

of all. On the whole, we believe the most jaded reader of histories of the civil war will find here fresh matter of lively interest, and broad views of conditions like that of Washington during the formation of the Federal army, or of Kentucky before operations began, such as are hardly to be found elsewhere. The accompanying maps are sufficient for orientation.

The accident of marrying a Boston lady, the only daughter of William Lloyd Garrison, was the cause of an episode not to be overlooked, viz., Mr. Villard's engagement as secretary of the American Social Science Association, whose headquarters were in that city. This had an important bearing on the growth of the civil-service reform movement, and led to personal relations with Mr. Godkin, editor of the *Nation*, which culminated, in the days of Mr. Villard's financial success, in his purchase of that paper and the *Evening Post* in the interest solely of independent journalism, pure politics and honest standards of government.

The final chapter cannot well be summarized. It is a compact statement of the circumstances by which Mr. Villard, while residing in Germany in the early seventies, was called in to consult with bondholders of defaulting railroads in this country, with the result of his embarking in the completion of the transcontinental line of the Northern Pacific Railway, and becoming one of the financial magnates of Wall Street. This survey of a period of scant twenty years is more romantic than all that has gone before, being not less full of vicissitudes as well as of alternations of public applause and odium—"revivals, too, of unexpected change." Here is to be glimpsed the expansion under prosperity of one of Nature's noblemen, a public benefactor in both hemispheres, the idol of the northern Pacific Coast, to which he had opened the overland approach, the honored and fêted son of his native country. If Lincoln was the chief historic personage of the first volume, Bismarck is of the second, and nowhere does Mr. Villard as a writer appear to better advantage than in rehearsing his memorable conversations with the ex-Chancellor at Friedrichsruhe. We have room for but a single quotation (vol. II., p. 348):

"The Prince then began to question his guest regarding himself, about his early life in Germany, how long he had been in the United States, and about the course of his career there. He wanted to know how many miles of railroad he had built, in what time it had been done, how many steamships had been under his control, how many men he had employed, being very much surprised that 15,000 Chinamen had been among them, and saying: 'Why, you had a whole army corps under your command!' He asked how much capital Mr. Villard had been obliged to raise and how it was raised, and about the relative value of white and Chinese labor. He inquired whether he had named Bismarck, the capital of Dakota, after him, to which the guest had to reply that the place had been founded and baptized before he had anything to do with the Northern Pacific. Bismarck remembered that he had received thence telegraphic greetings from the German participants in the Northern Pacific opening excursion, and asked whether it had a future. In reply, Mr. Villard had to confess that it was not then very prosperous, and he explained that all the capitals of the several American States were as a rule of slow growth. This the Prince could not understand in the light of the contrary European experience. He remarked that what his guest had accomplished in a foreign country, he never could have done in the

Fatherland, owing to tradition and to the clinging to accustomed ways so characteristic of old countries. Did he not encounter a great deal of prejudice among native Americans against him as a foreigner in the pursuit of his undertakings? To this Mr. Villard replied that, on the contrary, he had found his chief financial backing and his main support among them, and that there was no people on earth among whom enterprise and energy prevailed to a greater extent, or that more readily appreciated those who possessed such qualities. To this the Prince said that he was well aware that the Americans were the most progressive people in the world, for which he admired them, but it was new to him that they were so free from national jealousies in appreciating merit."

The index to these handsome volumes ensures their utility as works of reference. They will attract a wide class of readers in every part of the continent.

#### THE METRIC FALLACY.

*The Metric Fallacy*, by Frederick A. Halsey; and *The Metric Failure in the Textile Industry*, by Samuel S. Dale. D. Van Nostrand Co. 8vo, pp. 231.

The adoption of the metric system would have real advantages. It would also have real disadvantages. Are the former so assured and so great as unmistakably to overbalance the latter?

The serious advantages of the metric system, itself, are two. The first arises from its decimal subdivisions, and this, so far as it goes, is a sound argument for the full adoption of it. Yet we are apt to overrate it, because we think of the conveniences of our decimal money, without considering how much more frequently sums of money have to be added by ordinary people than weights and measures have to be arithmetically operated upon. The second advantage of the metric system lies in that system's furnishing a universal commercial language for weights and measures. We believe this to be the greater advantage of the two; but it affords no argument for any modification of our laws, since everybody is already free to express himself in metric units. The law of 1866 (due to Messrs. Kasson and Julius E. Hilgard) protects him in doing so, and he is sure to be understood. Other advantages are claimed for the system, but any impartial person will easily satisfy himself that they amount to little. Thus,

is it averred that the simple and elegant relations between the different kinds of units of the metric system would be important. No doubt they would for a small number of scientific men, not a hundred thousand all told. But these all use the system already. They seem to be very desirous that the unlearned, too, should be able with equal readiness to interconvert mass, length, and capacity; but really this cannot be a vital advantage even for the scientific class; and when it is divided by the ratio of the whole population to the number of this class, it evidently becomes insignificant. For the great body of the people, the relations between the old units of mass, length, and capacity are about as handy. They are not generally very well known, for the reason that they are not generally very important.

It is further pretended that the adoption of the metric system would lighten the tasks of schoolchildren so much as to afford an argument of national importance for its adoption. The idea presumably is that they

would no longer have to learn the tables of weights and measures. But, as matters now are in this country, children need to be required to learn but a small part of those tables; and that little they would still need to know just the same. For, not to dwell on the fact that the books that speak of the old measures, as well as the things made according to them, would still endure, Mr. Halsey conclusively shows in the volume before us that the old units would persist, and with them the need of knowing them. Finally, it is said that another advantage of the change would be that manufactured articles would be made of the same sizes the world over; that such things as bolts, screw-threads, machinery, textile fabrics, etc., would have such uniformity that our manufacturers could begin to compete in the markets of Continental Europe. Surprising as it may be, there actually are intelligent and educated men so utterly ignorant of the condition of their own country's business and of its relations with other countries, and who are so ignorant of their own ignorance, that they are not ashamed to talk more or less like this before the faces of those who are acquainted with such matters. Much more worthy of attention is the counterclaim that our abandonment in our manufactures of a unit of the international importance of the English inch would bring disaster upon the country. This is, indeed, the greater of the two main arguments against Congress proceeding any further than it has already done in the direction of favoring the metric system. The other argument is drawn from the intrinsic inconvenience of a decimal system, especially when employed, not merely as a part of language, a mode of expressing quantities, but as regulating doings and makings.

That the number *ten* is an unfortunate base of numeration is generally agreed by those who have inquired into it. Indeed, it is so decidedly so that several men otherwise remarkably intelligent have actually proposed that it should be given up, and that a power of two (they mostly prefer sixteen) should be used in place of it. This is sheer insanity. Yet it is worth notice as showing that our retention of *ten* is pure conservatism, and as consequently affording a warning against the follies to which unmeasured rationalism in regard to weights and measures, like all unquantitative discussion about quantities, may lead. The effect of the inconvenience of this base of numeration has been that while it has mainly governed our expression of quantities, yet our practical dealings with these have broken away from our system of expression and have been regulated by other factors of subdivision.

There are two principal cases. In the first place, when our subdivisions are used additively, as, for example, in weighing anything by placing weights in one pan of a balance, everybody knows the great convenience of successive bisections. We virtually put to the balance a series of questions answerable by *yes* or *no*; and the most expeditious way of reaching the desired result is by so putting the questions as always to bisect the possibilities. In this case, subdivision by *ten* causes a loss of time and energy amounting to 2.35 per cent. The other principal case is where it is desired to have within certain limits so many sizes of some article, say screw-bolts, that the ratio of each size to the

size below it shall never exceed a certain value. If there be an unnecessary variety of sizes, not only will more capital be locked up in keeping them on hand, which aggregates something, but, what may rise to any degree of importance, in an emergency the particular size needed may not be found in the store.

Take a typical case of continual happenings. A refrigerator car of strawberries from California broke down in the desert for want of a bolt. But that bolt was of the Sellers system of sizes, which prevails the world over, except in England, and even there is much used. Here, there is no other system, and therefore the size wanted was sure to be procured in the nearest store, and was found, and the car went on after half a day's delay. Suppose, however, that the metric system had been in use, with the Armengaud system of bolts, now struggling for existence in France against the Sellers and Whitworth systems. That system has forty-one different sizes for the interval covered by thirty-one sizes in the Sellers system. The chance of replacing the bolt in time to save the precious cargo would have been much less. Besides these two principal inconveniences of decimal subdivisions, there are others of an obscure nature whose effects are certain to be felt by every mechanic.

Of the main disadvantage which the change would involve, we must now endeavor to give our readers some slight idea. Although manufactures engage but a quarter of our gainfully occupied population, and do not therefore constitute our highest material interest, yet their annual products amount probably, by this time, to full equality with those of Great Britain, Germany, and France, put together, even after subtracting from the nominal value of ours 25 per cent. for the illusory magnification produced by our tariff. Our population, it will be remembered, is only half of theirs. We owe this proud position to several causes, of which the first—to generalize as much as possible—may be said to be American systematization. The most prominent effect of this has been the supremacy of American machinery, which is absolute. The greatest factor in the attainment of this supremacy, greater perhaps than the American genius for simplification or than American ingenuity, was, we believe, the thorough systematization of American machinery early brought about by the labors of Eli Perkins, by which the dimensions of the different parts were brought into simple relations to the inch, so that those parts could readily be replaced—a feature only tardily copied by Europe. The result has been to impart to the English inch an international character embodied in real manufactured things and in the tools with which to make those things. This internationality does not appear in ordinary expressions of quantity, but has a real existence, and already rivals the real internationality of the centimetre. Ultimately, if we sustain the inch, one or other of two results must be reached: either the real internationality of the inch must gain a clear ascendancy, or else the metric countries must be forever stunted in the growth of their manufactures.

Now we are assured by those who are the best qualified to judge of the matter that, were any law to prevent our manufacturers from making things to inch measure, or

which should prevent obligatory contracts to do so, the position of our machinery abroad would be irrecoverably surrendered—to England, if she had not already taken a like step; but in any case, would be gone. The understanding under which our machines had been sold, that parts should be replaced, would be dishonored, and we disgraced. Our own country would be flooded with English machinery, unless it were kept out by heavy duties the effect of which would be to bring all our manufactures to the verge of ruin, or further. A large proportion of all the machinery now in the country would have to be thrown away. As for the cost of the change, something may be guessed of it from the fact that the cost of the designs and tools to manufacture a single machine will sometimes amount to nearly a hundred thousand dollars. All this is the best testimony we have.

We know ourselves that the metric system has never been effectually introduced into any country without the aid of penal provisions of a severity entirely unknown to our people; and there has been no people among which they have been more necessary than they would be among ours. Were such measures enacted here, in a few years they would be repealed amid a storm of popular indignation, almost doubling the havoc and confusion, and bringing well-deserved ignominy upon the heads of the doctrinaires whose conceit and pretension had drawn such disaster upon the country; and our universities, where their leaders are, would suffer in consequence.

How are we to estimate the probable amount of this disadvantage in dollars? The only sane way of doing so will be to be guided mainly by a critical consideration of the testimony of those of our great manufacturers who are in the habit of using measurements with real precision, say with errors not greatly exceeding one hundred-thousandth part of the quantity measured. These are the people who make our machinery, etc. For it is certain that their great capital of seven hundred millions cannot be seriously impaired without the injury being felt, first, by all other manufacturers, and soon by every unit of our population. It is no mere theoretical question upon which physicists or other scientists are, as such, competent to lay down the law, but is a practical question of tremendous moment, which practical men best comprehend.

The bill at present before the committee of the House contains two provisions. One of these is that "on and after January 1, 1907, the weights and measures of the metric system shall be the legal standard of weights and measures of and in the United States." We doubt much whether this provision, in the absence of the penal clause usually attached to it in introducing the metric system, amounts to a row of pins. As matters now are, if a court had before it a contract in which a Rhine-inch was mentioned and was defined as 1.03 United States inches, would not that court hold the contract valid? If so, after that enactment, why should not a contract which mentioned an English inch, defining it as 2.54 centimetres, be equally enforced? The contract would express itself in terms of the standards that would be legal "of and in the United States." The other provision of the bill is, that immediately "all the Departments of the Government of the

United States, in the transaction of all business requiring the use of weight and measurement, except in completing the survey of the public lands, shall employ and use only the weights and measures of the metric system." In examining all the printed matter put forth by the committee, we have been struck by its avoidance of any explanation of the phrase "employ and use." Does it mean *use in practice* or *use in expression*? If the former, and the bill becomes a law, no chart that expresses depths of water in fathoms can legally be used; if one of our ships should lose a bolt, it can never be supplied, but the vessel must be condemned; the vast collection of designs in the archives of the Navy Department can never be consulted, with a thousand other consequences equally ridiculous. Common sense protests that that cannot be the meaning. Then, the meaning of the phrase "employ and use" must be to *use in expression*. When an inch is meant, it must be called 2.54 centimetres. That would be an innocent provision. But the ambiguity was deliberately intended by those who have been behind the bill. They expect in this way to divide the struggle into two parts, getting the bill passed by quietly representing to those who hesitate to vote for it that it amounts to little more than a requirement that quantities shall be expressed metrically; while, after the bill once becomes a law, they will insist that the inch must really be abandoned, to the endless embarrassment of business in the Departments. They hope to dictate afterward their own interpretation. This should not be allowed. The phrase should be precisely defined in the bill.

The volume before us contains two distinct works. Each contributes something definite, pertinent, and irrefragable to the controversy. In the first, Mr. Halsey shows that the old units are still used a good deal in all the metric countries—*nominal*, even in France; and really, elsewhere. We regret, however, that the author builds too much on this fact, and that, generally speaking, he too much dilutes weighty arguments with others that are almost trivial, if not sometimes downright fallacious. This fault is avoided by Mr. Dale, who, on the positive side, brings forward facts less open to general observation and very instructive, showing that the English inch is "employed and used" in France and throughout Europe, both in practice and in expression in the textile industry, side by side with the centimetre.

*Citizenship of the United States.* By Frederick Van Dyne, LL.M., Assistant Solicitor of the Department of State of the United States. Rochester, N. Y.: The Lawyers' Cooperative Publishing Co. 1904. Pp. 385.

It is strange that a topic of such fundamental importance as that of American citizenship should have thus far received so little attention from publicists. Of the two books heretofore written on the subject, that of Alexander Porter Morse, which appeared twenty years ago, is an erudite treatise, and still possesses value for special students, but Mr. Morse is a civilian educated at the New Orleans bar, and his point of view is continental rather than Anglo-Saxon; moreover, the American doctrine of citizenship has taken a more defin-

THIS PAGE LEFT BLANK INTENTIONALLY