27th Congress, 1st Session. Doc. No. 33. Ho. of Reps

STANDARD WEIGHTS AND MEASURES.

LETTER

FROM

THE SECRETARY OF THE TREASURY,

Transmitting a report of F. R. Hassler respecting ounce-weights.

July 13, 1841.
Read and laid on the table.

Treasury Department, *July* 6, 1841.

Sir: I have the honor to submit herewith, for the information of the House of Representatives of the United States, a report made to the Department by F. R. Hassler, Esq., superintendent of the work for preparing standard weights and measures, announcing the completion of the ounce-weights, (being the final series of weights,) prepared for the use of the respective States of the Union under the resolution of Congress approved the 14th day of June, 1836.

All which is respectfully submitted.

T. EWING,
Secretary of the Treasury.

Hon. John White,
Speaker of the House of Reps.

Washington City, *June*, 1841.

Sir: With the present, I have the honor to inform you of the completion of the standard ounce-weights for all the States of the Union, which form a part of the task of constructing standards of weights and measures for the custom-houses and the States, in accordance with the joint resolutions of both Houses of Congress relating to that subject, which is committed to my charge.

There are 29 boxes, numbered, and inscribed, with the names of the respective States.

I take the liberty to propose, in relation to these standards, that I should be directed to deliver them to the Treasury Department, like the larger weights, and some of the yards have already been delivered there, and that, at the same time, by communicating this letter to the two Houses of Congress, as habitual hitherto, the members thereof might be informed of the fact, and induced, or invited, to occasion the Governors of the respective States to send directions to the Treasury Department, to whom and how

Gales & Seaton, print.

National Oceanic and Atmospheric Administration

Annual Report of the Superintendent of the Coast and Geodetic Survey

ERRATA NOTICE

One or more conditions of the original document may affect the quality of the image, such as:

Discolored pages
Faded or light ink
Binding intrudes into the text

This has been a co-operative project between the NOAA Central Library and the Climate Database Modernization Program, National Climate Data Center (NCDC). To view the original document, please contact the NOAA Central Library in Silver Spring, MD at (301) 713-2607 x124 or Library.Reference@noaa.gov.

HOV Services
Imaging Contractor
12200 Kiln Court
Beltsville, MD 20704-1387

hese standards may be forwarded in order to reach their aim of public utility: there might then also be forwarded at the same time, the yards, and some of the sets of the larger weights, which remain still in the vaults of the Treasury Department uncalled for, to bring them into that actual use which, at the time of the beginning of these works, appeared so pressingly desired.

With the present delivery, therefore, the task of the construction of standards of the *weights* for the States, as well as for the custom-houses, is completely absolved.

In the system, or rather collection, of weights with acknowledged denominations, formerly English, now, by old transportation, of the United States, the troy pound is the only standard unit, legal, and material; the other weights, the denominations, and value, of which are adapted to the different uses they were intended for, must be deduced from this unit by the proportions given only in numbers, generally of grains, they are more or less easily deducible from the 1 lb. troy.

In the system of ounce-weights, which is habitually used for weighing precious metals and other objects of higher value, the unit or ounce is the one-twelfth part of the troy pound, such as it is employed in the mints, and there subdivided, and multiplied, decimally; it was necessary to determine it with especial care from the standard of 12 ounces.

I have rendered account of the manner in which I have done that in my sixth report to the Treasury Department, dated 18th November, 1837, wherein I rendered account of the construction of the sets of ounce-weights, made for the mint, which that establishment undertook afterwards to extend to larger weights, and to multiply for the branch mints; they are in full use and application.

To execute properly the intention of the joint resolution of Congress of 14th June, 1836, to provide for the States full sets of standards, such as were then under construction for the custom-houses, it was evidently necessary to furnish to the States full sets of the ounce-weights, with proper subdivisions in decimals of this unit, as they are habitually used in the mint.

As the application of these standards must be the verification of coins, those of the weights of gold or silver smiths, and similar smaller operations, it is not necessary that they be extended to larger weights like those for the mint have been. The sets of ounce-weights for the States, here with presented, begin, therefore, with the ten-ounce weight, and go from there down, decimally subdivided, until to the one-ten-thousandth of the ounce. The utmost care has been bestowed upon their accurate determination by the system of combined weighing, explained in my report, quoted above. It would be needless to give larger multiples of the ounce-weights, the 1 lb. troy, or 12 ounces, being in the sets of standards of the larger weights, already delivered to the States, to which the present delivery forms the complement, and the completion of the full series of standards of weights, intended to be furnished to the States. Any larger weight, required to be determined nominally in ounces, will naturally be compared with an appropriated combination of the same larger weights, and these ounce-weights. It is, in general principles, not proper to multiply the standards over what is absolutely necessary for a full set, because the combinations of accidental circumstances, which may deteriorate one or the other, may produce uncertainty rather than verification.

As the ounce-weights are used for weighing where more minute accura-

cy is desired, while the avoirdupois weights are used for the grosser commerce: it might be considered proper, in their construction, to make more minute scientific calculations in their comparisons, with reference to the variation of the state of the atmosphere, which is indicated by the barometer and the thermometer, and the consequent variation of the reduction to the vacuum, and also for what variation might result from different composition, and consequent different specific gravity of the brass; which is, however, of small influence.

Such would be the mode of proceeding if the task were to construct only one or a few standards. But for such a large number of standards, of all sizes of weights, length-measures, and capacity-measures, as are required to form one uniform system for the whole Union, the task would have been of an inexhaustable length.

Therefore, the plan to pursue was: to obtain the same ultimate result, and effect, by practical mechanical means, which the nature of the work so easily suggests, and the establishment here made for the construction of the standards fully affords, by the following means:

The troy pound of the mint, which has been adopted as legal standard by act of Congress, having been compared already in the course of my former comparison of standards, of which I rendered account in 1832, with the weights I had then at my disposition, and a new standard troy pound having been procured from England, which was carefully compared with that of the mint at Philadelphia, the equality of the two being tested, brass weights were made of the composition—which has been uniformly adhered to for all constructions of this establishment for the standards, of sufficient number to make the comparisons by combination, and from the troy pound to deduce the system of ounce-weights, as I have rendered account of in my report quoted above.

The London weights being determined by 30 inches height of the barometer and 62° Fahrenheit of temperature, and, from the weights so obtained, all others being deduced, the equality of the metal all through the whole operations of this establishment neutralized, of course, all influence of any variation of the atmosphere, and of the metal itself; the same metal being also used for the counterpoises, serving as dead weights when the weighings were made; by always placing the actual weight in the same basin, or what is called: weighing by substitution, they were even of the same form, and always near approximating the weight to be compared.

Thus all the effects which, in the use of weights of different materials, would complicate, and endanger, the accuracy of the work, or occasion long calculations, were neutralized, as well as the balance itself was compensated by the weighing by substitution in the same basin.

This mode of proceeding was so much the more appropriate, nay, the only one applicable in the case, as the English weight, from which the weight of this country is derived, had originally no such determination, as can be considered attending to these small variations of influences and their consequent corrections.

For any more detailed deductions or description it is proper in this case, like before, to refer to a final report at the close of all the works of the construction of standards.

By the delivery made to the Treasury Department under 10th July, 1840, a number of yards, sufficient for all the States and for some of the custom-houses, have been presented, and those for the custom-houses were forwarded to their destination, as directed by the Treasury Department.

It is desirable that those for the States, remaining still in the vaults of the Department, be called for; the attention of the Governors of the States might be invited to the subject, that they might give the necessary information for their proper forwarding at the same time with the ounce-weights herewith delivered.

In order to provide such means for the comparison of the standards of yards, or length-measures in general, as could in future be used with less scientific apparel and knowledge, I had, under due authorization from the Treasury Department several years ago, ordered a feeling-lever-comparator in Berlin, of which Chevalier Bessel, Astronomer Royal of Konigsburg, had the kindness to direct the construction.

This instrument is just now arrived, and I intend to make, in proper time, the comparison of the yards, which are still in the office, by both means now on hand, this feeling-lever arrangement, belonging to the establishment for the construction of standards, and the microscopic scale of 82 inches, which belongs to the collection for the survey of the coast. This operation, at the same time as it will make the two methods directly comparable, will also furnish the accurate comparison of the standard length-measure of Prussia with ours, and with those which I have heretofore compared belonging to the State Department, and other establishments. This apparatus is therefore a very valuable addition to the establishment of standards, which it is so desirable that should be made to regulate with certainty the relation of foreign and domestic measures, which are in daily want, and use, in the custom-houses.

I take the liberty to join here a short instruction relating to the manner of using these weights, and of preserving them from deterioration, which it will be proper to print, or otherwise multiply, and add a copy with each box when delivered to their destination.

F. R. HASSLER.

The Hon. THOMAS EWING,
Secretary of the Treasury of U. S.

Instruction upon the safe-keeping and use of the standard ounce-weights.

1. The box must always be kept right side up, and horizontally, particularly in opening the box, in order that the weights might not slide out of their places, when not pressed by the cover.

2. The weights must never be touched by the hand; there are tools adapted to every kind of weights, by which they are to be taken in and out of their places; the pincher-like tool is for the largest weight, the two spring-formed forceps are for the two kinds of smaller weights.

3. The weights must never be wiped, if there is dust upon them it must be cleaned off with feathers, in preference those of wild birds.

4. When the weights are used they must always be placed upon clean white paper; all rubbing and dropping must be prevented, and they must be in general always handled with the greatest care, because their adjustment, being very close and delicate, is easily lost by any abuse or mishap.

5. It must be remembered in use that the small weights are all *decimals of the ounce*, and not grains, as being more convenient in calculations; they go down to the $\frac{1}{1000}$ part of the ounce.

6. It is necessary that these, and in general all standards, be preserved in a dry place, and that they be never exposed to dampness.

F. R. HASSLER.