subject to Gresham's law by allowing

the several private monies to be traded against one another at varying prices. With monies varying in price, however, - within a country and even between countries - there is in my view no national (or international) money in the sense of a standard suitable for measurements. A fixed conversion coefficient between meters and yards permits measurement to take place in either. When the relationship between the yard and the meter fluctuates, however, the public good of a standard of measurement is lost.

Even the medium-of-exchange and store-of-value functions of money that Vaupel believes should be left to the private market as private goods, subject to the prescription of caveat emptor, pose problems in transactions costs. The state has two reasons to set a money standard. In the first place, there is strong historical evidence that not all members of society possess the capacity adequately to safeguard their own interests. This is the reason for standards of pure food and drugs, honest measure, tolerable limits of bacteria in the water at bathing beaches and public swimming pools, enforced by the state. The state, moreover, lays down and seeks to enforce strong rules against counterfeiting or debasement of money of other sorts, such as writing bad checks. The Federal Deposit Insurance Corporation sets limits of insured deposits, originally \$10,000, then \$40,000 and now \$100,000, because small depositors presumably lack the capacity to judge the safety of a given bank, whereas the possessor of wealth is held responsible for protecting his own money.

In addition to this function of protection, standardization of the medium of exchange saves transactions costs. It took

four months to test and count the money for the ransom of the sons of Henry II of France in 1520 (check) (Ehrenberg, 1928, p.). To economize on weighing and assaying specie in Italy in the Middle Ages, and up to the nineteenth century in the Eastern Mediterranean, banks accumulated coin in purses marked with the amounts contained, and dealt in them without recounting, with the state levying heavy penalties against any overstatement of the amount (; Marlowe, 1974, p.). "Bank money" developed in the seventeenth century, consisting of transferable deposits of coin in the public banks of Genoa, Venice, Amsterdam, Hamburg, etc. with the bank certifying to the existence on deposit of specie of the requisite weight and fineness (van Dillen, 1934). Bank money in Amsterdam normally traded at a premium of 3 to 5 percent about the equivalent coin, the premium testifying to the transaction saving in testing and counting (Smith, 1776, p.). As unit of account, and to a great extent in the medium-of-exchange and store-of-value functions, standardization of money - a process that has been continuing in Darwinian fashion for centuries - provides a public good that reduces transactions costs.

III

Standardization can produce physical economies as well as savings in transactions, though not necessarily in total cost. In production, the saving may lie in economies of scale through repetitive production and in the reduction of down time for changing patterns and shifting materials. In use - more often perhaps of intermediate than of final goods - the benefit is in interchangeability of equipment. A classic example is the

standard railway gauge of 4 feet $8\frac{1}{2}$ inches, believed by tradition to have originally represented the width of the hind end of a Norfolk mule used to pull coal wagons on wooden rails. In 1846 the British Parliament enacted the Gauge Act requiring all railroads to conform to the standard gauge. The Great Western Railway that operated from London to Devon and Cornwall and had started with a gauge width of five feet resisted strenuously on the ground that its wider gauge was superior to the standard adopted, producing a smoother, more stable and safer ride. As the Great Western acquired other railroads through purchase and merger it widened their gauges by $3\frac{1}{2}$ inches and equipped the acquired locomotives and wagons with new axles. Cargo moving on other railroads from the Midlands to the Southwest had to be transshipped at Gloucester from standard to wide-gauge wagons, and vice-versa for shipments in the other direction. After holding out for half a century, the Great Western finally yielded to the inevitable and adopted the standard gauge in the 1890s.

Railway-gauge problems have also been prominent in wars involving Russia with a wide gauge and Germany with the standard (adopted by most countries), and in the separate states of Australia. In the Russo-German case, the Germans for a time shifted one track inward on sleepers as they conquered Russian territory in World Wars I and II, and then adopted locomotive and wagon axles with an extra wheel to fit the wider size to make transfers possible without relaying track. In Australia each state kept to its own gauge until after the middle of the present century, forcing most interstate cargo to be carried by sea between settlements along the coast, and interstate shipments by rail to be reloaded from one system to the other.

Many manufacturing processes in Britain escaped standardization for lack of government efforts, those of a trade association, or the pressures of a dominant firm. It has been said that there were 200 types of axle boxes, 40 different handbrakes in railway wagons, perhaps 200 sizes and specifications for manhole covers. The Railway Clearinghouse laid down regulations for equipping privately-owned cars with automatic brakes, but most railroads built their own stock to their own standards (Parkhouse, 1951). There were 122 channel and angle sections in England, when the Germans had reduced their number to 32 (Landes, 1965, p. 495), and "an almost unbelievable lack of standardization" on the part of British manufacturers of plows (Saul, 1968, p. 212). In World War I Britain was found to have 70 electricity generating companies with 50 different systems of supply, 24 voltages and 10 different frequencies (Plummer, 1937, p. 21). British automobiles adopted the precedent of trains and drove on the left of the road with the driver in the right-hand side of the front seat, whereas virtually all other countries changed over to the American standard of left-hand drive cars on the right hand lane of dual roads.

Standardization between firms allows for greater interchangeability of equipment not only in such items as railroad locomotives and rolling stock, but also savings for the consumer if, say, the change from 78 revolutions per minute for records and record-players is made entirely to 33 r.p.m. long-playing records, instead of one company, R.C.A., adopting for a time a different standard of 45 r.p.m. French resistance to the adoption of the United States standard in color television of

a minimum number of lines per inch and attempt to spread its own finer but more complex and difficult to maintain standard evoke echoes of the holdout of the Great Western railway except that in this case it succeeded in getting its standard adopted in Europe. It is a general phenomenon that the first major firm in the field in a country has a relatively free hand in setting the standard. This may, however, prove later to be less than optimal but at such time difficult to displace.

In Britain some part of the explanation for the lack of standardization that would have constituted a collective good for an industry lay in the numbers of small companies making a virtually simultaneous start in an industry, with none sufficiently in advance to induce others to follow its lead. In addition, both railroads and cities hired own consulting engineers with pride in their professional competence who chose specifications for railway or municipal equipment as if they were architects designing unique structures, without attention to possible external economies (Saul, 1968). (The adoption of separate building codes for cities and towns in the United States has the same origin in local pride of authorship and the same result in preventing the achievement of economies of scale in many aspects of the construction industry, though there may be some basis for regional differences - south and north, wet and dry - and the like.) There were exceptions in the British case. In tramways, John Young was a dynamic municipal engineer who persuaded the entire country to follow his standard type of overhead trolley, enabling manufacturers to gain production economies of scale (McKay, 1976, pp. 181-4). By contrast standardization

in Germany and France was achieved by the success of a dominant firm in each country so far in the lead that it forced the competition to follow. Charles Mertz of Northeastern England was both a consulting engineer and a supplier of electrical equipment who achieved standardization of electricity production and distribution in the area in which he operated (Saul, 1968, pp. 231ff; Byatt, 1968, p. 272). He was of course aided by starting some time after the initial introduction of electricity in the south of England, and was able to profit from the example of that region's troubles.

Where a company is far in the lead, as the American Telephone and Telegraph Company or IBM in computers, there is strong pressure on the rest of the industry to make its equipment compatible, leading to the private and collective good of standardization, although for the lead company which may be partially displaced, the standardization might be regarded as a private bad. In international trade Jacques Drèze has explained why Belgium, a small country unable by itself to get economies of scale in its market, has to concentrate on the production of standardized commodities that can be sold in world markets, for example, semi-finished iron and steel bars, rods, shapes, wire and the like, flat glass, intermediate chemical products such as soda ash and urea, electric wiring harnesses used interchangeably on many models of foreign automobiles (1960).

Standardization may also be desirable within an organization for physical reasons. Armies, navies, air forces find it desirable to focus on a few types of weapons in order to reduce numbers of spare parts to be maintained, and to simplify the training and

operations of users and repairers. What is self-evident for such a large organization as an army applies as well to firms, to railroads for locomotives, bus companies, fleets of taxis or rental cars, etc. If the equipment wears out a little at a time, and technical progress or model changes continue in the industry, the company faces a difficult choice between heterogeneous equipment or lumpy capital expenditures, which choice may or may not be assisted by the possibility of selling obsolete serviceable equipment in a second-hand market.

A variety of defenses of advertising have been put forward, notably the dissemination of information, the gaining of consumer loyalty through product recognition, appealing to consumers directly over the heads of wholesalers, jobbers and retailers (Kaldor, 1951). For consumer loyalty it is important for the company to set and maintain high standards and quality control, and to persuade the public that a brand name is a guarantee of quality. Brand loyalty based on such belief is an intangible asset, included on the balance sheet under good will. Sophisticated methods of testing and quality control are required along with advertising to eliminate "lemons" (equipment that performs inadequately or requires excessive maintenance and repair), short measure, or disappointment to public expectations in other ways. Generic foodstuffs and drugs which are cheaper than branded articles encounter difficulty where a brand name is believed to be a guarantee of quality. To the extent that generic products are gaining on higher-priced branded products, it is possible that the consumer attaches an implicit guarantee of standard quality to the retail dispenser.

IV

Standards may be imposed by government, by trade or professional association, dominant firm, or in some cases be altogether missing. Where they exist with important economies in transaction costs or physical economies of scale, or don't exist but would be useful, they are difficult to change, or to adopt late in an industry's life, because of lumpiness. A substantial capital investment is likely to be required for a smaller monetary gain over time. With perfect information on costs and benefits, and well-functioning capital markets the decision as to whether or not to change standards is readily made by a single decision-maker with due attention to discounting future benefits by some appropriate rate of interest. In practice, with many firms in an industry, the difficulties are likely to be great, partly because of the free-rider problem that inhibits the production of public goods: each firm, household, individual waits to undertake to change the standard until the rest of society has conformed and the costs and benefits to the single unit are clarified. The various forms that resistance may take can be illustrated, beyond the Great Western railway and French television already cited, with reference to right- and left- hand drives for automobiles, and the metric system in France, Britain and the United States.

Trains in Britain used the left track, and those of Sweden, Switzerland and the United Kingdom (at a minimum) still do. When automobiles came along, the British clung to the left-hand side of the road, whereas the United States chose the right-hand side. (The question was undoubtedly decided state by state, but once the first few states adopted a common standard the rest followed with-

out question). (The practice of driving on one side or the other with horses and horse-drawn vehicles may have been a factor affecting the choice in Britain and the United States, but I lack information). When the United States moved into mass production and export of automobiles, the American left-hand drive car, appropriate to a right-hand traffic pattern, came to dominate foreign countries. Pressure for standardization was significant among contiguous countries, although a few like Austria and Sweden, held out in the British pattern. For the British Isles, with no highways running directly to foreign countries - prior to completion of the Channel tunnel - it was easy to keep to an idiosyncratic standard since there was no necessity to change sides of the road in continuous travel. A certain cost was incurred in having to have special assembly lines for left-hand drive cars sold abroad, or right-hand cars purchased from abroad, and in accidents from drivers who intuitively turned the wrong way or pedestrians who looked the wrong way. The extra cost of foreign right-hand-drive cars may have been enjoyed, however, as a non-tariff-barrier.

Sweden shifted from the left to the right side of the road after a long drawn-out process of study and decision-making. Royal Commissions studied the question once in the 1930s, and again in 1946, both with negative decisions, a national referendum voted against change in the 1950s, and a positive decision was taken only at the end of the 1960s. The early commissions thought the costs - presumably the transitional heterogeneity of the carpark as well as the more serious necessity to discharge passengers of trams and buses on the street rather than on the sidewalk - outweighed the benefits of moderately cheaper cars

and a common standard with neighboring countries. Increasing internationalization of automotive purchases and sales and of automotive travel finally tipped the decision the other way. It is of some interest that the national referendum voted overwhelmingly against change.

In Austria, I believe, there was little pressure for change up to 1938 when, after Anschluss, Hitler ordered the change to be made overnight. Confusion was substantial, and doubtless accidents, but an absolute authority, interested in uniformity throughout the country, decreed that it be done without ado. ~~The contrast between the close and drawn-out~~ decision in Sweden, made with difficulty in a democratic society, and one put into effect without discussion suggests the limits of experience in changing standards.

The French change from the weights and measures of the Ancien Régime to a metric system, including among the measures money, reveals a process with something of both elements, along with a failure, the decimalization of time. The basis for the metric system was laid in the seventeenth century, and with the support of the French Academy of Science, put into effect by Talleyrand who got it through the Estates General of the French Revolution. The legislation was introduced in 1790; commissions were appointed for weights and measures on the one hand and time on the other. Both were adopted. Decimal time beginning with year one from September 22, 1794 and the 12 months of thirty days each: Vendémiaire, Brumaire, Frimaire etc, weeks of 10 days was adopted partly to break down the Christian system of Sundays and holy days. It lasted only ten to twelve years. Decimal time

with 10 hours of 100 minutes each per day survived far less - failing to survive for two years (Carrigan, 1968). Weights and measures needed a Revolution to effect a drastic change. The substitution of the decimal franc germinal for the livre (pound) tournois, divided into sous and deniers (nominally equivalent to shillings and pence), a quasi duo-decimal system that went back to the Romans was perhaps more readily put into effect in 1803 under Napoleon because of the collapse of the assignats in 1795.

Somewhat like the Gauge Act of 1846, however, it was one thing to order the standard changed and another to have the change accomplished. In his book From Peasants into Frenchmen (1976), Eugen Weber points out that the French peasant was still using the old measures as late as 1870, when he began to be integrated into the rest of France by virtue of military service on the one hand and national norms laid down for education on the other. The process seems extended, but it is understandable to those who are aware that the change from the old to the new franc, decreed by President deGaulle in 1958 at the ratio of 100 to 1, is still ignored by many French today. Children and tourists quickly began to calculate in new francs, the children learning in school, the tourists starting with tabula rasa. People who grew up under the old franc, however, mostly cling to 10,000 francs where foreigners would say 100.

A generation for the new franc, seventy years for the franc germinal of 1803 were slight as compared with the century and a half for the British to adopt a system of decimal money. Immediately after the Napoleonic wars there were pressures to join the French in adoption of the decimal system. A Royal Commission

in the 1840s recommended early action. Indeed, the minting of the 2 shilling florin was undertaken in 1847 as the first step toward a decimal money - one - tenth of a pound as compared with the half crown which was a binary one - eighth of a pound. Throughout Europe in the middle of the nineteenth century country after country was falling in line with the decimalization of money, Belgium, Germany, Italy, Spain, Sweden, Switzerland, although the Swedish decision lagged behind others for a time because of the objections of clergymen. A new committee was appointed in Britain in the 1850s to rubber-stamp the decision to follow suit. It happened, however to contain the opinionated monetarist, Lord Overstone, who objected to decimalization largely because it involved change. By adroit maneuvering he blocked the decision which was not taken favorably until a century later when computerization somewhat increased the benefits of the change (O'Brien, 1971, vol. 1, pp.   ; vol. 3, pp.   ).

Lord Overstone's stated objections to decimalization were based on technical grounds on the one hand, and on the distribution of costs and benefits on the other. Technically he made such points as that a system of 1000 mils, which would have been required because 100th of a pound (2.4 d) would have been too large for the smallest coin, was inferior to a system of 960 farthings ($1/4$ d), since 27 numbers can be divided into 960 without a remainder and only 15 into 1000. He also felt that it would have been necessary to change the normal system of counting since he found it awkward to quote a price of, say, 10 pennies for a dozen eggs. As to distribution of costs and benefits, he acknowledged that the change would benefit banking,

insurance, and finance of all sorts for which reckoning, especially of percentages, would be eased, but felt that the change in money would be hard on the lower classes and the poor. While Overstone was generous in gifts to charity, it is not evident that he had an intimate knowledge of these groups. In general he opposed change. Final British action in 1951 was taken after Australia and New Zealand had adopted decimalization, and long after the change had been made in Canada and South Africa.

The United States is today engaged in the process of changing especially linear, and liquid measurements and temperatures from the British to the continental decimal standard, doing it with deliberate slowness and increasingly meeting resistance from politically conservative groups who oppose change, especially change that involves adopting foreign standards. To an amateur in such matters, it seems to have been psychologically wrong to proceed so slowly, posting temperatures in public places both in Fahrenheit and in Celsius, and distances and speeds both in kilometers and in miles. The process of change requires the public first to convert from the new to the old, and, when the new becomes sufficiently familiar, to stop converting and use just the new. If both measures are given simultaneously, the necessity to convert is eliminated, and the second stage of relying on the new scales alone to economize on conversion may not be reached. It may be in the short run, however, that the benefits of a common set of measures between the United States and the rest of the world are declining as neo-mercantilism spreads, and that the benefits appear to decline as the costs seem heavier.

V

Apart from international statistical standards which have to be changed anyway and where countries have a strong motive to agree, it is hard to think of international standards that did not start out as the public good of some particular country, usually one with high international standing because of its economic and/or military power. During World War II, the United States and the United Kingdom harmonized the pitch of the screw thread between them to make screws of the same size interchangeable. Since the economy of the United States was several times that of Britain, the more costly changes were made by the latter. The Justinian and Gregorian calendars in macro-temporal measurement were produced by Rome and adopted generally in Europe and throughout its colonies, though not by Russia or the Moslem world. Greenwich mean time became the world standard when Britain ruled the waves. As noted, decimalization emerged from France, the gold standard from Britain, and the dollar-exchange standard from the United States, the last with some political holdouts such as France. It is not a random result that international air traffic where the benefits of a common standard of communication are high communicate in English, except for the one expression for planes in distress "M'aidez", which is usually transliterated into "Mayday". Like a dominant corporation in a new industry producing steel shapes, left-hand drive automobiles, IBM 360 computers, the big countries "ram it through".

When countries are more evenly matched in size and importance, agreement on international standards for output, regulations, taxation and the like is likely to lag or to be weakened in compromise. The original Rome treaty envisaged not only abolition of

tariffs on trade within the Community but also the harmonization of excise taxes, regulations and the like so that trucks and rail-road cars carrying goods would not have to stop at the frontier. This freedom of movement for goods remains to be achieved. Local standards may be retained and new ones such as the requirement that cars in Sweden be equipped with windshield wipers for the headlights imposed as non-tariff-barriers. In joint activities such as the European airbus, the equipment of NATO, the pooling of research in space and nuclear physics, the principle of allocating work to the low-cost source has been compromised in favor of the juste retour in which each country gets a share of output allocated to it according to its financial contribution. The possibility exists that the Common Market may end up like early British industry with only limited harmonization and interchangeability as the free rider or the holdout hoping to have its standard adopted, makes easy adoption of common standards impossible. Merchants were responsible for most standardization at the international level in earlier times, though some international standards were imposed by strong governments, and a few by the power of superior performance. In today's world in highly competitive national markets and in the international economy with no one country any longer leading or dominant, there is risk of market failure in the sense of failure to adopt widely accepted standards in new goods, to keep old standards up to date as improvements become possible, and especially to achieve the international public good of world standards.

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