

METROLOGY

The Big Change to Metric

The increasing costs and confusion caused by U.S. persistence in keeping the English system of measurement makes adoption of the metric system here inevitable.

► A FEW YEARS from now you probably will not be able to touch an inch, yard, bushel or pound with a three-meter pole.

Although this country has hardly budged a centimeter so far in adopting the metric system of weights and measures, chances are high that the big change is getting near.

This big change will mean that virtually every man, woman and child will have to be trained or retrained in the metric system, since everything from screws to speedometers will have to be altered to meet metric measures.

Today there are more than 80 units of weights and measure commonly used in the U.S., ranging from feet and furlongs to gallons and gills. On the other hand the metric system has only three basic units—the gram, liter and meter.

As in the system of counting money, the metric method uses the decimal system, with everything measured in multiples of ten. When the 39.37-inch meter is multiplied by 1,000, it becomes the 39,370-inch kilometer. Divided by 1,000, it is the millimeter, about one twenty-fifth of an inch.

Worldwide Scale

Most of the world, including Russia, measures with the metric scale, which was devised in France during their revolution. There is no measurement system now available so simple, so clear and so universal. About 90% of the world population uses the metric system, with the U.S., Canada, Australia and South Africa as the only major holdouts.

Canada, however, is now also seriously weighing a switchover, following Great Britain's announcement last spring that it will move into metric during the next 10 years.

Switching to metric measures will be no easy task for Americans just as it was no easy job for other nations who recently accomplished the switchover. India, Japan and Korea, which also had confusing multiple methods of computing, have adopted metric standards in recent years. However, those people have picked it up quickly and favorably," one expert reports.

Both advocates and opponents of this country's joining the metric bandwagon agree that there would be a tremendous cost and inconvenience involved. But many economists fear that the alternative of staying with the present "English" system would be even worse.

It was estimated recently that the U.S. is losing between \$10 and \$20 billion in foreign trade every year because it is not on the metric system.

To solve some of the problems arising from a changeover, the House of Representatives passed a bill, already passed in the Senate, authorizing the Department of Commerce to spend \$2.5 million on a three-year study of teaching the United States to count all over again.

Scientists throughout the world, with few exceptions, have computed by the metric scale and urged its general use. In 1906, a bill was introduced in Congress to require metric calculations in Government business. Dr. Alexander Graham Bell, inventor of the telephone, stressed the tediousness of having to work in inches, feet, yards, ounces and pounds. He called the metric system "a labor-saving device of the greatest importance and value."

Today's engineer and scientist waste countless and valuable hours converting units of weight, volume and length from English to metric and back again. One estimate made recently was that the aerospace industry alone would save \$100 mil-



Allegheny Ludlum Steel Corporation

DOWN WITH THE POUND —
These accurate stainless steel weights will have to be changed to meet the meter, if and when the metric system is adopted by the United States. Although conversion costs to industry is expected to reach into the billions, most economic experts believe that industry and the economy will benefit in the long run.

lion annually in time spent by engineers on calculations if the U.S. used metric.

Our out-of-date method of measuring is certainly hurting this country in its contest with Russia for world leadership, believes Dr. Edward Teller, a prominent American scientist who played a major role in developing the H-bomb. The clumsy U.S. method of measuring could actually "hobble our international trade, slow down our technological development and lose for us the greatest contest in the history of the world—the contest for leadership of the world itself," he said.

Economists at Stanford Research Institute, Palo Alto, Calif., predict that the changeover process will cost the nation something like \$11 billion during a 20-year conversion period, but they point out the cost will be more than made up by increased business and productivity. The Stanford study showed that switching to the metric system will mean:

... Faster calculation for engineers and scientists in a host of industries.

... Better, faster understanding between scientists and businessmen.

... An easier job for U.S. educators in training the young. (The whole system takes less than an hour to learn, while a child may spend a whole year in school learning our system.)

... Less chance of costly errors.

The confusion existing in the United States, which sometimes uses the metric and sometimes the English, is evident when considering an electric motor, J. Herbert Holloman, Assistant Secretary of Commerce, said. The power input of an electric motor is figured on a metric electrical unit—the watt, but the output of the same unit is figured in horsepower, an unknown quantity in the metric system.

NASA Uses Metric

The National Aeronautics and Space Administration uses the metric system in a major part of its scientific work and publications to avoid problems of conversion and error in complicated space technology. NASA must still use English dimensions, however, when it orders hardware because U.S. manufacturers are geared to that method. U.S. engineering textbooks use the English system, but American scientific texts deal only with the metric system, he added.

Although U.S. adoption of the metric scale is inevitable, it will not mean that the system will go into effect overnight. Americans will not wake up some morning and find that all the street signs have been changed from miles to kilometers, that the quart of milk is now measured in liters or that all the weighing scales have been changed from pounds to grams. The big change will undoubtedly be a slow one, perhaps taking as long as a generation, some experts believe.

Hardest hit by the conversion would be such industries as automotive, appliance and

machine tooling. In these, all dies, tools, machine parts and gauges would have to be changed to metric units. Millions of plans, diagrams and designs would have to be converted. In some cases adjustment of a present machine might be possible, while in others entirely new equipment would have to be designed and built.

In 1963 there were some three million machine tools in use in this country and all were geared to standard English measurements.

Although many of these industries claim that conversion to the metric system will be nigh onto impossible, one industry—the pharmaceutical industry—has found transition to the metric system “easy and valuable.”

“In recent years the major American pharmaceutical manufacturers have converted completely to the metric system,” reported Joseph V. Swintosky, president of the Academy of Pharmaceutical Sciences. “This has been done not only because of the greater assurance of safety to the human consumers of drugs, but it also has been done because it enables greater manufacturing efficiency,” he said.

None of the industries, and indeed nations, adopting the metric system over the past 150 years has regretted it. And chances are that when the U.S. adopts the system, no one will regret it either—not by a country kilometer.

• Science News Letter, 89:74 January 29, 1966

TECHNOLOGY

Strips Better Than Cells in Solar Panels

► SHINY BLACK RIBBONS of silicon crystal up to 18 feet long may save weight and improve reliability of solar panels powering future spacecraft.

At present, the individual cells that make up solar panels are made by cutting slices from a cylindrical crystal also of silicon. The round slices are then squared off, electrically connected to one another, and mounted on a backing material.

All these connections, however, are heavy and provide numerous places for something to go wrong. The new strips, developed by Westinghouse Electric Corporation, Youngwood, Pa., under a U.S. Air Force contract, are said not only to eliminate most of the connections, but to double the power output of solar panels.

• Science News Letter, 89:75 January 29, 1966

Do You Know?

One theory about cancer suggests that cancer virus is present in most animals and humans, being transmitted from generation to generation, and only causes disease occasionally.

Hearing acuity may be related to the adequacy of the blood supply to hearing mechanism in the inner ear.

• Science News Letter, 89:75 January 29, 1966

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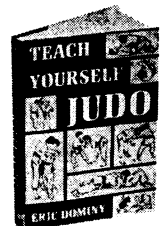
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By Eric Dominy

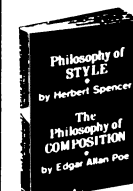
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