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STANDARD WEIGHTS.

LETTER

FROM

THE SECRETARY OF THE TREASURY,

TRANSMITTING

A report of F. R. Hassler, upon the subject of Standard Weights for the United States, &c.

JULY 4, 1838.

Read, and laid upon the table.

TREASURY DEPARTMENT, July 3, 1838.

SIR: For the information of the House of Representatives, I have the honor to transmit herewith a report made to this Department by F. R. Hassler, Esq., superintendent of the work for the fabrication of standard weights and measures. He represents that complete sets of standard weights for the respective States of the Union have been prepared, and are now ready for delivery, and gives directions as to their use. This work has been done as directed by the joint resolution of Congress, approved the 14th of June, 1836, as follows:

Resolved, That the Secretary of the Treasury be, and he hereby is, directed to cause a complete set of all the weights and measures adopted as standards, and now either made or in the progress of manufacture, for the use of the several custom-houses and for other purposes, to be delivered to the Governor of each State in the Union, or such person as he may appoint, for the use of the States respectively, to the end that a uniform standard of weights and measures may be established throughout the Union."

Immediate notice will be given to the Executive officers of the States, in that their directions may be obtained as to the person and manner of their delivery.

The superintendent is actively engaged in the preparation of the measures of capacity and length, also referred to in the resolution; and when completed, and ready for delivery, the course pointed out by Congress will be duly complied with in regard to them.

All which is respectfully submitted.

LEVI WOODBURY, *Sec'y of the Treas'y.*

Hon. J. K. POLK, *Speaker Ho. of Reps.*

National Oceanic and Atmospheric Administration
Annual Report of the Superintendent of the Coast and
Geodetic Survey

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Report to the Treasury Department of the United States, upon the construction and completion of the standards of weights for all the States of the Union, by F. R. Hassler.

I have the honor to inform you that I have completed the execution of the *first part* of the joint resolution of both Houses of Congress of the 14th of June, 1836, namely, the construction of the uniform standards of *weights* for all the States, and that the same are now ready for delivery.

Each set of weights for one State consists of the following weights :

One 1 pound, troy	One 5 pounds, avoirdupois
One 1 do avoirdupois	One 10 do do
One 2 do do	One 20 do do
One 3 do do	One 25 do do
One 4 do do	One 50 do do

It is easily seen how 100 pounds, &c. can be combined by their means, when desired.

The first eight weights are contained in one box, the last two in another, and they are together fitted again into one box for transportation. The inner boxes are lined with velvet, and each weight has its special cavity, which cannot be mistaken. In the bottom of it, the value of the weight is marked. The tops of the boxes are screwed down, with knobs, upon brass rods, which guide the cover; they keep the upper part tight, so as to prevent all shaking of the weights by transportation. Upon the weights themselves, only a light stamp of an eagle is made, to denote the authenticity of the weight—(the small figures stamped upon many being only references to the private register of the weighings referring to our journals.)

It is a subject of great gratification to me to have been enabled, in the short time of two years, to execute a task which has been so much and so long desired in the country, to the extent that each State becomes at once simultaneously, and equally supplied with these standard weights; by which, of course, the anomalies unavoidable in simple copying (which would have been the consequence of a partial delivery) is avoided; thus, security of uniformity is established for the future, provided the proper care is taken for their preservation, and the preventing of accidents, according to the instructions which I shall join hereto.

The preparation of the metal for these standards, and the mode of their mechanical construction, have been stated already in some of my several previous communications.

The method of combined weighing, which I have described in my report of November last, as applied to the mint-weights, has been equally applied to these weights for the States, in their ultimate adjustment, up to the 50-lb. weights, which it was not convenient, nor necessary, to treat in the same manner.

The accuracy which this method of weighing affords has been shown in the report quoted; and I can add to it only, that it has been obtained not only proportionally, but even almost identically the same in all the larger weights of these standards.

To be enabled to produce these results, in weights of the size of those required for the sets of standards, it was necessary to construct, in the establishment itself, appropriate balances, of large size and peculiar construction, with an accuracy and strength far superior to what has ever

been habitual. Brass beams of two, somewhat considerable, dimensions, supported upon metal columns, and with peculiar arrangements, have afforded the most satisfactory results; and the desired acceleration in the final adjustment has been the consequence of it. But the assiduity and attention required are such, that the persons employed in the mechanical part of the weighing of the larger weights were more than once entirely exhausted by the long-protracted task.

All those standard weights have been adjusted by myself, personally, which have served for the establishment of the multiples; and always such individuals were selected as would produce, by their sum, the fullest exactitude of the intended large weights.

Of all and every operation of weighing regular journals were kept, in which each individual weighing, as well as the detailed results, were registered as soon as made, so that they might serve in future for any investigation that could be found desirable; similar to the habit in astronomical observation made in an observatory, and as I practise in all the operations for the coast survey.

To determine the avoirdupois pound from the troy pound, (which is the only British standard, adopted as such, and made with proper authenticity,) was again an operation, in some respects, similar to that which I had to perform for the system of ounce weights.

The awkward ratio of 5,760 grains for the troy pound, to 7,000 for the avoirdupois pound, renders its determination very precarious, when done by means of the grain weights, quoted in the legal statement, as there is no easy common divider between the two numbers; in fact, I believe that, in England itself, the habitual execution of this proportion is not regarded with much confidence. A similar inference might already be drawn from the fact made apparent in my report upon standard comparisons, in 1832, page 30, in the last column of the table; where I deduced the value of the pound avoirdupois that would result from each of the standards of the State Department, which are furnished with full parchment documents, stating their veracity, &c., it will be seen that the pounds deduced from the different weights vary differently between 6997.95 grains and 7001.1 grains, (in the extremes,) expressed in mint-weights; and, for instance, the 28 lb. differs for $24\frac{1}{2}$ grains, and 56 lb. for 93, from their legal nominal value.

The two avoirdupois pounds procured from England did not present fully the desired ratio, nor did they agree with each other, within such a limit as I could not easily discover the difference.

Having established the weight of the ounce, and its subdivisions and multiples, from the troy pound, by the method of combinatory subdivisions, and ultimate verification, by combined weighing, (as related in my report of last November,) in such a manner as to reduce the possible differences or anomalies to the smallest possible, I considered myself better able to establish an avoirdupois pound of the true legal ratio than the weights received from London, as such, were representing: their difference, besides, indicated already the propriety of relying rather upon the means, which I had established upon good principles, than upon the servile copying of either, or the taking of a mean between the two.

Other experiences, moreover, indicated to me the propriety of such a course in the settlement of this question, which is evidently left too much in the vague, by the law giving no rule of easy following, by which to establish the avoirdupois pound from the actual standard, the troy pound.

The troy pound which I had brought from Europe with me already in 1805, had, at that time, been found exactly equal to that of the mint of Philadelphia, received by authority from England. The new troy pound, of which an authentic copy had been procured for the same mint, proved, according to my comparison, (of which I rendered account in 1832,) to exceed this old pound of mine, which has been always carefully preserved, by 241 grains; a difference equal to the mean between the deviations discovered by Sir George Schuckburg, in 1796, and that which had been found, almost simultaneously with me, by Dr. Mall in Utrecht.

These, and, I suppose, other similar facts, proving that the British mint-weights were too light, a declaration to that effect took place in England, by authority, depreciating the coins made before 1828, for the value of one and a half grain of the precious metal they should represent.

The troy pound which I had procured from Troughton and Simms, of London, when I began the construction of standards, proved to agree exactly with the one of the mint—declared standard for the United States by act of Congress, in 1828. But a second troy pound, procured about a year ago, proved so much lighter that I found it not proper to put any reliance upon it.

I found best to start, for all weights whatever, from the unique weight, which I had found coincident with that of the mint, and to use my results of the ounce weights, and their subdivisions, as deduced from the combined weighings, upon which I considered myself authorized to lay more confidence, for the establishment of the other weights.

Another accessory circumstance is, that the weights which I received after the first troy pound have large letters and other indications engraved upon them, which collect always more or less dust, or soil, and render it uncertain under what circumstances in that respect they may have been determined, or under which they may be at the time I would use them; for it must be observed that the rubbing for cleaning in the cavity is not admissible, as it would easily take more weight away than (I may be allowed to state that) any of my weights can deviate from the truth. A slight rubbing with an oiled leather, as otherwise had been considered allowable for cleaning weights, I have found to alter them far more than I ever allowed standard weights to differ.

To adopt the grain weights from England for the completion of the difference between the pound troy and the pound avoirdupois, I considered inadmissible, on account of the accumulation of the small errors that may occur in their construction. I used only one forty grain weight to make up the ultimate complement to the avoirdupois pound; this was one equally verified by combinatory weighing. Considering myself thus fully authorized to stand upon my own ground in the establishment of a proper avoirdupois pound, that would have the due ratio to the troy pound, as stated by law, I established the standard avoirdupois pound by the following weights:

	Grains.
1. Simms's troy pound, affording	5,760
2. One two-ounce weight, of my construction	960
3. One half-ounce weight of the same	240
4. One forty-grain weight, determined by combination	40
Making the total avoirdupois pound	7,000

With this I compared again, by combined weighing, three different combinations of the ounce weights, and I included the avoirdupois pound received from London, and marked A, which was nearest coinciding with my results for the ounces, adding for its defect as deduced from determinations, which I had previously made. Thus I obtained five weights, to verify by combined weighing, which established by their mutual confirmation the standard avoirdupois pound, which I adopted, and upon which, therefore, also, the heavier weights are grounded, by combining an adequate and selected number of them.

By these methods and combinations I hope that I have obtained a degree of accuracy fully satisfactory, and superior to whatever may be considered as of influence in any practical use of these standards.

F. R. HASSLER.

WASHINGTON CITY, June 26, 1838.

Instructions relating to the use of the standard weights.

1. Never touch the weights with the hand, in any case whatsoever.
2. The weights are to be lifted out and in their places, and in any case of their being moved, by means of the fork, or hook, covered with leather, which are added to the boxes for that purpose, and fitting the different weights.
3. When the weights are taken out of the box, they must always be placed upon clean white paper, that they may not become scratched or soiled; as well when placed on a balance as otherwise.
4. The whole collection must be kept in a safe and dry place, free from all disturbances or danger of damage.
5. They must never be moved away from under the care of the officer under whose charge they are, to any other building or place, to make comparisons; but any weights to be compared must be brought to the place of deposit of the standards, to undergo the comparison.
6. To make a good comparison, the weight standard must be placed in one of the basins of the scales, and in the other must be put any heavy bodies to make exact counterpoise to the same; when thus an exact equilibrium is obtained, the standard weight is removed, and in its stead the weight to be compared is placed. Whatever may have *to be added to the weight compared*, for so much it is too *light*; whatever may be needed to *add to the counterpoise*, will indicate the weight compared so much too *heavy*.
7. That the utmost caution is to be observed in the use of the weights, will be self-evident. In all cases the weights must not be left exposed to the open air, when not absolutely necessary.
8. As the standard weights have all their proper legal weight, it is proper to observe, that, in comparing rough weights for common mercantile use, there ought always to be a certain allowance made for the wear of such weights in their use, by an overweight proportioned to the magnitude, the kind of use the weight is intended for, and the usage which it may have to withstand; as, after a while such weights would otherwise too soon become too light, and deviate too much from the accuracy that may be wished in them: by this allowance they remain longer near enough to the desired accuracy before needing new adjustment.
9. The value of each weight is marked upon a paper fastened to the

bottom of its place in the box, (in preference of stamping it upon the weights,) so that the removal of the weights can never disturb them, the fitting of the weights not admitting of their being misplaced. It is only to be observed that these papers must never be removed.

10. The boxes are expressly made without locks; the cover must be lifted up straight, as the brass bars at the sides direct. When the weights are in, the cover must be screwed down tight to its place, by means of the four-finger screw-knobs.

F R. HASSLER.

REPORT
FROM
THE SECRETARY OF THE TREASURY,

TRANSMITTING

A report from the superintendent of the coast survey, and of the fabrication of standard weights and measures, showing the progress in those works during the present year.

DECEMBER 6, 1838.

Read, and ordered to be printed.

TREASURY DEPARTMENT,
December 5, 1838.

SIR: I have the honor, herewith, respectfully to transmit to the Senate a report made to me by Mr. F. R. Hassler, superintendent of the coast survey and of the work for the fabrication of standard weights and measures, exhibiting the progress made in said works during the present year.

I have the honor to be, very respectfully, your obedient servant,
LEVI WOODBURY,
Secretary of the Treasury.

To the Hon. WM. R. KING,
President of the United States Senate.

SPRINGFIELD MOUNTAIN STATION,
November 15, 1838.

SIR: Herewith I have the honor to forward to you the yearly report upon the works under my charge, of the survey of the coast and the construction of standards of weights and measures.

The progress made in both works will, I have every reason to hope, be satisfactory. As both have yielded considerable results, and being now in regular organization and activity, they will continue in future in such regular steps as will become easier calculable beforehand, if the whole organization is now maintained as it is.

Upon this view, the proposition of the appropriation necessary for the coast survey is grounded, as deduced in the report. I have every reason to hope that the amount proposed will be granted, as it is evidently the most advantageous for the economy and good progress of the work. The increase of the appropriation over the amount asked last year is properly

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accounted for by the unexpectedly increased expenditure for the shipping which occurred last season.

This fall appears to turn out very unfavorable for my works, by too much bad weather, so that I may, perhaps, be obliged to break up earlier than I intended, and join the winter work in Washington.

I have the honor to be, with perfect respect and esteem, sir, your obedient servant,

F. R. HASSLER.

Hon. Levi WOODBURY,
Secretary of the Treasury of the U. S.

Seventh report of F. R. Hassler, as superintendent of the survey of the coast of the United States, and of the construction of standards of weights and measures; rendering accounts of the works of 1838.

1. In my last report, (the 6th,) I have stated what were the works which, in the proper regular course of progress, were to be executed this year. They have been prosecuted in all parts with success, to the full extent which could be expected, though the latter part of the season has not proved so favorable as the earlier part.

2. The standard weights for the States being so near their completion at the opening of the season last spring, that I could expect to deliver them before the end of the last session of Congress, I considered it the best use of my own time, to finish this much desired task.

3. This task, accomplished within the time of the session, notwithstanding the delay occasioned by my severe sickness, which intervened, I have had the pleasure to report upon separately, under the 26th June last.

4. As soon as various arrangements and works, relating to the great theodolite, employed in the coast survey, required for its more favorable use in the mixed astronomical observations, and other minor works for the equipments of the different parties in instruments, were completed, I left Washington for the fieldwork of the main triangulation, notwithstanding the bad state of health, to which I had been reduced by the excessive heat. Falling again in severer sickness in Philadelphia, I could not reach the station of Weazel mountain until 1st of September, still sick, but gradually recovering to health.

5. Upon this station were to be made observations of azimuths and latitudes, which I considered necessary, to multiply these data, so important in works of the nature of the coast survey, the moment appeared so much more opportune, as the solar eclipse of the 18th September gave at the same time an opportunity for a good determination of the longitude at the same place. For the execution of all these tasks, which cannot be done to the best advantage by one observer alone, I took two of my assistants to me, from their other works. All was executed properly, notwithstanding considerable contrariety by bad weather, which of course delayed our stay upon that station proportionally.

6. These assistants have returned to their work at the secondary triangulation, and I continue my own works on stations of the main triangulation, as long as the season may allow me any favorable chance.

7. The present settled state of the main triangulation, in the considerable extent which it now has, admits to extend the secondary triangulation to some distance outside of its two extremities. Among the triangle points obtained by this means, the most favorable ones may then be selected for stations of the main triangulation, which must extend over them, and which furnishes to them in due time, the full accurate elements of their calculations; as fundamental data for their application to the topographical and hydrographical part of the work.

8. Thus the secondary triangulation has been continued this year, southerly in New Jersey and Pennsylvania, for the elements of the detail surveys of the Delaware, the outer sea shore, and Barnegat bay, towards Cape May, and those neighborhoods.

9. In like manner the secondary triangulation to the east of the main lines, between Tashua, Friarshead, and Mount Carmel, east of New Haven, and New London, has been completed, and extended until over the Rhode Island shore, &c., on the main, and over all the islands, between the east of Long island and the main shore.

10. The task of the topographical parties for this year was, as alluded to in my last report, the continuation of the detail surveys, easterly from where they left off the year before, which was stated in the last report.

A. To the end of Long island, as well on the sea shore, as on the shore of Long Island sound, with all the interior, to Montauk point, the easternmost extremity of Long island, and over all the numerous islands and bays within and near north of it, till Fisher's island, inclusive. This has been fully and properly executed by the five topographical parties that were engaged in it.

B. Upon the northern shore of Long Island sound, in Connecticut, &c., five other parties were engaged in the topography of the shore, which was fully executed until to the neighborhood of Stonington.

C. All that was required to furnish constantly the necessary directions for the sounding parties, that followed the shores of the sound, and the sea shore of Long island, was by all these parties always regularly provided, besides the topography; some parts of the interior within the limits of the triangulation were also surveyed in the same manner, leaving only, like in the previous works, for their future task, that filling up between these works and the interior part of the main triangulation, which the aim and plan of the works require.

11. Two hydrographical parties were again in operation last season, but they had each an additional vessel, larger than those they had before, one of which was purposely built for its aim, and employed in Long Island sound, the other a revenue cutter, which was used upon the outside coast.

12. These expenses, of building, and fitting up, of these vessels, and others, occasioned by this increase of the naval part, having not been foreseen at the time of my last report, and the forming of the estimate of the necessary appropriation, they have of course encroached upon it in a manner, and to an amount, that I could not be aware of in due time.

13. The one of these hydrographical parties continued the soundings of the outside shore of Long island, as far off as to forty fathoms sounding, from east of Fire Island beach, where the earliest outside soundings had begun, till to Montauk point, the eastern extremity of Long island, and inside of it, over Gardner's bay, which lies between the Long island shore, and the islands stretching northeasterly towards the main shore, including the southern shores of these islands.

14. The other hydrographic party continued from the points where it had left off last year, about the middle of Long Island sound, easterly to Black point on the main, and Oyster Bay point, on one of the islands of Gardner's bay, that is nearly to the extremity of the sound; which, however, could not fully be reached, on account of the closing of the season, the much greater breadth of the eastern part of the sound, increasing the work within an equal distance much over that of an equal distance of the western part of the sound, so that the part between some of the islands above alluded to, and the main shore, will remain for the work of next year.

15. It is well known that all sea charts must be provided with regular and accurate views of the aspect of the shores, upon proper scales, from the principal points of approaching harbors, and their different channels, of the light-houses, and also from any dangerous point from which the shore can be seen. To the two first of those the seaman has recourse to ascertain what land he has made, and the latter shall warn him from a shoal or a rock, upon which he may come.

16. Such views I intended last fall to cause to be begun, of the part of the coast now surveyed, between Long Branch, New Jersey, and Block island, east of Long island, but it was delayed until in the fall in order not to delay the progress of the out-shore soundings, by the delay unavoidably required, to stop at one point, as long as is required for the drawing of these views. But the season proved too unfavorable, and it had necessarily to be postponed until next spring.

17. There has been no occasion to make any alteration in the scientific means, and methods, employed for the work, from those employed in the origin; on the contrary, I had the pleasure to observe in various European accounts upon methods now used in observing, the approach made towards my methods, (explained in my papers on the earliest works of the coast survey of 1817,) in whatever they applied to the peculiar circumstances, under which the observers were. The interest taken in the coast survey by men of science in Europe has shown itself by various presents of books, and communications by letter, to me, (which I continue to receive,) treating and discussing subjects of interest for the work. Also in this country the interest in our work evidently increases with its progress, as it shows always more apparently its public utility.

18. The mechanical organization of the distribution of the works appears to be well adapted to its present state, and it will continue to be sufficient until the work may come into such parts of the country as must occasion a great increase of topographical work, and thereby perhaps an increase of the planetable surveying parties. In that proportion as this may occur, in that will on the contrary the naval, or hydrographical, parties be less occupied. This will give the proper time for the investigation of soundings, if any, at a greater distance from the coast, and of the various currents along the coast, which appear very imperfectly known by the public, and only partially so, by the local coasters, in the parts to which they are the most habituated. All these tasks being dictated by the law for the coast survey, and naturally implied in the work.

19. A considerable number of assistants will be occupied, during the coming winter, by the great mass of calculations, for which the elements are now at hand, and those which are required for the proper extension of the auxiliary tables necessary for the increased extent of the work. To

these works, I shall, however, not be able to direct them, before their work, of executing the drawings of their fieldworks of the last season, will be finished; which order dictates to be the first, and unpostponable, winter work.

20. As much as the time will allow after that, I shall direct the bringing together of the whole triangulation hitherto made, upon such a scale as might serve to prepare for the future publication, when the proper mass of work will be fully at hand; at that time I shall then have the honor to propose also the proper measures, and the necessary arrangements, to secure the accurate execution of that part, upon which so much depends, not to lose in it the accuracy and good execution given to the scientific part of the work. Last spring already a preliminary sketch of such a collection of data was begun, to serve as guide, so far as it could then be extended.

21. With regard to the appropriation desirable to be proposed to Congress for the next year's works, I must take the liberty to state several facts in support of the proposition which I have to make:

1st. The unexpected increase of expense in vessels will not leave any remainder of the last appropriation for the outfit of the different parties next spring; however, the appropriation will, most likely, be made before this will be needed, the session of Congress being a short one.

2d. Out of the appropriation to be made will have to be provided for two outfits, namely, those of both coming springs, on account of the succeeding session of Congress being again a long one, and some additional expenses occur unavoidably every year at that period. It is thus that last spring, to assist in stretching out of the remaining amount of the appropriation, at least in what I could, as I could not go into the field until much later than the topographical parties, I allowed those parties to take the whole field equipment belonging to my party, which had to be replaced when I went myself into the field. This year a great part of the tents have been torn up entirely by the violent storms, which have made much heavier ravages among the shipping, and even buildings; (my camp, however, received not the slightest damage.)

3d. The present extent of shipping will most likely have to be continued next year as has been this year; consequently, also, the same increase of expense, if not more, by the perhaps necessary exchange of some vessels for larger ones.

4th. Several of the assistants at lower compensations have this year liberally given their services as chiefs of planetable parties, without the betterment of their compensation, which is proper, and which others in similar stations have; it will, therefore, be proper, at least for the future, to place them, in this respect, also upon the same footing as others who do similar duty. Also the compensations of several other assistants it will be proper to increase.

5th. The proper adaptation of the number of assistants to the quantity of the work to be performed yearly, has shown itself by the closeness with which my intimations, in my last report, of the work to be performed the last season, has agreed with the work actually executed, as has been the case already the year before. This proves, at the same time, the proper adaptation of the present state of the establishment to the most economical prosecution of the work, as neither gap nor double employ occurs, and the proper quantity of work is done.

6th. The detail estimates presented in one of my earlier reports may still remain as a guide to estimate the medium expense of each party, and is therefore needless to be repeated here again.

22. Upon these considerations, and the general knowledge of the requisites of the work, I take the liberty to propose that Congress might please to grant an appropriation of \$100,000, for the expenses of the coast survey for the coming year. If it should occur that something of it should not be needed, it would of course remain uncalled for, and be taken into account in estimating the next following appropriation, as I have done in the preceding years, in which the case has heretofore occurred; while its disposability, at all events, secures the work from interruption, which would be of very far greater loss, in all respects.

Upon the weight and measure standarding.

23. After the completion of the standards of weights for the States, the gradual approaching of the yards to their proper length was immediately begun. This operation requires reiterated leaving off and returning to the work, if it shall be done with accuracy, because, if the metal of the standards of length is not given sufficient time to cool down to the proper temperature of comparison, it will be judged too long, by the influence of the overreaching temperature; then a further reduction being applied, upon this deceiving indication, the case would occur, which I have quoted and proved in my report of 1832, in respect to the brass metre copies, which I found all too short, a fact in which also astronomer Bessel, of Koenigsberg, in a letter lately received from him, found my statement fully correct.

24. The further alternate comparisons and reductions will be continued and extended at first to such a number as will bring this part of the work parallel with the weight standards hitherto delivered, namely, sufficient for all the States and the principal custom houses; but it is evident, by the above statement, that it would be preposterous to name any accurately specified time, nearer than beginning of next summer, when this task will be fully executed, so much the more as a great part of it falls upon me personally, who have a multitude of other works to attend to besides.

25. Also the standarding of large weights for the custom houses has been continued again, grounding upon the inferior weights, which I had prepared for the purpose of this work in general. This part will thence progress regularly, with no other interruption than the extreme fatigue of the task, by the close attention it requires, will necessitate. They may be delivered gradually in proportion as a certain number of sets may be finished.

26. The mechanical part of the work for the capacity measures for liquids is about entirely done. The multiplicity of the other works, and want of room, before the extension obtained only about a month ago, have hitherto prevented any attempt to standard any capacity measures. In the new locality acquired I shall make proper arrangements for the necessary works.

27. The construction of the half bushel, as dry capacity standard, has been begun, and will progress in its regular course.

28. The task of furnishing each State with appropriate balances, like those used in the office, for the proper use of the standard weights delivered last spring, as ordered by the joint resolution of both houses of Congress,

and communicated to me by your favor in July last, will be taken into hand as soon as in the progress of the other works, such workmen become disposable for it, as the finishing of their works, on which they are at present engaged, will allow to occupy them in it.

29. The extension of room required this fall, which renders even the room disposable before, far more commodious and adapted to our different purposes, will ease equally the works for the coast survey, and those for the weight and measure standards, which had before to make room alternately for each other, and however were crammed, and provided in a much less adapted manner.

30. Various instruments required from Europe, and ordered since more or less time, may be expected either during this winter, or next spring; the time they consume, of the artists who have them in hand, testifies that in all such works, as require to execute practically, with proper accuracy, works that shall fulfil scientific requisites, in a problem of mathematics applied to natural philosophy, is a task of time, labor, and persevering application, and industry, which cannot be hurried over that certain degree, which characterizes assiduous perseverance.

F. R. HASSLER.

SPRINGFIELD MOUNTAIN STATION,
November 14, 1838.