

of an inch in America, and 5 millimeters or approximately  $\frac{1}{5}$  of an inch in France or Germany.

The division of material bought and sold by weight into halves and quarters is natural to the human mind. Its division into fifths or tenths is not conceivable. What is possible in money is not practicable in the market. Half of the kilogram, nearly equivalent to the pound, had to be legalized in France and Germany, and this again is subdivided into quarters and not into ten parts in such materials as meat and butter.

As to memorizing such a system, it is, I fear, more easily forgotten than acquired, as has been proved time and again by questioning those who are compelled to use it. The difficulty with English-speaking nations is that there is no correlation between the metric units and the inch, foot, yard or pound, but if we make the meter 40 inches long this difficulty disappears at once.

Without attempting to go further into the discussion of this subject, I would say that if the Institute desires to make any recommendations looking toward a change in our standards of measurement, I deem it advisable to call the attention of its members to Sir Joseph Whitworth's suggestion, which in my judgment is the simplest and wisest solution of the problem that has been presented.

I remain, yours truly,

COLEMAN SELLERS.

PHILADELPHIA, February 19, 1902.

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*To the Secretary of the Franklin Institute :*

The commotion caused by the disturbance of established customs has been compared by Dr. Holmes with that which follows the overturning of a large flat stone which has long lain in the field. The good Doctor well describes the panic of its conservative population upon being deluged with the unaccustomed sunshine.

In the days of our forefathers such a disturbance accompanied the attempt to substitute the dollar and the cent for the pound sterling and its cumbrous subdivisions.

In our own days it took a mighty effort to convince our manufacturers that the blue-print was worthy of their attention ; and now the effort to substitute the meter and the centimeter for the yard, the foot and the inch, the cubic meter and centimeter for the cubic yard, foot and inch, and the various gallons, quarts, pints, bushels, pecks and what-not, and the kilogram and gram for the numerous tons, hundredweights, quarters, pounds, ounces, pennyweights, scruples and drachms, is giving rise to discussions like the present one—discussions upon which our posterity will assuredly look back with compassionate wonder.

That either of these reforms, instead of being immediately hailed

with delight and accepted in all its fullness, should have had to fight its way upward through dense overlying strata of stolid opposition, is a fine illustration of human conservatism, which includes an adherence to the existing order, in any given case, not for its merits, but simply because it is old; an adherence due to that mental inertia which makes us rather bear those ills we have than go to the trouble of thinking about anything in particular, and which yet, paradoxically, induces its votaries to take infinite pains and exhibit remarkable ingenuity in showing why any particular improvement should not be adopted.

But even that peculiarly aggravated phase of conservatism which prefers the British to the American coinage and the British to the civilized metrology, weakens before the all-subduing influence of time; and now, more than a third of a century since the use of the metric system was made lawful throughout the United States, the opposition to it is perceptibly weakening.

Even the manufacturer, who has so long been insisting that the introduction of the metric system meant his ruin, now admits that, when a large foreign order depends upon doing work in the metric system, that system is found not to be an insuperable barrier after all, and the order is taken.

To argue the superiority of the metric over what we may well blush to admit is still the British and the American system, would be a reflection upon the intelligence of the members of the Institute. In the language of the Editor of London *Engineering*, "the time has gone past when it was necessary to furnish arguments as to the advantages of the metric system over our own confused methods."

To my mind, the only serious reason for hesitation in pushing the adoption of the metric system, is that which, at first sight, appears to be its chief merit, viz. : its decimal basis.

The number 10 came to us as a basis of notation through our having each 10 fingers (including thumbs). Its unfitness for the purpose becomes manifest whenever we have occasion to think of the half of a quarter dollar and realize that this half is 12½ cents, bringing us at once into inconvenient fractions. As my good friend, Mr. Benjamin Smith Lyman, says, in his paper entitled "Against Adopting the Metric System:" "If our early predecessors, in learning to reckon, had but omitted to count their thumbs, \* \* \* they would have saved the world a vast deal of labor, and would almost have abolished the use of vulgar fractions."

Undoubtedly, some future generation will find itself using 8 or 12 or 16, instead of 10, as a base, just as our generation finds itself using the Arabic instead of the ancient Roman numerals. Therefore we must regard the metric system, not as a finality, but simply as a temporary expedient for the public welfare.

At first sight it might appear that the general use of the metric system, with its decimal base, would tend to perpetuate the decimal system, and to render more difficult the inevitable transition from it to the vastly preferable octonal or duodecimal system. If so, we might properly question the propriety of sacrificing the future for the present gain by adopting the metric system.

But, in the first place, the abandonment of the decimal base is so radical a step that we can hardly hope for its accomplishment during this or the next generation, and those generations might as well be delivered from the manifold inconveniences of the present alleged system.

In the second place, it seems altogether reasonable to hope that the metric system, by educating the popular mind up to the advantage of simplicity in matters of arithmetic, may rather help than hinder the ultimate substitution of a new basis of notation.

But, granted that there is no question as to the desirability of the speedy general adoption of the metric system, we may still ask whether the Franklin Institute, by taking the action now proposed, will help or hinder that consummation.

Certain experience of my own, in the use of argument based upon fact, as a means of bringing about the adoption of another sort of meter, has led me to question the efficiency of that method of obtaining popular approval of a measure smacking of innovation; and I have been ready to say, in my haste, that the speediest way to bring about the reform of an abuse is to keep quiet and let the abuse make itself intolerable. Until it does so, until the public really wakes up to the nuisance, argument against it only wearies those who do not keenly feel its burdens, and awakens the resentment of those who have some interest, if only the interest of conservatism, in maintaining it.

In all such movements, however, there comes a time when an organization like the Franklin Institute, universally respected as an authority (though coolly left without the support necessary for a decent existence), is looked to for its voice in the matter, and should feel that it owes it to the unappreciative public to utter that voice in no uncertain tones; and later there comes a time when the community, at last aroused, asks of the authority, "What! Slumbering still?"

It is now a quarter of a century since the Franklin Institute, by the narrow majority of 41 to 39, adopted a report opposing a proposition looking to the extended use of the metric system. At that time the Institute might have endorsed the metric system for *the system's* sake; but the time has now come when she *had better* endorse it for *her own* sake. She cannot afford to neglect the present opportunity of reversing her action of 1876.

JOHN C. TRAUTWINE, JR.

PHILADELPHIA, February 19, 1902