ON NEW EXAMPLES OF EGYPTIAN WEIGHTS AND MEASURES.[1]

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In bringing these examples of weights and measures before you—some new in their character, and others belonging to a standard hitherto unpublished—it is difficult to avoid entering on the whole subject of ancient weights and measures; especially as I have needed to compare all the Oriental examples published or accessible to me, in order to arrive at any certain conclusions. As I hope to obtain some further information, before publishing a final estimate of the exact values of the Egyptian and Assyrian standards, I will avoid giving the details of those already published; but it should be remembered that the mean values of the known standards stated in this paper are derived from not only all the material used by previous students, but also from many fresh examples in the British Museum, Mr. Hilton Price's, and my own collections.

The study of ancient weights has been somewhat confused by the assumption that every weight found must belong to some standard already known; hence, weights which really had no relation to the usual standards were supposed to be merely very erratic examples of them, the true range of variation of the weights was very much over-rated, and new standards were never detected until forced on our notice by an unmistakeable inscription.

Such an inscription has now left us no choice in recognising a standard hitherto quite unknown. In 1875, the British Museum purchased a weight brought from Gebelein, about twenty miles above Thebes. The material of it appears to be a hard white limestone; its shape rectangular, with a curved top; and on the top is the inscription, consisting of the throne-name of Amenhotep I, of the eighteenth dynasty, followed by "gold 5." There is, therefore, no question that this is a weight used for weighing gold in the sixteenth century B.C.; and that it was a multiple of five times the standard.[2] It actually weighs now 1022·7 grains; and I estimate its loss by chipping at about 15 grains, making a total of 1038 grains originally. A fifth of this gives the standard of 207·6 grains; a totally different weight from the known standards of early date. But this is not an isolated example, for on examination, there are no less than fifteen other weights found, which all agree to this basis; eight of them in the British Museum, three at Bulak, and four of my own, now before you. Many of these had been attributed to one-third and one-sixth of the

[1] Read at the Monthly Meeting of the Institute, April 5th, 1883.

[2] It may be observed that the authenticity of the inscription is unquestionable. The style of the characters is just that of the period named, and would be incongruous in an inscription even one or two centuries later.

Egyptian standard, the *ket*; not only, however, are trinary divisions of the *ket* otherwise unknown, but there is here a weight of the same class, which is a whole unit of 200 grains, and, therefore, quite unattachable to the *ket* of 145 grains. The various examples of this weight may then be tabulated as follows, with the number and registration marks of those in the British Museum :

				grains.			grains.
L.	Domed type[1]	brown limestone,	6196 h, 71·6·19·497	52.3	¼	of	209·2
L.	"Amenhotep I, Gold 5,"	white limestone,	6196 m, 75·5·17·102	1038	5	„	207·6
L.	Drum	hæmatite	6196 f, 78·12·17·83	51·8	¼	„	207·2
L.	Pyramidal	jasper		50·7	¼	„	202·8
F.	Conoid	hæmatite, with bronze ring		199·6	1	„	199·6
F.	Conoid	hæmatite		49·8	¼	„	199·2
L.	Pyramidal	hæmatite		49·6	¼	„	198·4
B.	Domed type	bronze		49·6	¼	„	198·4
F.	Ring	copper		49·6	¼	„	198·4
L.	Conoid	hæmatite	6196 k, 76·6·15·6	49·4	¼	„	197·6
F.	Conoid	hæmatite		24·7	⅛	„	197·6
L.	Pebble	hæmatite		24·6	⅛	„	196·8
B.	Domed type	bronze		48·5	¼	„	194·0
B.	Domed type	alabaster		48·5	¼	„	194·0
L.	Cylinder	hæmatite		24·2	⅛	„	193·6
L.[2]	Oblong	lead, marked B.	6195 d, 70·7·9·1	380	2	„	190

Many of these weights are of the peculiar shape here called conoid—round, and tapering to the top, with flat top and base; thus, unlike the usual type of either Egyptian or Assyrian weights. They are mostly of hæmatite, and from Syria, I believe; and may probably be assigned to the eighth century B.C. The majority of them agree very closely together, and are somewhat lighter, by about four per cent., than the inscribed Egyptian standard. From this, it would seem probable that this standard was 208 grains in Egypt, 1600 B.C.; 200 grains in Egypt and Syria, about 700 B.C; and by the lead weight marked B, or two units, perhaps as low as 190 in Egypt about 100 A.D. This lead actually weighs 410·7; but thirty grains is allowed for its increase of weight by carbonation.

This standard, then, of about 200 grains, would seem to be the origin of the Greek-Asiatic and Persian standard, stated by Chisholm as 200·6 grains; and it would also seem to be the only likely origin of the great Aeginetan standard of coinage, the heaviest example of which is 194 grains, and which Mommsen says cannot be put at less than 191·4. The universal and well-known lightness of coinage standards would make it probable that the original standard was 195 to 200 grains; and it is impossible to derive it, as Mommsen does, from a Persian silver stater of 170 grains.

The most common Egyptian standard, the *ket*, of 145·6 grains, has been already mentioned; but it appears that the Assyrian and Persian standard, the *shekel*, of 128 grains, was also in use in Egypt, at least in the period after the Persian conquest.

[1] "Domed type" is the characteristic Egyptian form, circular, expanding to the top, and with a more or less raised dome on the top. The characteristic Assyrian form is a barrel shape, with more or less swell, sometimes flatted on one side.

[2] Here, and elsewhere, the collections are denoted thus :—B=Bulak; F=Flinders Petrie; H = Mr. Hilton Price; L = London; M = Mayer (Liverpool); P = Paris; R = Rogers Bey.

The glass scarabs, some of large size, found in Egypt, are a peculiar class. They are uninscribed and unpierced, and are thus quite distinct from the great bulk of the ordinary scarabs. On comparing the weights of those that are accessible, two in the British Museum, one at Liverpool (kindly communicated by Mr. Gatty), and four of my own, it appears that they are all multiples of one standard, agreeing exactly with the shekel. Their weights are $\frac{1}{2}$, $\frac{2}{3}$, 2, $2\frac{1}{2}$, 3, and two of $7\frac{1}{2}$ shekels; the $\frac{2}{3}$ shekel is known in two other weights, and is forty *aplus*, of which sixty composed the shekel; the $7\frac{1}{2}$ shekels is also not an unlikely multiple, as it is $\frac{1}{8}$ of the mina, composed of sixty shekels. The range of the shekel required by these glass scarabs is less than the variation of the Assyrian duck-standards, or the Assyrian hæmatite barrel-standards. Of course, if a sufficiency of various multiples be assumed, and also a great variation in the standard, it might be shown that any objects belonged to any system of weights; and an objection to this effect might be brought against recognising these glass scarabs as weights. The only true test for this is to take all likely multiples of the standard, such as 1, $1\frac{1}{2}$, 2, $2\frac{1}{2}$. 3, 4, &c., and allowing each a range of variation as required by the varying examples (in this case a range of 122 to 134 grains per shekel), then, to show what proportion of the whole scale is covered by these ranges; or, in other words, what proportion of a purely chance lot of objects would be claimable as weights. In the present case, the proportion would be less than $\frac{2}{5}$. There is, therefore, only two chances in five of any chance object being attributable to the shekel standard; and only one chance in six of two objects; or one in seventeen of three objects, all falling within the range of shekel multiples. The chance, then, of the seven glass scarabs all falling within the ranges of the multiples of the shekel, and none beyond those limits, is only one in 800; in other words, it is 800 to 1 that the seven glass scarabs were intended to be multiples of a standard weight. And when, further, we find that that standard is exactly the shekel, and that even the range of variations is the same as in the Assyrian shekels, the intention shown in the weights of these scarabs seems beyond reasonable question.

But, beside these, various other weights and objects found in Egypt appear to be also on the basis of the shekel. Two or three very finely wrought stone scarabs (one found with the glass scarabs); a large red glass heart; a head in bronze (supposed to be a weight by Dr. Birch, even before I had weighed it); a frog in bronze, and two frogs in stone (frog-weights being represented as early as the eighteenth dynasty); and some stone weights of the usual type; all these agree closely to the shekel standard, as follows:—

				grains.			grains
M.	Scarab	blue glass		367·2	3	of	122·4
L.	Scarab	blue glass	6269 d, 69·1·29·19	309·8	$2\frac{1}{2}$	,,	123·9
F.	Scarab	lapis lazuli, Lower Egypt		20·7	$\frac{1}{6}$	,,	124·2
F.	Frog	bronze ,,		124·2	1	,,	124·2
L.	Domed type,	basalt, hieroglyphs on top		83·1	$\frac{2}{3}$	,,	124·6
F.	Scarab	blue glass, Sakkara		937	$7\frac{1}{2}$	,,	124·9
L.	Head	bronze	79·11·20·82	125·1	1	,,	125.1
F.	Scarab	white glass, Sakkara		63·1	$\frac{1}{2}$	,,	126·2
F.	Scarab	white stone ,,		379·4	3	,,	126·5
F.	Scarab	blue glass on white, Sakkara		254·4	2	,,	127·2

L. Heart	red glass, pendant, Abydos,	79·5·22·9	642·6	5	„	128·5
B. Domed type	alabaster		129·9	1	„	129·9
B. Domed type	bronze		43·3	$\frac{1}{3}$	„	129·9
L. Frog	brown limestone	78·12·17·52	1302	10	„	130·2
	(1277·3 actual, + 25 ? chipped.)					
L. Oblong block,	bronze, rosette on top	71·6·19·51	651·4	5	„	130·3
L. Disc	steatite	6196 e, 74·3·14·56	86·9	$\frac{2}{3}$	„	130·4
L. Rough oval	basalt	6196 d, 70·7·9·61	658·1	5	„	131·6
F. Scarab	blue glass, Sakkara		87·8	$\frac{2}{3}$	„	131·7
B. Domed type	with handle, bronze		1318·0	10	„	131·8
B. Domed type	flatted top, grey granite		26388	200	„	131·9
L. Domed type	basalt	6196 c, 71·6·19·498	3963·2	30	„	132·1
L. Scarab	blue glass	72·5·24·18	997	$7\frac{1}{2}$	„	132·9
H. Scarab	porphyry		44·3	$\frac{1}{3}$	„	133·0
B. Domed type	grey porphyry		665·6	5	„	133.1
L. Frog	variegated limestone	2012 b, 78·2·27·43	335·7	$2\frac{1}{2}$	„	134·3

The mean of all is 128·8 ± ·6 [1]; or the glass scarabs alone, 127·2 ± 1·2. Beside these, there is a set of leaden weights in the British Museum, which, after due allowance for carbonation, appear to be the shekel and fractions; they weigh as follows:—

				grains.		grains.			
L.	6195 k	71·6·19·69	cleaned	234·2	original	244 ?	2	of	122
L.	6196 b	79·11·20·74	carbonated	126·2	„	122 ?	1	„	122
L.	6196 k	79·11·20·73	„	66·2	„	61 ?	$\frac{1}{2}$	„	122
L.	6196 j	79·11·20·71	„	49·2	„	43 ?	$\frac{1}{3}$	„	129
L.	none	79·11·20·72	„	34·7	„	31 ?	$\frac{1}{4}$	„	124

The mean is 124 ± 1 grains. These are probably of Grœco-Roman period, being from Alexandria.

Comparing now the shekel, as derived from the above Egyptian series, with that of the Assyrian and other standards, they agree thus:—

Assyrian	lion-weights	(12)	120·4	to	129·7	mean	126·5	±	1·0
Assyrian	duck-weights	(20)	117·9	to	134·4	„	125·4	±	·8
Assyrian	barrel-weights, &c.	(19)	122·8	to	134·6	„	128·1	±	·5
Egyptian	glass scarabs, alone	(7)	122·4	to	132·9	„	127·2	±	1·2
Egyptian	shekels, altogether	(25)	122·4	to	132·9	„	128·8	±	·6
Persian	darics, coined	(139)	127·4	to	134·3	„	129·2	±	·1

Thus, we see that the standard in different countries, ages, and classes of weights, agrees quite as closely as could be expected; both in its mean value and its range of variation. There can hardly be any doubt as to the origin of the daric weight, and that of the gold of Lydia, Phokea, Lampsakos, &c., from this Egypto-Assyrian shekel; though strangely, Mommsen does not connect the daric with the shekel.

Whether the glass scarabs were made as weights, with any commercial object, or whether they were so adjusted with an idea of their being made exact, or perfect, to bury with the mummy (like the Hindoo ideas of religious accuracy) we cannot at present determine; but we see, at least that the making weights of glass was not a notion introduced by

[1] The sign ± shows the amount of the "probable error," or limit within and beyond which there is an equal chance of the truth lying.

the Arabs, but only (like all the rest of their civilization) borrowed from the country they overran. The weights of the glass scarabs are, as it were, illustrated by the use of glass weights in Arabic times, on the one hand; and, on the other hand, by the examples of three Pharaonic weights in the British Museum, with scarabs marked upon them.

If, then, the use of glass weights is not merely an Arabic custom, but also Ptolemaic, or earlier, in what light we are to regard the dozens of glass dumps of Roman age, so commonly found in Egypt? Were they all weights? or can any of them be so identified? These questions can only be settled by the examination of a large number; and I have, therefore, weighed those in the different departments of the British Museum. They have never before been all examined or compared, and number about seventy-eight, besides those without any type to indicate their age, which were, therefore, not examined.

In the first place, all those of which I was informed of the locality, came from Egypt, excepting one from Beyrout, and one from Rome; it is clear, therefore, that they must be considered essentially Egyptian, as much so as the coin weights of Arabic times. The most distinct group of them is in the Byzantine class, of which more than half agree closely to a uniform standard. These are as follows, the component letters of monograms being included in brackets :—

L.	Palest green	† Full face bust ı		31·9	½	of 63·8
L.	White	Η . Υȣ, on cross arms	+ 4 grs. loss	64	1	„ 64
L.	Pale green	Bust	+ 1·8 chip	32·5	½	„ 65
		ΕΠΙ . ΘΕΟΔΟΤΟΥ . ΕΠΑΡΧȣ around.				
L.	Pale yellow	Bust, ΕCΡΥ on cross arms		65·7	1	„ 65·7
		D . N . IVSTINIANVS P . P . AVG around				
L.[1]	White	. III .	+ 2 chip	49·8	¾	„ 66·4
L.	Pale green	Bust, illegible		33·4	½	„ 66.8
L.	Domed type	white glass, no inscription		67·4	1	„ 67·4
L.	Dark blue	Bust, illegible		50·6	¾	„ 67·4
L.	Light green	Bust ΕΠΙ ΚΟCΜΑ ΕΠΑΧȣ		67·7	1	„ 67·7
L.	Palest yellow	ΝΑΛȣ, on cross arms		17·0	¼	„ 68·0
L.	Palest yellow	ΝΑΑȣ, on cross arms		34·0	½	„ 68·0
L.	Pale indigo	Head, ΤΟΥΕΝΔΟΙCΛΟΝΙΜȣ ?		68·3	1	„ 68.3
L.	Pale blue	ΙΔ, .. ϥΡ	+ ·8 chip	17·2	¼	„ 68·8
L.	Yellow	Figure, between dolphins		34·4	½	„ 68·8
R.	Blue and white	ΝΑω (ΤΟΥ), on cross arms		34·5	½	„ 69·0
R.	Yellow	ΑΟΚΥ, on cross arms		69·0	1	„ 69·0
L.	Pale green	(RAFC), ground edge	+ 1·8 chip	34·9	½	„ 69·8
L.	Pale green	ΟΚΡΥ, on cross arms		70·4	1	„ 70·4
L.	White	Bust, illegible		17·7	¼	„ 70·8
L.	Light brown	letters on cross arms, illegible		18·0	¼	„ 72·0

The mean of all these is 67·9 ± ·4 grains; a few that show later and ruder work, though of much the same type, are so much lighter than the rest that I have separated them thus :—

[1] This is remarkable as bearing a number, 3, which shews the number of quarters of the unit in the weight.

L.	Pale green	Head ....ΕΠΑΡΧȣ	+ 1·2 chip	29·4	½ of 58·8
L.	Pale green	B Bust MK, ΕΠΙCVMΕωΝȣ ΕΠΑΡΧȣ		29·8	½ „ 59·6
L.	Light blue	(ΡΑΛȣ, &c.)		61·2	1 „ 61·2
L.	Blue	(ΜΕΡ, &c.)		61·7	1 „ 61·7

This standard of 67·9 is clearly the same as the regular standard of the solidus in Egypt. By the mean of 14 coptic weights (10 in British Museum and 4 my own) the solidus was 68·2 ± ·3 grains. This unit was always marked as N, sometimes with a small O M added; meaning Νομισμα. A larger unit marked Γ was, by the mean of seven examples, 410 ± 4 grains, or exactly six of the solidus; and the solidus was divided in twenty-four portions, as a weight marked IB, or 12, of just the same style, weighs exactly half of it. As the N or solidus weight was $\frac{1}{72}$ of the Roman pound, it follows that the Γ weight is the Roman *uncia*, the N weight the *sextula*, and the twenty-fourth part of that the *siliqua*.

Thus the Byzantine Egyptian glass weights are evidently intended for weighing the solidus, half and quarter; and this makes it the more likely that they were coin weights, like those of Arabic date. From the existing custom the Arabs then borrowed the use of glass weights; and not only borrowed the material, but also the standard of weight. The Egyptian bronze solidus averaging 68·2 ± 3 grains, the glass solidus averaging 67·9 ± 4 grains, and the majority of the glass dinar weights being about 65·6 grains; an amount of reduction that would be likely to occur in gold coinage during some centuries.

The remainder of the Byzantine glass weights are as follows:—

L.	White	ΜΕΘΓȣ on cross arms		14·7
L.	Dark blue	Bust full face		19·1
L.	Green	Bird, illegible	+ ·55 chip	19.4
L.	Palest blue	ΚωΝȣ on cross arms		19·5
L.	Pale green	(ΡΑΝΤΥ)		20·9
L.	Lightest blue	(ΠΧΒΡΟΑΤ &c.)		22·5
		ΕΠΙ. ΙωΑΝΝΟȣ. ΕΠΑΡΧȣ around		
L.	Lightest blue	ΝΑ. ȣ on cross arms		23·3
L.	Light blue	(ΝΑΡȣ &c.)		24·4
L.	Purple	Bust full face, ground on back		26·0

On turning to the impressed glass pieces of the classical period, it is difficult to trace any order in the weights. The following may be connected:—

L.	Blue pendant	Bes	79·6·22·15	36·9	¼ of 147·6
L.	Blue pendant	Bes	76·6·3·4, + 2·chip	148·8	1 of 148·8
L.	Blue pendant	Harpocrates by altar	73·5·2·126	74·8	½ of 149·6

The mean 148·7 is the same as the heavier examples of the Egyptian *ket;* but against it is the fact of three other Bes pendants not agreeing to this standard.

The types repeatedly found are as follows; all in the British Museum unless otherwise marked.

O. Winged bust	O. Serapis	Ibis to l.	Ibis to r.
R. Male head	R. Isis	9·9	A. above
21·2	33·0	17·5	5·6
29·8	41·2	19·7	11·1
30·8	46·4	(decayed)	12·1

F.	32·4		28·1	F.	12·6
	34·5		28·3	F.	15·5
	34·6	F.	35·8		
	35·5				
	38·5				
R.	38·6				
	38·9				
	43·3				
	43·5				
	46·6				
	50·9				

It does not seem possible to assume any regularity of weight in these very varying quantities; the resemblances being no more than merely a general equality of form would produce. The stamps of isolated types are very various, and all similarly irregular in weight; the following are all in the British Museum.

Pink	Bust, hand to breast		4·0
Green	O Male head, R Serapis		4·7
Green, pale	Dolphin ?		4·9
Opaque red	Seated figure ?		6·4
Opaque red	Serapis. Medusa ?		7·8
Opaque red	Serapis.		9·9
Green	Palm, &c., ABD. MARA. in Phœnician		11·8
Green Red	Pegasus Figure with cornucopia	} two colours joined.	13·2
Pale green	Helmet ?		13·5
Opaque red	Greek head		15·8
Opaque blue	Canopus		16·6
Green	Bust ?		18·9
Pale green	Greek head, fine		22·0
White	Ram		22·9
?	Two heads (decayed)		25·4
Green	Duck, head turned		29·3
Dark pink	Bes. pendant		46·7
Pale blue opaque	Bes.	+ 5·chip	62·
Clear blue	Ear, rude work		97·6

Beside these, I have weighed thirteen draughtmen, or dumps without types, some of which may be weights, but which are all too varying for any conclusion to be drawn from them.

On the whole, the verdict must be against the theory of these classical glass stamps being weights; whether they were season tickets to the baths or circus may be a question; but it is certain that they have not the claim to be reckoned as weights, which is so well sustained by the Arabic and Byzantine glass stamps, or the earlier glass scarabs.

The history of glass weights, then, so far from beginning with the Arabs, must be carried back to the Byzantine weights, which they found already in use in Egypt (one of those quoted above being stamped by Justinian I); and even the standard of the *dinar* which they used, and for which they struck glass weights, is merely the solidus standard which they already found in Egypt, and on which basis the Byzantine weights of that country were already struck. Further, the idea of glass weights must be traced at least as early as Ptolemaic times; when the glass scarabs were adjusted to the shekel, which was probably introduced by either the Assyrian or the Persian, whose standard it was.

Of Egyptian capacity measures we have here several examples before us. Three cups of light red pottery, probably from Sakkara, are in the ratios of 2, 5, and 8 to one another; and it is seen that they do not exactly fit one in the other, the middle one being too large to agree with the others, and also of a different ware; probably the original set were doubles, 2, 4, and 8; and the size 4 being broken, a size 5 was the nearest obtainable. These cups having this ratio, their unit of capacity is 1.45 ± ·01 cubic inches. Another set of three cups, belonging to Mr. Hilton Price, in fine blue glazed ware, from Thebes, also have a simple ratio between them of 3, 5, and 15. This I determined quite indepen-dantly of the previous set, and yet their unit capacity comes out identically the same, 1·45 ± ·01 cubic inches. A smaller, blue glazed little vase, with long beak, is also probably on this basis, being three-fifths of one unit. Besides these, I picked up, at Sakkara, a piece of a similar vessel, having the characteristic straight sides, with a very small circular handle, and a broad and very flat rim, to give the strike of the measure accurately. This piece, by careful guaging, shows a capacity of fifty of the same cubic units.[1] Another vessel, probably from Sakkara, is evidently a measure. It is cut in hard wood, of cylindrical shape, and with a very flat, smooth rim, for the striking of the contents. Its capacity is just twenty-five of the same units. These may be tabulated, then, as follows;—

		cubic ins.			
H.	Blue glazed cup	21·826	15	of	1·455
H.	„ „ „	7·461	5	„	1·492
H.	„ „ „	4·213	3	„	1·404
H.	„ „ vase	·873	$\frac{3}{5}$	„	1·455
F.	Light red cup	12·01	8	„	1·501
F.	Light drab cup	7·04	5	„	1·408
F.	Reddish white cup	2·87	2	„	1·435
F.	Blue glazed cup, fragment	72·1	50	„	1·442
F.	Wooden cylinder	37·2	25	„	1·488

The last two are rather uncertain in amounts; yet probably more accurately known than the original variations of the measures. Taking, then, the mean of all, we obtain a unit of 1·454 ± ·008 cubic inches.

The value of the Egyptian *hon*, according to the mean of three vases at Leyden, and one at Bulak, which have their contents marked on them, is 29·2 ± ·8 cubic inches; and one-twentieth of this is 1·46 ± ·04 cubic inches, or the same as the unit, 1·454 ± ·008, obtained from the nine capacity measures above. As these pottery measures agree much more closely together than the vases, which merely had their contents recorded, and were not made to guage, it is evident that much more reliance can be placed on the accuracy of the result from these measures than that from the published vases.

There are doubtless many other examples of measures in our museums that need examination; and a careful guaging of all the vases whose

[1] This fragment is very interesting, from its having been patched anciently with pitch wherever the glaze was broken through, in order to preserve the softer sandy core from wearing away.

capacity is recorded, is much needed in order to settle accurately the Egyptian standard of cubic measure.

The ancient Egyptian recognised a connection between the standard of capacity and that of weight Chabas, Determination Metrologique 1837) as the *hon* is stated to contain 5 *utens* of water; but whether this is an exact equivalence, or only a rough approximation, must be examined by seeing how nearly the two quantities agree. Taking the *hon* as best defined by 20 times the unit found by the measures, or 29·08 ± ·16 cubic inches, the weight of water which it would contain would be 7330 ± 40 grains. Now the mean value of the Egyptian *ket*, as I have already mentioned is 145·6 ± ·5 grains; and this weight of the *hon* of water is 50 + 146·6 ± ·8 grains; the *hon* therefore contains exactly fifty *kets* (or five *utens*) of water, within the extent of the small remaining uncertainties of our knowledge. Thus the connection appears fairly exact, but there is still a suspicion that the *hon* of water and the *uten* were independent, as there was a weight called a *set*, which is stated as 4·947 or 4·703 *utens*, and therefore equal to 28·6 or 27·2 cubic inches of water. Goodwin (Zeitschrift 1873, p. 16) supposes that this is merely a wrong computation of 5 *utens*; but it seems not improbable this *set* may have been the weight of a *hon* of water, and that the *hon* only weighed approximately 5 *utens*, since the Egyptian statement does not go to closer detail than half an *uten*. That the unit of weight should be connected with the capacity unit full of water or wine is very likely; but there does not seem any relation between the capacity measure and a cube of any lineal measure. The theory of the general derivation of ancient weights, from the cubes of the lineal measures full of water, is one that has found wide acceptance, but on rather uncertain grounds. What is now needed, is a careful settlement of the exact values of the ancient standards of lineal and cubic measure, and of weight, and the limits of uncertainty of our knowledge. Then we shall be in a position to say whether there be any connection between the cubic volumes of water, the weights, and the lineal measures, in the various metric system of antiquity.

In conclusion I must express my obligations to Dr. Birch, Mr. Franks, and Mr. Stuart Poole, for the kindness with which they have granted me every facility for examining and weighing the various objects in their respective departments of the British Museum.