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ANCIENT
WEIGHTS AND MEASURES

BY

SIR FLINDERS PETRIE



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ANCIENT WEIGHTS AND MEASURES

ILLUSTRATED BY THE EGYPTIAN COLLECTION IN UNIVERSITY COLLEGE, LONDON

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KEY TO STANDARDS OF WEIGHT

Grains	Original elements	Ancient name	Modern names	Original elements	Grammes
113.9	116 121 124	P PEYEM	Euboic?	7.52 7.86 8.06	7.38
125.0	127.5 131.5	D DARIC	Babylonian Assyrian Euboic Italic mina	8.26 8.55	8.10
132.7	134.0 135.8	S STATER	Attic	8.68 8.80	8.60
137.5	144	Q QEDET	Egyptian	9.33	8.91
152.4	154.4 162	N NECEF	Milesian Alexandrian Syrian talent	10.00 10.50	9.87
168	171 185	K KHOIRĪNĒ	Persian	11.08 12.00	10.89
188	196 210	B BEQA	Nub Aeginetan	12.70 13.61	12.18
210	220	L SELA	Phoenician Maccabean Ptolemaic Alexandrian talent Italic mina	14.26	13.61
227.8					14.76

WEIGHTS AND MEASURES.

INTRODUCTION

1. THE subject of ancient weights and measures has been more neglected than other branches of archaeology. Only two or three dozen Egyptian weights had been published, when my excavations at Naukratis brought to light some five hundred. This former paucity was entirely due to neglect; it has been the same in most other excavations, whereas the work of the British School has added almost every year to the known material. Thus we have now at University College over four thousand weights, or about two thirds of all the Egyptian weights known; most of the remainder being those published in *Naukratis* and *Tanis II and Defenneh*, which were presented to American museums.

2. In view of the mass of material, it has seemed best to simplify future reference by incorporating in one series the scattered publications since those of Naukratis and Defenneh. Hence the numbering in those volumes is to be retained; while the shorter numbered lists published since, are here cancelled, and included in the single series of the present volume. The former series of type drawings of form are retained, as in *Naukratis*, except in two types which it was desirable to re-classify. The much larger variety of types now known has been incorporated (on the decimal system) by adding—for instance—types 331 to 339 between types 33 and 34. No additions have been made between the first ten types, in order to avoid confusion with subsequent numbers. Thus the present work forms a homogeneous whole with the earlier work of forty years ago. As much fresh information has accrued since that date, modifying the arrangement of the weights, there is here included a skeleton list of the latest attribution of all the earlier weights published in *Naukratis*, *Defenneh*, and the Cairo *Catalogue*. Thus nearly all the Egyptian material for study is at hand in this volume. The

whole subject of Arabic glass weights is deferred for a second volume, to follow the present one.

3. A revision of earlier studies was necessary, owing to the great advance made in recent years in Palestinian metrology. Four standards of weight have been found named on weights from Palestine (pl. xxiii), the Necef, the Peyem, the Beqa, and another with the monogram of XO, which I here render as the Khoirīnē, on evidence stated further on. Of these four standards, two had been already recognized in Egypt, but without original names, and two are quite new to us, and serve to clear up the Egyptian metrology, so that no limbo of unclassified material now remains.

Thus, by the material now known, we are forced to recognize eight standards in use in Egypt, which we shall specify and discuss. Each has so much variation between the different examples, that they form a continuous overlapping series, which can best be stated as starting from the peyem, beginning at 114 grains, to the sela, or Phoenician unit, ending at the double of that, 228 grains. Between these limits there is no unassigned place in the scale, and the variations are such that the ranges of the eight standards slightly overlap. Such a situation might seem to reduce the subject to a mere arbitrary assignment of any object to some standard, and even raise the question whether there were any definite standards. The subject is, however, cleared so soon as we reach the lower multiples. Some standards were multiplied by 3, others by 4, others by 5. Hence we find clear separations arising, such as, for instance, the result between 500 and 600 grains; there are only 14 weights altogether in this 100 grains of range, while, on the other hand, there are 15 weights of the single value of 287 grains, amid a multitude of others larger and smaller. Thus the different kinds of multiples serve to delimit the ranges of the standards, and so classify the weights.

The classification is also greatly helped by the different types of form which were favoured for different standards. Thus in the *beqa* (or Egyptian *nub*) series there are 50 square weights and 40 duck forms, whereas in the *stater* (or Attic standard) there are only 10 square stone weights and 23 duck weights. Hence by searching for varieties of form, which may be much more usual in one standard than in another contiguous to it, and mapping out the examples in a diagram, it is soon found what the limit is of one standard apart from the other. Of course it must be remembered that there was no fixed division between different standards; each had its variations, and they usually overlapped. If we had the same amount of irregularity now in our weights, there would be an overlap between the high pound weights and the low half kilogramme weights. All we can do is, by examination of all the material, to fix the points which divide best between the standards, and further to separate those which overlap, as far as possible, by evidence of forms and materials. All this only refers to a small percentage of the whole weights, for not more than two or three *per cent* are so divergent as to interfere, but it is needful to state exactly how they are here dealt with.

In such discussion of treatment, we must always remember that we are only taking a fore-shortened view of many thousands of years of changes, and that most of the variations which we observe might be simplified into quite separate lines of descent, if we knew the historical variation. The usual position is like that of looking along a crowded street, and seeing only a solid barrier of traffic, instead of looking down upon it, and so tracing the crossing lines of each separate unit of the whole confusion. We shall endeavour here to use every indication of the historic changes; for, though far from complete, they are invaluable as disentangling our view of the subject.

4. No attempt will be made here to deal with the whole of the immense subject of ancient metrology. This is only a publication of material, and in the necessary classification of it we may reach some solid foundations for the whole subject. The mass of fragmentary literary information, and results from other countries, will only be touched on where needful for the Egyptian material. Above all, nothing will be based on, or modified by, theories of connected standards; we only deal here with the material facts. The whole subject

has been badly confused by the speculative metrologists, who have wasted much paper by theorizing. BOECKH, SOUTZO, AURES, HULTSCH, LEHMANN-HAUPT and others have started theories which the vagueness of the subject would shelter, but which are quite incompatible with the historical facts in detail. Looking at the conditions of the ancient world, of a large number of communities each developing a strongly individual civilisation, the presumption is that there would be as many standards as there were languages. The vision of our reducing all to one original standard is as hopeless as the old idea of one primitive universal language.

5. Some writers have preferred to pay attention only to the small minority of marked weights, as giving a greater certainty of meaning, and have ignored the general mass of material. That is, however, unsafe as marks often show what a weight was not, instead of what it was. The meaning of this is that the marks are often secondary, being added to a weight of one standard in order to show what was its equivalent on another standard. There is a parallel to this in modern times, when the coins of one country are countermarked with a fractional value of another currency in order to pass in a different system. In other cases only the secondary value is marked, and is shown to be secondary by its not being a likely number, and by the weight being a simple number of some other and commoner standard. Thus

10 darics	marked	9 = 9 qedets (2640)
20 "	"	S = Roman Semis (2417)
30 "	$\frac{1}{2}$ mina	9 = 9 double beqa (4302)
$\frac{1}{2}$ qedet	<i>nub</i>	= $\frac{1}{3}$ beqa (Cairo 31601)
1 deben		6 = 6 double peyem (Br. Mus.)
1 "		8 = 8 khoirinē (3746)
5 "		3 = 30 double peyem (2031)
10 "		70 = 70 beqa (4399)
10 "		60 = 60 double peyem (Br. Mus.)
10 khoirinē		9 = 9 beqa (4254)
10 light beqa		9 = 9 heavy beqa (4302, 4542)
10 beqa		8 = 8 double daric (4416)
10 double beqa		19 = 19 heavy beqa (4417)
10 beqa		30 = 30 half qedets (3141)
10 "		8 = 8 double daric (Golenicheff)
100 "		15 = 15 deben (4491)
40 minas (sela)		270 = 270 deben (Cairo 31652).

In all these, the simplicity of the multiple on the commoner standards, and the irregularity of



the marked numbers on the rarer standards, shows clearly that the marking was secondary, as we might now mark 35 ounces on a kilogram weight.

In other instances, marks have been altered. There seems to have been a standard of $1\frac{1}{2}$ of the *nub* or beqa; on one weight (4552) a I has been altered to III, that is reducing from $1\frac{1}{2}$ to $\frac{1}{2}$ beqa as the unit; in another instance (4299), II has been altered to III, reducing from $1\frac{1}{2}$ beqa to 1 beqa unit. On another weight (4455, 4507) the value has been marked more correctly; 50 was originally on it, giving 208.66 grains for the beqa, and this has been altered to 51 by a fresh stroke, giving 204.56 grains unit. From all these it is evident that any number marked, beyond the simplest likely multiples, really shows that the weight was not made for that amount, but that its value on a fresh system has been added upon it.

The marks, when simple numbers, and undoubtedly referring to the original purpose of the weight, are often on a basis of a multiple of the standard. Thus a 5 qedet weight is marked I (Cairo 31289), and a 20 qedet (3673) marked IIII, and a 10 qedet marked II; also a 10 qedet (3260) is marked IIII, and a 40 qedet (3343) marked $\cap\cap$ (20); these show units of 5 qedet and of 2 qedet. The same is known from literary sources, where 5 deben has a name, *shed*.

6. Another point to notice, respecting marks, is that generic marks, or names for a weight, must not be confounded with specific marks which distinguish a standard. There were many different standards named mina or shekel; so finding "mina" or "shekel" on a weight does not show to which standard it belongs. Similarly in Egypt *deben*, though usually accepted as = 10 qedet, or between 1400–1500 grains, was also applied to other units. There is a weight (2046) of about 10 normal deben on which is clearly written "The 12 deben contained in the 2 weights of alabaster of Neferrenpet." Here the named deben is obviously about 1156 grains, or a name for the 10 peyem weight. Similarly, there is, in Cairo, a weight of "300 deben" (no. 31651) the unit of which is 10 darics of 124.9 grains; the multiple of 300 proves this, as the daric was multiplied by 60, while the Egyptian deben was decimal. Again, a weight (of Ampy) at Berlin marked 10 deben, gives a unit of 218.8 grains, the sela, or Phoenician standard. The circle or ring marked along with a numeral, on weights, has sometimes been supposed to mean one specific

unit; but it is found on weights of six out of the eight known standards, only omitting the *khairinē* and the stater (Attic); the meaning of it is therefore simply "unit."

7. It should be explained that the stone weights are treated here apart from the metal weights, as being the sole material for accurate discrimination. In most cases the stone weights have undergone no alteration; even when chipped, the original weight can be fairly closely inferred. But metal weights are nearly all so much attacked, that the alteration is serious; there has been gain by oxygen and carbonic acid, and loss by breaking away of the altered crust. A weight of metal which looks quite clear and smooth, may have had a large amount scaled off it, or have been cleaned in other ways. For the study of the units, only stone weights should be employed; the metal weights can then be attributed, after estimating the changes, and are of value for showing marks and types of form.

8. The choice of a modern standard to describe the ancient weights must be between the grain and the gramme. On the grain system there are thousands of weights already published, on the gramme system only a few hundreds at Cairo. The Continental scholars have devoted themselves to theorizing instead of collecting and publishing weights. It seemed best therefore not to break away from the great mass already in print, and split the subject by printing these fresh lists in grammes. To aid reference, I have here issued the Cairo weights reduced to grains, in the summary list, along with the weights of Naukratis and Delfeneh. In the diagrams of weights here, the dividing lines by grammes are put above that by grains, so that the results can be read on either system.

The actual methods of weighing this collection were as follows. For all weights up to three pounds, a new commercial balance by Becker was used, which freely showed 0.1 or 0.2 grain with a moderate load. A new set of grain weights were used, the errors of which were not larger. For all fractions of 100 grains, a vertical slider was read; this held one end of a brass chain, and the other end hung from the balance pan. Thus any amount could be added or subtracted without the least agitation of the balance, the swing of the balance could be instantly checked by moving the slider, and a complete control quickly brought it to rest. By this means 70 weighings an hour could

1*

be done to about 0.2 grain, and with 4000 weighings to be made, a speedy method was needful. The accuracy is amply sufficient for almost all the possible needs of the work.

For the heavier weights, up to about 30 lbs., a large mediaeval steelyard was rigged up, with the tip of the beam resting by a point in the balance pan; the leverage was about 1 : 10, and the amount of pressure was weighed in the pan like any other weight. The lever multiplier was ascertained frequently, by testing with a known weight. The knife edges rested on plate-glass planes bedded on plasticine to ensure a good contact bearing.

For a few very heavy weights up to 180 lbs., the weight was hung by a thin rope; a point at top and bottom of the rope was marked, and the distance measured; then the weight was pulled to one side by a horizontal spring balance, and the deflection and pull noted; several different readings were taken, and the weight calculated from them and averaged. This is sufficient to show what system the weight agreed with, and in no case could we depend on accuracy in such weights.

9. It need hardly be explained that the methods followed here, in classifying the weights, are those attained after many searches, and listing in many ways. A large amount of tentative tabulating had to be done, on various lines, before a conclusive method of handling each part of the material could be reached. The whole of the weights were first classified by form, and, under each form, according to the number of grains. The lists of these classes proved of great value for discriminating standards; but when once the useful differences are traced, the rest of such tabulation is needless to publish or keep. Similarly the actual weights, after classing by form, are all re-arranged according to the different standards, in the permanent order of the collection. In this volume all this scaffolding is removed, and might not be realised when looking only at the conclusions here stated. If any one wishes to revise the conclusions, they must go through the stages of classifying, and many trials of diagrams and curves, which have led to the present order; without such detailed study of the material, the situation cannot be grasped for any revision.

For the general state of our knowledge of ancient weights and measures, see the *Encyclopaedia Britannica*, 1890, art. WEIGHTS, and later materials

in *Palestine Exploration Fund, Quarterly statement*, 1912, and *Transactions of the Victoria Institute*, 17 May, 1915.

CHAPTER I

THE FORMS OF WEIGHTS.

PLS. III-VIII.

10. BEFORE considering the history of the various standards of weight, it is necessary to observe the different forms which were in use at the principal periods, as such serve to give the approximate age of the weights.

Cylinder and Dome, pl. v, 456, 458; viii, 881, 883. The earliest weights are the small blocks of limestone found in early prehistoric graves of the Amratian age. There is no sign of wear on these blocks, nor of any use of them as tools. There does not seem to be any possible purpose for these pieces except as weights. When they are compared together, they are all found to be within the range of the "gold" unit or Beqa, with simple multiples such as 40, three of 20, 15 and 6. Though some of these are cylindrical, and others conical, they all have the curious feature of domed ends, so that they never can be set upright. The age of these is given by the grave groups in five instances; only one is without a history, for it was bought. The earliest fixed points are sequence dates 32 and 33, or within the age of the white-line red pottery of the Amratian civilisation. The latest fixed point is S.D. 46, or in the earlier part of the Gerzean civilisation. Hence this form characterizes the Amratian period and hardly extends into the next age.

Cone, pl. viii, 913-915. This type begins with rounded cones of limestone paste, covered with black line patterns, of Gerzean age. Later, the cone was flat-based and pointed, as found in alabaster in the Semainian age just before the Ist dynasty. All of these cones were found singly or in pairs, but never in larger numbers, so do not appear to be gaming pieces. They agree in the Gerzean age to the Daric standard, and in the Semainian to the Qedet standard which was official in historic times. The conical form, roughly made, lasted to the xiith dynasty at Kahun. Cones with wide domed tops are figured in the xviiiith dynasty, as in *Qurneh*, xxxv, and L. *Denkm.*, III, 39; also in the xxvith dynasty tomb of Aba at Thebes (*M.A.F.*, V, 656, iv). There is no trace of cone weights from Naukratis or Defenneh.

11. *Square.* The next form to arise was the square block, somewhat oblong (vi, 65). This was found in a tomb of the beginning of the Ist dynasty (*R.T.*, II, xxxii, 61). Shortly after, there were many rudely squared weights, and ground slips of stone (*Tombs of Courtiers*, 9). This form was soon improved by rounding the edges to prevent chipping, until in the ivth dynasty—the age of mechanical perfection—the most suitable form was adopted (vi, 649, 653–654); this exhibits the greatest rounding of the edges compatible with leaving flat faces to prevent rolling. It is a form which is more perfect than that of any standards made since. It is dated by the weight of Khufu (Hilton Price catalogue), and the inscribed weight (vi, 656) of a nomarch Nefer-mäot, no. 4740, a ivth dynasty name. Rather less rounding is seen in the vith dynasty (*Abydos*, II, xv, 14), and less still in the jasper weight of Khety of the ixth dynasty (no. 4466, pl. xi). In a representation of weighing, in an Old Kingdom scene, the weights are shown as sharp-edged cubes. In the xiith dynasty, the square weights mostly have sharp edges, as at Kahun, though some were rounded. After that, the rounding of the square weight ceases.

Oblong. The oblong weight appears in the figures of weights painted in the tomb of Hesy, of the early part of the iiiird dynasty. Presumably these had the slight cylindrical curve of the top (as in the weight of Khufu), which is so usual in the xiith dynasty. Such was the typical form of the gold standard, but seen here in the splendid weight of prince Herfu (vii, 694). The same continued into the xviiiith dynasty, shown by the weight belonging to Amenhetep I (*Brit. Mus.*), and the figures in the weighing scene at Deir el-Bahri. After this it disappears; but a weight of Taharqa, here (pl. x, 2398) of oblong form, has a slightly domed top, curving in all directions. Nothing of the kind occurred at Naukratis or Defenneh, and it therefore did not continue in the Saite or later civilisations.

Pillow forms. A variety of the oblong form is the pillow type, with all the edges and faces rounded. Such is dated by my finding granite blocks of this form in the workmen's quarters at the pyramid of Khafra. Two examples of this form shown here (pl. vi, 658; nos. 4103, 4081) are of diorite, which clearly points to the age of the ivth dynasty. Some of the Kahun weights are roughly made of this type, and some with rounded edges, but almost

flat above and below. After the xiith dynasty the type disappears.

12. *Black quartzose cube, cuboid, and rough forms.* These forms (iii, 4–19) merge so indistinctly into each other that they must be taken together, though the finest are exquisite cubes with flat polished faces, and the roughest have scarcely any regular shape. All of the more regular are of black or dark grey rock, apparently a black hornblende base penetrated by white quartz veins, or a magma with more or less quartz. At first sight, the rough forms seemed as if they must be merely hammer-stones, and several have been so used, but this is a common fate of even the best weights. The great amount of labour given to working down such a hard stone, usually with smooth, and often polished, faces, points to their being weights. The possible attributions of them confirm this; were they mere hammer-stones the irregular forms would be equally found of all varieties of handy size, but, after classifying them, they are found to group into particular standards. In the qedet, the necef and the stater they are rare, only 2 or 3 *per cent.* In the beqa, khoirīnē and daric they are 12–14 *per cent.*; in the peyem 21, and in the sela (or Phoenician) they are the commonest type of all, amounting to 27 *per cent.* These hard black weights are not found in the Old Kingdom or in the xiith dynasty at Kahun. Two of the xviiiith dynasty from Gurob may well be of the later occupation. I have found them in the late town at Gizeh, overlying ruins of the xxith dynasty, and they are common at Naukratis and Defenneh. It seems, then, that they arose about the Bubastite age, and probably continued to near the Ptolemaic age.

13. *Domed top*, pl. iii, iv, 24–34. As early as the ivth dynasty, a circular weight with a domed top and fairly sharp edge is found, with the name Ra-ne-onkh deeply cut in the style of that age (no. 2152). It is a very imperfect example of the domed-top type, but it long precedes any others that are known. There is no dated example until we reach that of Onkh-nes-ra-nefer-ab (no. 2597) in the xxvith dynasty. The entire absence of the type, among the weights of the xiith and xviiiith dynasties at Kahun and Gurob, and in all the paintings of the xviiiith dynasty, makes it unlikely that it was used in those periods. The great multitude of weights of this form seem to belong, then, to the Saite age, and continued till Roman times (see *Illahun*, 33).

Domed, v, 37-40. Linked with the previous type, and passing into it, is the domed form, without the top being bounded by an edge. This seems to have arisen in forms contracting upward from the base, as early as the xiith dynasty (Kahun); but, in the more usual form, widening from the base upward, it appears rarely at Gurob, and perhaps only late there. It becomes extremely common, along with the dome topped type, in the Saite age; one example bears the name of Atha, son of Hor-uza (no. 2882), others in Cairo have inscriptions of Taharqa (31652) and Nekau (31604).

14. *Barrel*, vi, 485-53. The barrel or spindle form, flattened on one side, is probably Syrian in origin, along with the duck form. The earliest example is a small malachite weight found in the tomb of Zer, of the Ist dynasty (*R.T.*, II, xxxv, 78). None have been found of the xiith dynasty, and it is not till we reach the great age of intercourse with Syria, in the xviiiith dynasty, that this form is common in Egypt. Seven weights were of this type out of 32 found at Gurob, a large proportion. In the ruins of the temple of Merentpah at Memphis, xxth-xxvth dynasties, there are 6 in 56, or 11 per cent. Yet when we reach the Saite age, at Naukratis and Defenneh, out of 1270 weights only 4 barrel forms of stone occur, though there are some small bronze barrel weights for goldsmith's use. In place of 22 per cent of barrel forms in the xviiiith dynasty, or 11 per cent after that, there is only $\frac{1}{5}$ per cent in the xxvith dynasty—they are practically extinct. Hence all the stone barrel weights in Egypt should probably be assigned to the xviiiith-xxiiiird dynasties.

Duck, vii, 77-80. In Babylonia and Assyria, the duck form of weight is a well-known type, but it is not found in Egypt till the xviiiith dynasty. It is seldom that the head of the duck is retained in Egyptian examples; one or two here show it slightly, and the only clearly marked neck, head, and eye, is on a fine specimen in haematite from Sparta. In general, the Egyptian form is more like an egg with a pointed end, flattened below to prevent rolling. In the best examples the small end is raised clear of the base, in the worst the flat base is the widest part of the mass. In the ruins of the Merentpah temple, xxth-xxvth dynasties, there are 4 duck weights in 56, or 7 per cent. On reaching the Saite age there is, of all varieties of the duck type together, less than 1 per cent. Many of these are of poor and degraded forms. On comparing

this with the proportion in series where the duck was a regular type, there is 6 per cent in the stater (Attic) and 8 per cent in the khorinē. So it is clear that, in spite of Defenneh being on the Syrian road, the duck type was nearly extinct there in the xxvith dynasty.

15. *Animal types. Front.* Apart from the Babylonian duck type, there are many animal types apparently of Egyptian origin. Of these we mainly learn from the painted scenes of weighing. There is no trace of such forms in the earlier times, either actual specimens or in paintings. At the beginning of the xviiiith dynasty, an ox weight is figured at El Kab (*L. Denkm.*, III, 10). Under Hatshepsut, there are the ox and ox-head forms at Deir el Bahri. Under Tehutmes III, the calf and ox-head (*L. Denkm.*, III, 39). A little later a lion weight, and an ox-head weight (*Mém. Miss. Franç.*, V, 210, 569 ii). At Qurneh, about this age, there occur a hippopotamus, an ox, and an ox-head (*Qurneh*, xxxv). From Tell Amarna, under Akhenaten, there is an ox-head of bronze weighted with lead (no. 4939 here); and about the same age one from Gurob (no. 5030). In Cairo is the large stone ox-head with the name of Sety I. Coming to the xxvith dynasty, the tomb of Aba at Thebes shows a gazelle weight (*ROSEL.*, *Civile*, li; Cailliaud, 17). This last may be only taken from an earlier scene, as the whole tomb is an archaistic copy, mainly from the tomb of an earlier Aba at Sheykh Sayd. Hence we can only be certain of evidence for animal weights in the xviiiith and sixteenth dynasties. Apart from those due to Greek influence, as some are here, we should assign all Egyptian animal weights to the period of the New Kingdom.

16. Setting aside, then, weights of vague and ill-defined types, we may now sum up the usual ages of the definite types. These periods are not entirely exclusive, as there may be a small proportion beyond the ages given, but they may be taken as serving to date weights in general, if no more precise evidence is at hand.

		Types in plates
Cylinders and cones,	Amratan, prehist.	456, 88,
domed base		913-914
Pointed cones	Semainian, prehist.	915-917
Round-top cones	xviiiith dynasty	921-927
Square, sharp edges	Ist	62-64
Square, edges greatly rounded	ivth	656

		Types in plates
Square, edges less rounded	ixth "	653-654
Square, edges slightly rounded	xiith "	646, 649
Oblong, cylindric top	iiiird? xiith-early xviiiith dyn.	691-694
Pillow	ivth-xiiith dyn.	658
Black quartzose cube, &c.	xxiird?-xxxth d.	144-185, 55, 57
Domed top	(ivth) xxvith dyn.-Roman	24-36
Domed	xxvith-xxxth dyn.	37-45
Barrel	xviiiith-xxiiiird "	48-53
Duck	xviiiith-xxiiiird "	77-81
Animal	xviiiith-xixth "	Front.

(The weights marked Merenp, from over the ruins of the Merenptah temple, Memphis, are placed to the xxiiiird dynasty.)

CHAPTER II

MULTIPLES AND FRACTIONS.

17. THE general principles of the assignment of multiple and fractional weights to different standards should be noticed. Each standard had its regular system, as we have a system of 16 drams = 1 ounce, and 16 ounces = 1 pound. Occasionally a different fraction or multiple may occur for convenience of approximation to another system, as we had at one time postal weights of $\frac{1}{3}$ ounce as an equivalent for 10 grammes, and France now has a unit of 15 grammes as equivalent to our $\frac{1}{2}$ ounce. In general we should not accept any multiple which is unlikely, such as 11, 13, 23, 28, 33, 46, which all appear as supposed multiples in a recent paper on weights; nor any multiple which is out of the usual system of the standard, as 16 in the Assyrian sexagesimal system, or 6 in the peyem system which is decimal and binary. For purposes of classifying weights, the table on pl. xxv is the most ready way of seeing to what standard or standards any weight should be assigned. Some amounts are ambiguous, as for instance 600 grains may be either 5 peyems or 4 darics; or 800 grains may be either 5 necefs or 4 beqas. In such cases the only course is to place the uncertain weights together, compare the forms and materials with the certain ones of each standard in

question, and then assign each weight its probable place. Thus the really uncertain material is seen to be only a minute amount of the whole. In order not to prejudice the question, any weight which might be supposed to belong to either of two systems, is entered here under each, the detail being given in the most likely position, and a bare mention of the weight in the less likely list, with the initial of the standard where it is fully stated.

18. The treatment of fractional weights is somewhat different. There is not the same range, as $\frac{1}{6}$ is the smallest fraction usually found, so that only five fractions need be considered, and the $\frac{1}{2}$ is usually obvious. The fractions of different standards are not well fixed, except the daric, the stater, and the sela. The method here followed, for separation of the small weights, was as follows. In order to separate at 23.5 to 26.5 grs. between $\frac{1}{8}$ B. and $\frac{1}{6}$ P., $\frac{1}{5}$ P. would not extend over 25.0; if it existed side by side with $\frac{1}{8}$ B. then there should be more weights from 23.5 to 25.0 where they overlap, than from 25.0 to 26.5 which can only be $\frac{1}{8}$ B. Yet the numbers are equal in those two ranges, therefore there are no $\frac{1}{5}$ P., but only $\frac{1}{8}$ B. B. is proved to divide in $\frac{1}{8}$ th by the uniform series of haematite conic weights of 200, 50 and 25 grains. The sela we know to be divided into 4 drachms of 56 grains, and that in $\frac{1}{8}$ th; hence 34-38 grains cannot be $\frac{1}{6}$ L. and must therefore be $\frac{1}{5}$ K.: and 26-28.5 grains is $\frac{1}{8}$ L. As K. divides by 5, then 28-31 grains cannot be $\frac{1}{6}$ K., but must be $\frac{1}{4}$ P. As P. divides by 4, then 38.5-40.5 cannot be $\frac{1}{3}$ P., but must be $\frac{1}{4}$ N. This covers all the scale, and the results are:—

peyem	114-125	÷ 4	28.5-31.2 grains
daric	125-132.5	÷ 6	20.8-22.1 "
stater	132.5-137.5	÷ 6	22.1-22.9 "
qedet	137.5-152.4	÷ 5	27.6-30.5 "
		÷ 3	45.8-50.8 "
necef	152.4-170	÷ 4	38.1-42.5 "
khoirine	170-190	÷ 5	34.0-38.0 "
beqa	190-211	÷ 4	47.5-52.7 "
sela	211-228	÷ 4	52.7-57.0 "

Here it will be seen that there is an overlap of $\frac{1}{4}$ B. = 47.5-52.7, and $\frac{1}{8}$ Q. = 45.8-50.8. Now no $\frac{1}{8}$ Q. weight could exceed 51 which is = 204 on the beqa system; and the larger beqa weights, under 204 and over 204, are in the proportion of 4 : 3. As there are 14 small beqa weights *over* the limit, there should be by proportion 18 *under* the limit, within the Q. region (3 : 4 :: 14 : 18). Hence

we have to weed out 18 small weights as beqa from the mixture of qedet and beqa of 45.8–50.8 grains. On examination, it was found that there were just 18 of these of the conical dome form common for the beqa, having the rest of the domed-top form characteristic of the qedet. There is therefore little or no uncertainty in discriminating the two standards in the small weights.

CHAPTER III

System of the Catalogue. PLS. XXVII–XLII.

19. BEFORE describing the Peyem and other standards, the arrangement of the tabular catalogue, at the end of the volume, should be noted.

The weights are classed according to the eight different standards. The order is according to the amount shown for the unit, from light to heavy. Where examples agree in the unit to a tenth of a grain, they are classed in the order of the multiple of the unit.

Column of number. As the long lists of weights of Naukratis and Defenneh are quite independent of the weights here, they continue to stand as a permanent record, numbered from 1 to 1292 (*Naukratis*, I, 75–79; *Nebesheh and Defenneh*, 82–88, in *Tanis*, II). The short lists subsequently published from other places are cancelled, as the examples all appear in this larger catalogue. The numbers here begin with 2001, to avoid clashing with the above lists. In the list of qedet weights, *d*, means a duplicate, which has been removed from the College collection and is not numbered. In all the columns, repetitions of current numbers and words are left blank, as the more open arrangement of figures is easier for reference.

Material. The obvious nature of the stone is named, rather than a purely geological definition, which would be less clear to archaeologists. Where more than one word is required, abbreviations are used. Bk., black; Br., brown; Gn., green; Gy., grey; Y., yellow. B. or Bas., brown basalt, the commonest material for weights; Bl. gl., blue glaze; Gls., glass; Glzd., glazed; Gy. volc. ash, grey volcanic ash; Gran., granite; Limest., limestone; Mem. glass, Memphite glaze factory; Porph., porphyry; Qtz., quartz; Qtzite., quartzite, silicified sandstone; Qtzose., quartzose, hard silicates with quartz veins; Steat., steatite.

Form. Numbers refer to the plates of types, pls. iii to viii.

Grains. This is the present weight, when undamaged; if damaged the amount of loss estimated is added, so as to restore the original weight. The amount of loss estimated is stated as $-n$ in the last column.

×. This is the multiple of the unit in the weight. For heavy weights it is the multiple of the super-unit, such as D., deben; M., mina; T., talent.

Unit. This overlaps a little from one standard to another; the discrimination between the standards is detailed under *delimitation* in the following accounts.

Detail. This gives the name of the source when known; the date when known; the amount of loss, if any; the cross reference to another standard, when a weight probably belongs to a different system; the marks, if any, which are more exactly figured in pls. x to xv. “Merenpt.” refers to the Merenptah palace site at Memphis; “Gebln.” to Gebeleyn; “Karn.” to Karnak.

The registers of metal weights (xlili–xlvi) are differently arranged, as the metals have both gained and lost; hence the total amount of change, by gain of oxygen and carbonic acid, and of loss by corrosion, scaling, cleaning and wear, must all be stated, in order to show how much uncertainty there is. After the number and form, as before, there is the present weight, NOW, the total amount of the changes, CH., the estimated ORIGINAL weight, and then the multiple, unit, and details.

The Peyem standard.

PLS. XXVII–XXVIII.

20. THIS standard is guaranteed, and named P-Y-M (pl. xxiii) by three weights found in Palestine, of 112.2, 117.4 and 119.6 grains, averaging 116.4 grains.

There appears to be a reference to this word in a passage I Sam. xiii, 19–22, which is amended by Signor Rafaelli and Rev. Mr. Segel, thus:—“And all Israel went down to the Philistines to forge every man his ploughshare and his *'eth* and his axe and his goad; and the inducement was a *peyem* for the ploughshares and for the *'ethim* and 3 *killeshōn* for the axes and to put a point on the goad.” The *bakhshish* or bribe of a *peyem* seems to be this standard weight of silver; the *killeshōn* is supposed to be the *karasha* of the Aswan papyri,

about 860 grains, or 5 khoirinē (*Pal. Exp. Fund, Quarterly statement, 1916, 77*).

The existence of the peyem in Egypt is proved by twelve marked weights:—

No.	Weight	Mark	Unit	Peyem
2017	1834	÷ 4	458.5	114.6 × 4
2023	2296.4	÷ 10	229.6	114.8 × 2
2025	1379.3	÷ 6	229.9	114.9 × 2
2028	230.0	÷ 1	230	115.0 × 2
2031	6900	÷ 3	2300	115 × 20
2037	1382.2	÷ 3	460.7	115.2 × 4
2042	231.1	÷ 1	231.1	115.5 × 2
2066	1870.2	÷ 4	467.5	116.9 × 4
2086	117.8	÷ $\frac{1}{2}$	235.6	117.8 × 2
2132	481.0	÷ 2	240.5	120.2 × 2
2214	495.4	÷ 2	247.7	123.8 × 2
2235	248.7	÷ 1	248.7	124.3 × 2

The median of these is 230.8 or 115.4 for the peyem, closely agreeing with the Palestine average of 116.4. In Egypt it seems that the double peyem was regarded as the unit. Further the importance and early date of this standard is shown by the large weight (2152) of 48476 (÷ 400 = 121.2) with the name of the "nesut rekh Ra-ne-onkh" (pl. x). The style of the signs and the name, alike fix this to about the vth dynasty. This person is probably the same as that of a tomb at Saqqarah (MAR., Mast. F. 1); or possibly Ra-ne-onkh without the title *nesut rekh*, of a tomb at Gizeh (L. *Denkm.*, II, 91a). It is evident that the peyem was decimally multiplied.

Coming down to the xviiiith dynasty, there is a limestone ball (2046) from Tell Amarna, stated to be 12 deben; allowing a maximum for loss, it may have been 14360, and could not therefore be 12 deben Egyptian; it was probably only 13870. The unit would be 1197, or 1156 if without loss. It is evidently the deben, or 10, of the peyem.

This standard is also known from documents of the xviiiith dynasty. In papyri (*Z.A.S.*, 1906, 45) values are reckoned in rings of gold weighing 12 to the deben; that is to say, the same unit as recorded in the last paragraph. As the extreme range of the qedet deben is 1375 to 1524, the unit of the ring was between 114.6 and 127 grains; the range of the peyem is 114 to 125 grains. The ring appears to be called *shoti* in a papyrus, so that may be the Egyptian name of the peyem.

21. *Delimitation.* It might be thought that the list of marked multiples above was merely taken

out of a list which might be continued far to either side. On the contrary, this standard has a very high proportion of marked weights, 12 in 219 or over 5 per cent. In the adjoining daric system, twice as numerous, in 434 weights there is only a single one with its number of shekels on it. In the sela system (Phoenician), on the other side, there are 5 marked weights in 162, or 3 per cent. The normal Phoenician standard of 224 is never above 230, and it would be impossible to assign to it weights up to 248 as above. The division between the peyem and the sela is best shown by the large weights. These are of 21277, 21900, 22130 grains on the sela; then a gap, and the peyem begins 22930, 23480, 23800, 24190, 24260, 24300, 24450, 24600, 24760. Thus the average interval between the sela weights is 430 and between the peyem 240 grains, while there is gap of 800 grains between the systems. In the double of these weights the same gap is seen; the sela between 42180 and 44574 averaging 160 apart, then a gap of 1500, and then an average of 600 apart in the peyem. Again in the duck and barrel weights the same interval is seen, between 112 and 114 grains unit.

The division between the peyem and the daric is indicated at once by the cessation of marked weights of the above list, ending with 124.3 grains. It is also shown very clearly by the heavy weights. The peyem weights from 22930 to 24760 average 240 grains apart, then comes a gap of 890 grains, and then the daric weights average 180 grains apart.

On the double scale this is still plainer, as there are 8 peyem weights between 46054 and 49700, and no daric or other weights larger, up to 55200 where the qedet system is reached. On looking at the total curve of weights of all kinds there is a very sharp drop at 125.0, down to less than a third of the number, and this clearly marks the limit of the peyem. Thus the extent of range of the peyem variation is well distinguished, and the named and marked weights leave no possible doubt as to the reality of the standard.

22. *History.* So far, we have been dealing with this standard on lines that have been familiar, without any historic discrimination of period. This is equivalent, in length of period, to lumping together all weights from the Hyksos down to our own time; obviously we must expect confusion in so long a period. We can now begin the new method of separating ages by the forms of weights,

as described in chapter I. This opens an entirely new prospect in metrology. In place of having a very few weights dated by inscription, and which may be exceptional in amount, we can, by forms, put into their probable historic order most of the weights that we have. Beside the criteria of form which we have noticed, there are some other guides; the source of the weights may indicate the age, for instance those from Kahun being of the xiiith dynasty; the material, for instance the haematite weights being of the xviiiith dynasty. Using all the guidance, the following peyem weights are dated to the earlier periods, as marked in the catalogue.

Old Kingdom unit	Mid Kingdom unit	Empire unit
114.9	114.6	115.0
115.0	114.8	115.1
115.5	115.0	116.0
116.1	115.2	116.5
116.5	116.4	117.0
116.9	117.2	117.7
117.0		118.0
	120.2	119.7
121.0	121.0	120.1
121.2		120.1
121.7	123.7	120.5
	123.8	121.3
124.2		121.5
124.2		121.6
124.3		122.7
124.3		122.8
		123.6
		123.8
		124.0

Later than these, the rough and cuboid forms belong to the xxiind-xxvith dynasties, and the dome-topped forms to the xxvith-xxxth dynasties.

To examine these results, it is best to form a diagram, placing all the units of one age at one level, as in pl. I. Here the five periods are separated, and at once the result appears that the early weights group on three different values, 115-117 grains, 121-122, and 124 grains. In passing from the vith to the xiiith dynasties, the first group spreads wider, the second and third groups shift toward the first. In the Empire, the spread of each group is still wider, and the second and third groups are fused. By the xxiind dynasty the spreading has almost united all the groups, which are finally mixed into a general diffusion in the xxvith dynasty. In each group, the limiting examples of each

period are joined by dotted lines. This primitive isolation of three original units, and the gradual spread of their range until they are finally merged into a single widely inaccurate series, is most instructive; and, as we shall see, this is like the history of most standards of weight. It shows for the first time the real history of weights; and any theories of connection of standards must be based on the original values of certain components, and cannot be left merely in the vague uncertainty of the corrupt period. Whether there is any real derivation of standards one from another in the earlier times seems very doubtful.

In the diagram, the weights of the 1st age of Gezer are marked G in the xviiiith dynasty line; those of the 2nd age (1300-800 B.C.) are in the xxiind line. These conform to the division between the high and low. The weights of the 3rd and 4th ages (800-100 B.C.) are placed in a line below, "Gezer late." They still show a gap at about 119 grains. The letter P shows the values of the weights inscribed "peyem" found in Palestine. One such is lighter than the limit of the diagram. The scale of grammes is above, that of grains below, so that the results can be read in either standard.

23. *Notes.* The marked weights have been listed above, and the marks will be found on pl. x. The transcription of the inscribed weight from Tell Amarna I owe to Dr. ALAN GARDINER. It may be rendered "The deben 12 borne by the stones (or weights) 2 of alabaster of Nefer-renpet." The present weight is 13860 grains; and an irregularity of the side is an early break, which may, or may not, have been before the inscription. From all the details it seems to be an original irregularity; the weight was not a finely finished example, but only a rough block, trimmed for copying the fine weights belonging to Nefer-renpet. Hence I should accept 13870 as the original, allowing for small bruises. This is expressly said to be 12 deben, showing a standard of 115.6 grains at Tell Amarna in the time of Akhenaten, very probably from some Syrian standard, agreeing with the central value of the low family of the peyem. A group of disc weights may be noted, as agreeing closely together, nos. 2133, 2157, 2175, weighing 481.2, 486.0, 489.4 grs. 2051 is a different estimate of 2031, accidentally entered in duplicate. Two fine weights from Gebeleyn (Brit. Mus.) give 6 and 60 × 245.2, the double peyem, marked B in diagram pl. I.

CHAPTER IV
THE DARIC STANDARD.

Pts. XXVIII—XXX.

24. OF the existence of this system from very early times there is no question; it appears in the standard weights of Dungi, and the copy of those by Nebuchadrezzar, and plenty of lion and duck weights of the later period. Among the metal weights at University College, there are lion weights of 1 daric and two of 20 darics. Owing to the many different systems in which the name shekel was used, and the single and double shekel in the Assyrian system, it is needful to use the later name daric, which has only one meaning. There is only one weight marked with number of darics (2379), and that is roughly done.

25. *Delimitation.* The lower limit has been already placed at 125.0 grains, by the evidence just stated for the peyem. The upper limit is the division between the daric and the stater (Attic system). This is not easy to define, as the fractions ($\frac{1}{6}$) are the same, and the daric is often decimally multiplied like the stater. Further, the mina of 60 darics and its half, overlap on 50 and 25 necef and on 40 and 20 beqa. The classes which are clear of these other standards are:—

Duck weights,	none between	131.6 to 134.5	
" "	255.0—270.1	127.5	135.0
" "	658.0—672.2	131.6	134.4
" "	1311.6—1337.0	131.2	133.7
Barrel weights,	none between	129.9	133.0
" "	255.5—271.0	127.7	135.5
" "	661.5—671.8	132.3	134.4
" "	1319.5—1335.0	131.9	133.5
Fine edged dome top			
no daric, stater begins	1317	0	131.7
" "	2661	0	133.0
Flat top, 1 daric, stater begins	1315.3	0	131.5
Rounded	3261.8—3331.6	130.5	133.3

From all these classes there is clearly a gap between 131.9 and 133.0, narrowed by one class rising to 132.3, while two others begin at 131.5 and 131.7 without any daric below them. Looking to the whole material, 132.7 seems to have an equal number of stragglers on each side, and may best be adopted as the dividing point, with 6 or 8 of each standard across the border, but distinguished by form, material, or multiples. The Gezer weights agree with this, the gap between

132.9 and 133.9 being much larger than any other interval lower or higher than this.

26. *History.* Rounded cones of limestone paste, which were moulded by hand, with a threading hole through the upper end, are found in the Gerzean age (*Prehist. Egypt*, xlix, 6—10). They are decorated with black line patterns, and no purpose can be assigned to these unless they are weights. There is also a double cone of clay, white washed and painted similarly, with a thread-hole. On comparing the weights of these, they agree in simple proportions. There are also two stone rings, too large for a thumb, too small for a wrist, and a finely wrought syenite slab, which agree with the weights of the cones.

Cone	485.5	÷ 4	121.4
Breccia ring	4435.0	÷ 36	123.2
Cone	313.5	÷ $2\frac{1}{2}$	125.4
"	941.3	÷ $7\frac{1}{2}$	125.5
Alabaster ring	3763.8	÷ 30	125.5
Syenite slab	3785.6	÷ 30	126.2
S.D. 40, cone	1267.0	÷ 10	126.7
Cone	261.7	÷ 2	130.8

These multiples agree on a system of decimal and sexagesimal, the $7\frac{1}{2}$ being $\frac{1}{4}$ of 30, the $2\frac{1}{2}$ $\frac{1}{8}$ of 30 or $\frac{1}{4}$ of 10. The range of the daric is 124.3—132.7, and that agrees fairly with the variations above. There seems, then, good evidence for granting that the Mesopotamian daric standard was brought into Egypt by the eastern invaders of the Gerzean prehistoric age. These are not incorporated in the catalogue of weights as there might be a hesitation as to their purpose, and the importance of them lies in their date.

The weights that can be approximately dated by the forms, in historic times, are marked with the dynasty number in the catalogue. In the diagram, pl. I, it will be seen how they are distributed. There appear to be two groups in the early period, five agreeing on 127.5, and seven between 130.4 and 132.8. Those of the first dynasty, marked I, are in the higher group. In the xiith dynasty, the 127.5 group spreads to 126.0—128.7, and the higher group extends to 129.6 toward the lower. By the xviiiith dynasty, the groups have become almost fused in Egypt, only showing a little gap at 128.6—129.0, wider than any other gap, except at the extremities. The Gezer weights are marked G. Probably 127.5 and 131.5 should be accepted as the earliest forms. The lower of these is the stand-

2*

ard of the Assyrian weights, and Nebuchadrezzar's copy of the early standard of Dungi gives only 126.0 for the unit. The late coin of the daric was intermediate, 129.2; most likely it was a mean example of the fused standards in late times. The higher value appears in some coinage, as the Lampsacene staters of the satrap Orontes, averaging 130.4.

27. *Notes.* The multiples of the daric standard were on two systems, the sexagesimal or old Babylonian system, and the decimal. Multiples on both systems are found from the Old Kingdom to the end, altogether 16 clearly sexagesimal, to 31 decimal. Looking at the higher and lower standard, they are almost alike in both; in the lower 15 sexagesimal and 29 decimal, in the higher 26 and 41 respectively. It appears, then, that both systems of multiples were used throughout. On comparing curves of the distribution under the two systems, there is scarcely any change in common. The only point that might be significant is that the sexagesimal curve has maxima A and B, at 127 and 131; these may well show the original units which group on 127.5 and 131, as stated above.

There is more uncertainty in the mina weights of this system than in any other, owing to the coincidence of three standards, the mina of 60 darics 7500-7960, 50 Necef 7640-8500, 40 Beqa or nub 7520-8400 grains. Thus all the daric minas except the lowest might be claimed on other standards. On comparing all the ambiguous weights with those of B which are above the mina limit, the probable division seemed to be that all the irregularly rounded, cuboid, and flat-top domed weights belonged to the daric, and the square, cylindroid and banded alabaster weights to the beqa. On comparing the daric and necef series, the higher multiples up to 31900 and 78600 stop with the D range and do not extend to N alone; hence doubtful cases should be given to D. Accidentally, no. 2355 is also entered as 2348 without addition for loss.

The notable weights in this series (pl. x) are those of Taharqa (2398) and of Onkh-nes-ra-nefer-ab (2597); they do not agree, giving 128.2 and 131.6 for the daric. The former is inscribed "son of Ra, Taharqa, by Osiris in the midst of Sais, beloved." This is probably the Osiris Unnefer of Nesaft, in or near Sais, see BRUGSCH, *Dict. Géog.*, p. 358. Another peculiar weight (2638) is a large duck with well-formed head, weighing 250 darics of 126.8, or

240 (4 minas) of 132.1 grains. Unfortunately the marks on it (pl. x) are bruised and worn; they might read 12 or 16 or 4. As they cannot agree with 250 shekels, or any derivative of that, it is probable that this was 4 minas. There is a fine haematite weight of duck form, with the head and eyes carved, from Sparta, 20 darics of 128.6. A weight from Malta is of a pointed dome form, pierced with a hole for a cord; it is a half mina, yielding a daric of 128.2. Both these latter I owe to my old friend Greville Chester, as likewise all the weights from Syria and Gebeleyn, beside others. One obvious 10 daric weight (2640) of 1321.9, has been re-marked with 9 cuts to show its value as 9 qedets of 146.9.

This standard was of great importance early in the Mediterranean. The Knossos octopus weight is 29 kilos = 447,500 grs.; and 20 bronze ingots with marks (*Bull. Paletnol.*, 1904, 101) vary from 27.0 to 33.3 kilos, median 29.4 = 453,000 grs., giving a shekel of 125.8 grs. No very exact result can be stated until these are all accurately weighed and changes estimated.

CHAPTER V

THE STATER STANDARD.

PLS. XXXI-XXXII.

28. THIS standard, otherwise called Attic, is here named from its most celebrated example, the immense coinage of gold staters of Philip of Macedon. We do not know any early name for it, and to call it Attic or Solonic is only to put back the name a couple of centuries in some thousands of years of history.

Coming in between two well-known standards, the Babylonian daric and the Egyptian qedet, the stater has been often confounded with one or the other, and its separate existence as a standard has been denied. There are but two early marked examples here, 2803, of the Old Kingdom form, giving a unit of 134.4, and 2911 of the Middle Kingdom, giving 135.7; one weight in Cairo (31613) with a scarab on the top and number "60," is 600 staters of 134.1. These are far removed from any qedet weight, the lightest of which with numerals gives 140 grains, and they are too high for any known example of the daric standard.

29. *Delimitation.* The gap between this and the daric has been described above. The most con-

clusive point is that some varieties of form are unknown in the daric standard, and only begin with the stater. The separation between this and the qedet is marked by the far greater proportion of duck weights of the stater; in proportion to the numbers of other forms, the duck weights are 5 per cent of the staters, and less than a thousandth of the qedet, fifty times more numerous in one than in the other. In the class of good domed weights there is a clear gap between 2698.9 and 2768.8 or 134.9 to 138.4 grs. unit; again, in rounded weights there is a gap between 3471.7 and 3522.9, or 138.87 to 141.32. On looking at the whole of the series in curves, it appears that 137.5 is the point where the two standards are equally usual; each must have a few examples extending across this point, which can only be distinguished when peculiar in form, material, or multiple. The heavy weights bear this out, though they are not very numerous. There are eight of 400 qedet, ranging from 151.7 to 138.0 for the qedet, and nothing whatever below that, till reaching 400×124.2 on the peyem standard; thus there are no weights of 400 staters or darics, and the qedet begins at 138.0. In the next grade, there are sixteen weights of 500 qedet from 151.4 down to 138.5, and then only one below that, of 135.4. Of the 1000 qedet series, there is a gap between 1000 staters of 134.5 and 1000 qedet of 138.5. Thus the heavy weights prove that the qedet series ends at about 138.0. From this, and the previous difference of 50 to 1 in the proportion of duck weights, between the two standards, it seems impossible to doubt the distinction between the stater and the qedet, however much they are naturally confounded by their nearness, and by examples crossing the border lines, especially in the later confusion of standards.

30. *History.* In the diagram, pl. I, it appears that there were two forms of the standard in the Old Kingdom, about 134 and 136; a unit of the latter value is supported by a weight in Cairo (31281). The same separation appears in the few weights of the xiith dynasty. After that there is no clear break, and only a confused mass of weights in the Greek period, hence the lack of discrimination in writers on metrology. The Gezer weights of the xviiiith dynasty onward do not show any such grouping.

The lower standard is what is best known from the Attic weights of 134 grains in trade, though never exceeding 133 for coinage. The higher standard of

136 appears in the early haematite weights from Troy, pl. xlix, between 136.4 and 137.4. Thus the varieties we see in early Egypt continued to be reflected in other countries to a later time.

Notes. Outside of the barrel and duck weights there is little that is distinctive between this and the qedet; as a whole, the stater is of rounded forms, seldom fine or clean-cut, and often bad and ill-defined, whereas the qedet is the best cut of any group, and generally of clean forms and sharp edges.

Of peculiar weights, beside the two marked ones noted already, there is no. 3042 of 274.8 with a large Δ cut on it, showing it to be 4 drachmae of 68.7. As a whole, the stater series is not distinctive or interesting in detail. A fine weight of basalt of the ivth dynasty in Turin is inscribed for the *kher heb*, Hep-ata ("Law of the prince"). It is marked 10, giving a unit of 267.9, or 2×133.95 , marked T on the diagram, pl. I.

CHAPTER VI

THE QEDET STANDARD.

PLS. XXXIII-XXXVII.

31. THIS is by far the most numerous standard in Egypt, and has generally been regarded as especially Egyptian. It is the basis of nearly all statements of weight from the xviiiith dynasty onward. The multiple of 10 qedets was termed the deben, and 10 debens were termed the sep, in the xxvith dynasty (*P.S.P.A.*, 1893, 309). Deben is however a name applied also to other standards.

The marked weights are not more than a hundredth of all, in this standard. Their evidence is varied; two give the qedet, and two the deben, on the basis of 140-150 grains (3102, 3218, 3453, 4491); five give the double of this as the qedet (3178, 3260, 3343, 3484, 3547); one gives a quadruple qedet (3234). There was, then, the confusion of single and double values, as known in the daric and other standards.

The marks are more usual on the light varieties, mostly on a standard of 138 to 141, special emphasis being on values of 140.0 "of the treasury of Heliopolis" (*Brit. Mus.*), and 140.4 "of Heliopolis" (*Louvre*), and about 139 "of the treasury" (4985); others are nos. 3102, 3178, 3218, 3234, 3260, 4491. The heavier examples that are marked are much more scattered, 142 (3343), 144.0 (3453), 144.3

(3484), 145.6 (3547), 149.5 (3746), and the most important 150.0 with the name of Aohmes II (Brit. Mus.). There is also a deben of the Old Kingdom (3746) of 1494.7 grs., roughly marked 8, probably to correspond to 8 khoirīnēs of 186.8. It is evident that the high value of 150 had strong support, though in Saitic times there was a ruling Heliopolitan value of 140 grains.

In late times, there was a fractional standard called the *khenp*, a word that has too many meanings; the *khenp*-deben was $\frac{1}{5}$ th of a deben, the *khenp*-qedet was $\frac{1}{9}$ of a qedet, thus making a binary system of $\frac{1}{9}$, 1 and 2 qedets (*P.S.B.A.*, 1893, 310-312). The $\frac{1}{9}$ qedet and 2 qedets were the Egyptian drachm and tetradrachm.

Delimitation has already been noted between the stater and qedet, and that between the qedet and *necf* will be noted under the latter.

32. *History.* The history of this standard is not well defined, owing to its not being so common as some others in the early periods. The earliest stage appears to be at the rise of the Ist dynasty, when half a dozen alabaster cones (viii, 915) were placed in graves, sometimes singly, or else two together (*Tarkhan*, II, p. 11, pl. ix). As the cone with a curved base occurs in prehistoric weights and with a flat base it is common in xiiith dynasty weights, there is fair ground for accepting the *Tarkhan* cones as weights. As they occur singly, or two together, they cannot be pieces for a game. The details of these are:—

No.	Grave	S.D.	Grains	÷	Unit
3272	1568	78	845.3	18	47.0
4050	717	79	478.2	10	47.8
3499	717	79	144.8	3	48.3
3541	728	78	872.6	18	48.5
4352	1892	77	980.0	20	49.0
4363	728	78	985.0	20	49.2

The standard thus appears to be the qedet, but divided by three, and this is the case in 45 instances in the list of historic times. The multiples 18 and 3 might as well be 6 and 1 qedets; but the multiples 10 and 20 strongly show that the third of a qedet was the unit. These were misunderstood at first and are entered in error to 3 and 7 qedets in the list. The qedet here would be from 141 to 147 grains.

Referring to the diagram, pl. I, it is seen that the Old Kingdom weights extend over the whole space between the values 141 and 148 as given in

the Ist dynasty. There seems to be probably a gap between 145.6 and 147.7. If so, we may look on the early weights as indicating two families, centering on 144 and 149. On reaching the xiiith dynasty such a division disappears, and no clear families can be traced. In the xviiiith and xxiiiird dynasties the mixture is so continuous that it is useless to figure it, and all that can be said is that there was a low group of 138.4; but from 140 to 148 there is no separation, and a grouping at 151 in the xviiiith dynasty is lost in the xxiiiird.

If it were possible to get sufficient examples from single localities of an early period, perhaps the origin and growth of the variations might be traced. For instance, 9 out of 12 from Kahun of the xiiith dynasty are between 140.6 and 144.0, pointing to a standard of about 142.5, with rare examples of 147.2 and 149.3. In late times there was a definite standard of 140 at Heliopolis. In the Delta, in Greek times, there is so close a relation between the curves of distribution at Naukratis and Defenneh (*Tanis*, II, pl. L) as to point to five standards between 138 and 149, equally diffused.

The best that can be said seems to be that there was during the Old and Middle Kingdom a principal standard of about 145 grains, with local variations up to 150; and that in the xviiiith dynasty two extreme groups of 138.5 and 151 became attached to the qedet, more probably by assimilating some foreign standard, rather than by variation of the earlier qedet. The gold shell of Taoa (Theban xviiiith dynasty) points to 151 being a southern unit. The Heliopolitan standard of 140 points to 138.5 being of northern or eastern origin. The great mass of hundreds of small weights of late period are so generally diffused that they are of no value for determining the standard.

33. *Notes.* There are not many peculiar weights in the qedet series; they are mostly plain conventional forms of the Saite age, and so much commoner than other standards that they did not require marks.

3102 has the names and titles of Apries with the numeral 40 (pl. viii); this serves to vouch for multiples by 4 and 40, but, owing to a large piece being broken away, the original weight of the deben is not precisely fixed.

3162 has the seal hieroglyph of the chancellor, lightly engraved on the top.

3218 is a splendid hippopotamus head in haematite, marked |||||O||||, ten qedet in two methods of numbering. It is from the Set temple of Nubt, a temple standard.

3336 is of brown serpentine, oblong, with rounded top edges, obviously Roman.

3392 of alabaster, thin, with rather bulgy outline, is from Nubt.

3594 has the mark Λ, probably 10; and, if so, 10 thirds of the qedet; the form seems influenced by the cheese-shaped Roman weights.

3687 is a finely polished block with slightly curved faces, of black quartzose stone.

3722 is a mace head form of black and white porphyry; that it is a weight is suggested by a similar form of grey syenite from Meroe, 3795, which also agrees with the qedet standard.

3876 is a simplified duck form of yellow limestone, with a large plug of lead up the axis, for adjustment.

4982, 5003 are hollow cases, filled with lead.

4985 has the mark of the *per hez* or treasury, and agrees in the light standard.

5015 is of black steatite of Roman age, and therefore placed with late weights.

5028, 5046, 5049, 5095 are a set of four weights found together, and then completely cleaned, with full allowance for the scale removed. They serve to show exactly how much variation existed in a single set.

5034, 5044, 5080, 5086 all have loop handles on the top.

5068 is an octagonal barrel weight, with an eye at the end; through this is a ring of four-sided rod, thinned to the ends, which are coiled round each other in Egyptian fashion. It has been adjusted by adding three turns of strip copper, around the ring.

5094 is a very large bronze weight, which had a handle let in to the top of it, now lost.

letters *nun-tzaddi-pe*, and in English usage it may best be called *necef*, the vowels being unknown to us. The name may perhaps appear in Egypt as the *nusa*, see *P.S.B.A.*, 1892, 440. The Palestine weights yield 153.5, 154.3, 156.8 and 157.6 grains for the unit (excluding two damaged examples), the mean being 155.5.

On the Egyptian side, there is the literary evidence of $\frac{1}{9}$ of a qedet of gold being a unit of value at Karnak (*P.S.B.A.*, 1892, 440). The range of the qedet implies that this gold unit was between 153 and 169 grains. Thus it agrees with the *necef*. There is also the evidence in the inscriptions of Tehutmes III, that the irregular multiples of tribute stated in qedets, agree to regular multiples of a basis of about 160 grains. There are many other Asiatic examples of weights also on this basis (*Encyc. Brit.*, 80 grain standard).

The marked weights here catalogued vary in the multiple adopted for the unit.

No. 4045	398.1	marked 5	gives $\frac{1}{2}$	of 159.2
" 3939	38.5	" $\frac{1}{4}$	"	1 154.0
" 3962	154.9	" $\frac{1}{2}$	"	2 × 154.9
" 3927	307.5	" $\frac{1}{2}$	"	4 × 153.7
" 4071	40100	" 5	"	50 × 160.4

Thus the unit was taken as the Palestine unit of 154, or the half, or double or quadruple of it; the mina was of 50 *necef*.

35. *Delimitation.* The square weights are less than 1 per cent of the qedet, while they are 5 per cent of the *necef*. On looking at the distribution of these, there are but 4 in a range of four grains, from 148 to 152, followed by a close group of 5 in the space of 153.6 to 154.3; hence it seems that the division is between 152 and 153.6. The heavy weights also show a break, eight 40-deben weights ranging from 55,200 to 59,750 (= 138.0 to 151.7), and then ceasing; after which, the 500 daric weights run from 64,830 to 66,000 (= 129.65 to 132.0); in these, therefore, there is no example of 400 *necef*. On searching the curve of distribution between 152 and 153.6 it appears that the point of crossing of the qedet and the *necef* is at 152.4; and probably some qedet extend over 153, while some *necef* may begin at 151.5. Thus between 151.5 and 153.5 the separation of the weights must depend upon the forms. The *necef* was very commonly dome-topped, with the sharp edge of the xxvth dynasty style, like most of the qedet; but it was very rarely domed from the base upward, like

CHAPTER VII

THE NECEF STANDARD.

Pts. XXXVII-XXXVIII.

34. THIS standard was first found named in 1890, and by 1912 no less than six examples were known from Palestine bearing the name in early Hebrew (xxiii); five of these are single *necef*, and one is a quarter *necef*. The name is written with the

many of the qedet weights. As noted above, the square weights are five times more common in the necef than they are in the qedet. The limits of the necef and the khoirīnē will be noted under the latter.

36. *History.* On looking at the diagram (pl. I) of the distribution of these weights, arranged according to period, it appears that there were two standards somewhat separated at first. The lower is from 153.2 to 154.3, or 155.6 in a Cairo example; the upper is from 160 to 164.5. These two, which were quite separate in the square weights of the Old Kingdom, became spread nearer to each other at 157.0 and 159.7 in the xiith dynasty, and became almost unified in the xviiiith dynasty. A separation still existed in the xxiiiird dynasty between 156.9 and 160.8; and the Gezer weights show the same separation, being all of the lower standard in the xviiiith dynasty. The late weights of the Saite age are indicated by the number of each grain, and show a maximum at 154, and then a fairly steady dwindling down to 168. The history, therefore, seems to be that the unit of 154 grains was the early form, preserved in Palestine as 155 grains; that another unit of 163 grains existed in the Old Kingdom, which became confused with the 155 grain necef in the xviiiith dynasty, but was never unified with it, and while separate in the xxiiiird dynasty, was spread out by variation as a long and diffused extension of the 155 grain necef in the Saite age.

37. *Notes.* Regarding the various ambiguous examples which might be attributed to either the necef or the daric mina standard, we have already noted (under the daric) that in the higher multiples, up to 10 minas, the series ends with the range of the daric, and does not extend into the range where the necef is alone. This gives ground for attributing all such weights to the daric, and they are accordingly marked in the necef series with D prefixed, and given in full in the daric series.

Peculiar weights of this series which should be noted are no. 3914, 765.8 grains, with the *khent* sign on the top; no. 4045, 398.1 grains, a rough cone of alabaster with five holes marked on the base; and a red marble disc, no. 4101, 164.0 grains, with the Christian monogram on the top, probably the latest example of the necef. On the whole, there is not much of interest or peculiarity in the series, which is largely of the Saite age, as shown by the quantity of dome-topped weights like the qedets.

CHAPTER VIII

THE KHOIRĪNĒ STANDARD.

PL. XXXIX.

38. DURING recent years many weights have been found in Palestine bearing a sign, of which one example occurs in Egypt, see no. 5152, pl. xiii. This sign appears to be a monogram of *kh* and *o*, presumably the beginning of a name *kho*—. With this sign are various multiple numbers I, II, L, L, L, which, by the weights, have obviously the values 1, 2, 4 and 8; there is also a $\frac{1}{3}$ unit marked *bb*. The name will be considered further on.

Unfortunately there has not been any critical examination of the Palestine weights to determine their gain or loss. It is not possible therefore to come to any exact conclusion as to their mean value, or range of variation. It may be said that the stated range of the *kho* series (omitting one extreme instance) is from 173.6 to 179.4, with a mean value of about 177.5 grains.

The number of weights which appear to belong to this standard in Egypt is less than that of any other standard; there are barely 150 in this collection. Of these, only three of stone are marked with numerals; (4230) of 362.7 grains is 2×181.3 ; (4149) of 1710.0 is 5×342 , the double of 171; and (4253) of 36976 is 10 of 3698, or 200 of 184.9. One of bronze 5152 has the monogram XO, and is 2 of 189 grains.

39. There is an interesting group of five cowry shells carved in grey syenite, evidently all from one source, though bought singly. The largest weighs 4 of the next one, and that double of the next, and these are respectively 2, $\frac{1}{2}$ and $\frac{1}{4}$ khoirīnē; the others agree to $\frac{3}{10}$ khoirīnē. See pl. xvi.

No. 4248 (ix)	368.0 grs.	2	$\times 184.0$
" 4214	89.8 "	$\frac{1}{2}$	$\times 179.6$
" 4217 A	45.0 "	$\frac{1}{4}$	$\times 180.0$
" 4205 A	53.6 "	$\frac{3}{10}$	$\times 178.7$
" 4196	53.3 "	$\frac{3}{10}$	$\times 177.7$

No other weights cut in the form of a cowry shell occur in the whole collection. These are marked on the diagram, pl. I, by \odot along the top of the khoirīnē series. See pl. xvi.

Turning next to the name, the cowry was named by the Greeks *khoirīnē*, as Prof. D'Arcy Thompson has kindly informed me; his notes on the subject are added here as an appendix. This name seems at once to give the source of the monogram *kho*

found upon the weights. The *khoirinē* shell was very familiar to the Greeks, as it was that used in balloting. May it not be then that these shells were used for rough weights? To any one familiar with the broken brickbats, chunks of stone, scraps of China plates, and many other casual masses which are common as weights in Oriental markets, a lot of apparently uniform shells will seem respectable as weights. Through the kindness of Dr. Bather, my enquiry about Aegean cowries has been answered by Mr. Cosmo Melvill, who states that a specimen of *Cypraea lurida* weighs 214 grains, and *C. spurca* and *physis* about 120 or 130 grains. Dr. Harmer further states that *C. lurida* from Cape Verde Islands is 200 grains, and from St. Helena is 142 grains. There is, then, no improbability in a growth averaging about 180 grains having been found in the Mediterranean; or the standard may be older than the use of the shell, and examples chosen which agreed with it. We may thus fairly link together the *khoirinē* shell, the artificial cowries of syenite, and the weights marked *kho*.

Delimitation. The break between the *necef* and the *khoirinē* is shown in the simplest way by the single unit stone weights. Of these there are 35 of the *necef* between 152.4 and 167.9; after that an entire break, and then 14 of the *khoirinē* between 172.4 and 185.2. Looking at the whole series, 168 grains is the point which best divides the standards.

40. *History.* On mapping the distribution of these weights according to age (pl. ii), there appear two groups. An example at 171.0 in the Old Kingdom (with marked numerals) appears to be the parent form of two in the xviiith dynasty, of the same value, and 172.7. On the other hand, the great mass of examples begins with 185.0 to 187.4 grains, and spreads out in the xith dynasty to 176.5 to 188.5, and to 176.1 to 190.0 in the xviith dynasty. By the xxiiird dynasty, examples appear, fusing together the two groups; and in the xxvth dynasty there is an almost continuous variation centering mainly about 176, but tailing off to 190. This is the foundation of the Palestine group with marks, centering on 177.5. The Gezer weights of the xviiith dynasty show the division as in Egypt at that date, between 172 and 177.6; but the later weights agree with the fusion of varieties seen in Egypt. This history of the standard, thus traced by the forms of the weights, is a warning against accepting any late group, such as the Palestine

marked weights, as a basis for discussing the origin of weights.

41. *Notes.* The value shown by the cowries is marked along the top of the diagram. One remarkable weight should be noted, no. 4254. This jasper weight of king Khety of the ixth dynasty (xi, 4466) bears on the end of it, apart from the inscription, the numeral 9. It is very unlikely that this was the original intention for the weight, but, like many other numerals, it has been added to show the value by a fresh standard. Unfortunately, fractures have destroyed the accuracy of this weight, but it was originally about 1850 grains, or 10 *khoirinai*, and it thus shows that we are justified in tracing the *khoirinē* back to the Old Kingdom. The weight has been converted into 9 of the gold standard or beqa. The first weight on the list, no. 4141, is very low, and would not be placed to this standard, were not its form like that of no. 4220, and its material, amazonite, like that of no. 4231. The cowroid forms, nos. 4142, 4231, agree with the syenite cowries, and the *khoirinē* connection of this standard.

CHAPTER IX

THE BEQA STANDARD.

PLS. XL—XLI.

42. THIS standard has been recognised in Egypt during the last twenty years, and commonly called the gold standard, as the weights often have the hieroglyph of gold upon them. As there are here as many as 24 examples bearing numerals, it is scarcely requisite to extract them from the catalogue, in which they are all marked. The range of variation of these marked weights is from 189.7 to 215.2 grains for the unit.

In other collections several examples occur of weights of this standard with royal names and numerals, which are entered in the diagram. The weight of Khufu of 2060 grains, gives 206.0 for the unit. That of Senusert I is 4 units of 213.0. Of Amenemhet III there is a weight of 4 units of 196.1. In the xviiith dynasty is a weight of Amenemhet I giving 5 units of 207.6, and one of Tetutmes III giving 6 units of 197.1. A weight which is probably of the Old Kingdom, by the name, Ampy Ptah-ne-kau, gives 10 units of 218.8; but this is higher than any other marked weight, and probably belongs to the sela, the so-called Phoenician standard. Thus weights which by the royal

names were probably more accurate than usual, vary from 196.1 to 213.0, without any regular order of changes.

The name of this standard is given by three marked weights found in Palestine (xxiii), each with the word *beth-qof-ayn*, spelling beq'a. These weights are of 90.6, 94.3, and 102.6 grains, the half of a 181 to 205 grain unit. This standard was used in the earliest Hebrew literature, as it is named as the weight of the gold ring given to Rebekah, and the poll tax stated in Exodus xxxviii, 26. This is evidently half of the Egyptian gold standard, and there is no reason for forcing it into any supposed relation to the Hebrew shekel of any period. The double unit, like the Egyptian, is indicated in Palestine by a small weight in the form of a tortoise, marked 5 or $\frac{1}{5}$; as it weighs only 38.6 grains, it must be $\frac{1}{5}$ of 193 grains.

43. *Delimitation.* The lowest value shown by a weight (4299) marked *nub* "gold," is 189.7 grains. The barrel form which is often seen in all other standards (especially in the daric) is entirely absent from the beqa, there being no barrel weights of a unit between 191.7 and 218.4 grains. Other forms of the beqa exist, but are not found in its lighter variations, so that there is a wide gap between the higher khoirīnē and the lower beqa weights. Thus, there are no examples between the following values of the unit:—

Duck weights to 188, none to 199.1
 Domed " up to 190, " to 199.9
 Rounded " up to 191.7, " to 199.6

Looking at all the examples about the critical range, it seems that 188.0 may be accepted as the best dividing point, with a few of each family crossing this division.

44. *History.* The history of this standard (pl. ii) begins earlier than that of any other. Six of the prehistoric graves at Naqada each contained one block of limestone, of some form which had no parallel among working tools (vi, 456, 458; viii, 881, 883). The list of these, and three similar blocks of unknown source, is as follows:—

No.	Grave	Sequence date	Weight	Unit	Form
3175	461	40-61	2785	$\div 15 = 185.7$ or $\div 20 = 139.2$	913
4296	B. 107	33	5676	$\div 30 = 189.2$	881
4321	1773	31-41	7694	$\div 40 = 192.3$	881
4332	?	?	1163.6	$\div 6 = 194.0$	456

No.	Grave	Sequence date	Weight	Unit	Form
4358	1873	46	589.7	$\div 3 = 196.6$	646
			790.0	$\div 5 = 197.5$	A
4392	1866	43	3996.6	$\div 20 = 199.8$	456
			418.4	$\div 2 = 209.2$	B
4543	1563	32	4224.5	$\div 20 = 211.2$	883
4553	?	?	2180.2	$\div 10 = 218.0$	458
4555	?	?	118.0	$\div \frac{1}{2} = 236.0$	456

Three of these (4296, 4321, 4543) are cylinders with rounded ends (forms 881, 883); three (4332, 4392, 4555) are domes with rounded bases (form 456); only one weight (4358) is of the bulgy square form (646) usual in the Old Kingdom. Two are of unusual forms, A a porphyry turtle, B a porphyry cylinder; as the forms are not characteristic of weights, they are left here unnumbered. The cylinders with rounded ends are the earliest, being of S.D. 32, 33, and between 31 and 41, all therefore of the Amratian prehistoric civilisation. To the Gerzean civilisation belongs the dome with rounded base (4392) S.D. 43, and the bulgy square (4358) S.D. 46. As regards the standard, all but two of these are simple multiples of a unit between 188.7 and 211.2 grains, agreeing closely with the limits of the beqa in dynastic times. The multiples 3, 6, 15, and 30 show strongly a triple form. This triple multiple would bring it into relation with the later qedet, 3 of the lower family of the beqa being equal to 4 qedet: this relation may account for the frequency of 40 qedet weights (= 30 beqa) and $\frac{1}{3}$ qedet (= $\frac{1}{4}$ beqa) in later times. But though the first may be the qedet, one could not ascribe all the above examples to the qedet, for multiples of $13\frac{1}{3}$ and $26\frac{2}{3}$ would be quite unlikely. It might be supposed that the prehistoric Egyptians had not reached the art of weighing; but their high mechanical ability, and the presence here of a small balance beam, of a red limestone which is peculiar to prehistoric times, give ground for crediting the above blocks as being weights.

At the beginning of the 1st dynasty, conical weights were used; two of these were found at Tarkhan (4352, 4363; viii, 9, 156), as noted under the qedet; they are of 980.0 and 985.0 and appear to be 5 beqa of 196.0 and 197.0 grains. Of about the same age is the gold bar of Aha, weighing 216 grains, which can scarcely be unconnected with the gold standard (*Royal Tombs*, II, 21).

In the Old Kingdom, the lower standard is the more compact, 196 to 202. The higher standard

spreads out from 206 to 213.5; and the extreme amounts are the important examples, above mentioned, which are likely to be standards, one the gold bar with the name of Aha, the other the fine weight with the cartouche of Khufu. Intermediate examples show that these are not isolated values, nor due to casual error. It will be seen on pl. ii that the heavier group continued to extend toward the lighter, the ixth dynasty weight of Khety, and the second marking (4445) of weight (4507) 208.7, coming below the Khufu standard. The weight of Khety, however, must not be taken as exact, for the marking of 9 upon it, as before said, is probably only a secondary assignment of the 10 khorinē weight.

In the xiith dynasty, the range is wider in the low standard, 188 to 202.1, and the high standard is also widely spread from 204.4 to 215.2, but not quite reaching the Aha weight. In the xviiiith dynasty, the gap between the upper and lower standards is even wider than before (201 to 205.5), and there are royal weights in both, as before. It is not till the debasement of the xxiiiird dynasty that the two standards are finally confused. The Gezer weights of this period and earlier, are eight of the low standard, and only one of the high; this points to the low standard being Syrian.

Amid this wide inaccuracy and duplication of standard it should be observed how several important weights agree on 196–197, the Ist dynasty cones, the splendid weight of Herfu, that of Amenemhet III and later of Tehutmes III. These seem to mark a definite standard amid the wide range of 188 to 202 grains.

45. *Notes.* This standard is one of the most interesting on account of the many marked and dated examples, and the fine forms often occurring. The most beautiful weight in the collection is the large one, pl. vii, type 694, of light green veined marble (4355), in perfect condition and polish, made for the "Hereditary prince, royal seal bearer, sole companion, keeper of the seal, Herfu, living again." Unfortunately the locality of this is unknown, as I bought it from Aly Araby; see a scarab of Herfu in the Louvre, Salle des Dieux (*P.H.S.*, 444). Other weights of the same form bear the sign of gold, and numerals (4416, 4547). Two weights of the Old Kingdom (4455, 4507), much rounded, with finely cut numerals, are of a beautiful red-veined limestone, which I have not seen elsewhere; these are from Quft (pl. xi). Another Old Kingdom weight

(4399), now much broken, must have been splendid when originally made, as it is of fawn-coloured chert, well rounded and polished (pl. xi). A pleasing series of weights are those of haematite from Tyre, of truncated cone form (viii, 893), nos. 4360, 4382, 4388. They agree closely in a mean standard of 199.2, varying less than 0.2 grain from it. Two curious weights of white marble from the temple of Byblos (4325, 4385), bear a pair of breasts on the top, in one instance united by a cross handle. They vary somewhat in unit, and the lighter might equally well be 5 minas of the daric; but the heavier one is beyond the range of the daric, and so both probably belong to the beqa in its later character as the Aeginetan standard, of which these weights equal 4 minas. Similar weights in the collections are from Syria and Knidos, and belong to different standards.

A rather irregular series of unusual form are the sharp-edged discs nos. 4365, 4439, 4488 A, 4517, 4544, 4554. They have, all but one, been worked out of thin veins of quartz, varying in colour from white to yellow, pink, and brown. Two of the six are known to come from Quft, and from the similarity of material and form they were doubtless all made there. The average unit of these is 208.4 (mean diff. 5.6), and hence they belong to the higher standard. Four other weights from Quft average 206.4, and it seems therefore that the high standard is south Egyptian.

The Golenicheff weight of 2025 is probably 10 beqa, though marked 8 for the double daric system (*Rev. Eg.*, 1881, 177).

CHAPTER X

THE SELA STANDARD.

PL. XLII.

46. THIS is a very well known standard of weight, usually called the Phoenician or Alexandrian. As we have used the original or specific names of the other standards, instead of local names, it is desirable to use one of the ancient names here. The shekel is only a general term, and the sole distinctive name is sela, which was the later Jewish name of this shekel. As S is already appropriated to stater, the second letter L will be used for *sela*.

The marked weights here are:—

3*

No.	Grains	Mark	Unit	Period
4590	8570	÷ 20 =	428.5	XII
4593	429.4	÷ 2 =	214.7	VI
4612	432.4	÷ 2 =	216.2	VI
4626	1303.6	÷ 3 =	434.8	XXVI
4665	882.4	÷ 4 =	220.6	Ro.
4669	3534.4	÷ 8 =	441.8	Ro.
4688	8900	÷ 20 =	445.0	XII

It appears therefore that the double unit of over 400 grains, as well as the single unit, belong to both early and late times.

47. *Delimitation.* The nub-marked weights of the beqa extend up to 215 grains. The good domed weights are entirely absent between 1592.8 (the necef) and 2192.4 (the sela), so the khoirînē and the beqa were omitted. In the larger weights, of rather over 4000 grains, there occur clear gaps in the series. Thus in the cuboid weights there are 5 between 207.8 and 209.8 of beqa unit, and then a gap to 11 between 213.8 and 226.3 of sela unit. Similarly in the roughly rounded weights there are 6 between 199.7 and 209.6 of beqa unit, a gap, and then 7 between 215.1 and 227.5 of sela unit. These various limits indicate that the beqa usually ceases at 210 (though four marked ones are known above that, up to 215); and the sela begins about 214. Looking at the whole series, probably 210 grains may be accepted as the best division, as there are special reasons of form and material for any exceptions on either side which cross that limit. The boundary between the peyem and the sela was dealt with under the former standard.

48. *History* (pl. ii). This standard begins in the 1st dynasty, with a block of porous basalt, weighing 438.9 grains; from the tomb with the name of a queen Sma-nebui, apparently about the time of Mena. This falls in the middle of the range of Old Kingdom weights, which show a unit from 214.7 to 227.0. In the xiith dynasty, the examples were rather more scattered. In the xviii dynasty, the middle values became commoner, about 218; and these increased still more in the xxiii dynasty. The Maccabean shekel was 220 grains. The Gezer weights of late periods show much the same variability.

49. *Notes.* As a whole, this standard is marked by the large proportion of irregularly formed weights, more than a quarter of the whole; while fewer dome-topped weights of the regular Egyptian form appear than in any other standard. Barrel weights are scarce, and there is but a single duck

weight. A peculiar form is the half of a thick disc; one of these (no. 4714) has an inscription on the edge (pl. vii, 701), of the "Hereditary prince, purifier in the temple of Ptah, sam priest, high priest of Memphis, Hora." Several unusual forms occur in this standard, such as no. 4579, a roughly cut ram in limestone; no. 4626, a wolf's head in basalt; no. 4719, a duck's head; no. 4697, a large rectangular marble weight with the figure of a man on the top, from the Lebanon; no. 4716, a triangular prism (viii, 874), apparently of jade, with the name of Ptah finely cut on the end; no. 4557, a curious lump of haematite; and, above all, the finely inscribed weight (pl. vi, 656) of Nefer-maot, no. 4740, certainly of the early ivth dynasty.

A weight at Berlin has upon it "copper 15"; as it weighs 6343 grains, it shows a unit of 423 grains, or twice 211.5, which is evidently this standard. There is here the wolf's head (4626) weight marked *gamma*, 3, showing a unit of 434 grains, which accords with a triple multiple of this standard. But it seems possible that both of these are remarked, and were originally 50 darics of 126.9 and 10 darics of 130.4. The weight of Ampy Ptah-ne-kau at Berlin, inscribed "deben 10" is 2188 grains, and the unit of 218.8 agrees much better with the sela than with the beqa.

50. The values which we have found for the original units, (before their fusion formed the standards known historically), are the material necessary in any search for an original connection between them. Many theories exist of one unit being formed by multiples or fractions of another; the original bases of any unit are the quantities involved, and it is useless to compare the vague values made in times long after a unit originated.

The following are, then, the amounts which have to be considered in any theories of derivation of standards, and the equivalent cubic inches of water.

	Grains	Mina	Cub. ins.	Grammes
peyem	116	5800	23.0	7.5
	121	6050	24.0	7.8
	124	6200	24.6	8.0
daric	127.5	7650	30.3	8.25
	131.5	7900	31.3	8.5
stater	134.5	6725	26.7	8.7
qedet	145	7250	28.8	9.4
necef	154.5	7725	30.7	10.0
	162	8100	32.1	10.5

	Grains	Mina	Cub. ins.	Grammes
khourinē	171	8550	34.0	11.05
	185	9250	36.7	11.95
beqa	196	9800	38.9	12.7
	210	10500	41.7	13.6
sela	220	5500	21.8	14.25

One of the widest uncertainties in the later state of the standards is in the similarity of 6 darics, 5 necef, and 4 beqa. On referring to the original components, and multiplying them as above, the results are:—

daric	necef	beqa
765	772	784
790	810	840

Thus none of the original components are alike, and the resemblances of later forms are merely casual.

Another possible connection is that 5 peyem are 4 qedets. This is by the qedet 580, and by the lowest component of the peyem also 580. Both of these are at least as old as the ivth dynasty, and probably the qedet is of the Ist dynasty or earlier. The scantiness of early material leaves the direction of derivation uncertain.

The lower khourinē seems to be the source of the late Persian 86-grain unit, which has hitherto been taken as derived through a silver weight equal in value to a gold standard. This implies that the khourinē is $1\frac{1}{3}$ darics. By the daric, this would give 170 and 175.3; the khourinē is 171 and 185. Looking at the diagrams, pl. i, ii, it is unlikely that the primitive daric should be 128.25, or the khourinē 170. Thus the question remaining is whether the Persian unit is derived from $1\frac{1}{3}$ daric or from the khourinē; the data are too scanty and diverse for the settlement of this. Other supposed relations of weights may require to be tested, and the original standards are the only source for proving any derivations.

In the table above, the mina of each unit is stated, and the equivalent volume of water in cubic inches. This is required for testing possible connection of weight and water volume, which seems probable in several cases.

CHAPTER XI

WEIGHTS FOUND AT GEZER.

51. THESE weights are all published in Prof. MACALISTER's report, and are here reduced to

grains (in pl. xlix) in order to compare with the Egyptian weights. After the classifying of the previous weights, there is little question about the attribution of these, except that a few of the smallest, of which the fraction is doubtful, are omitted here. There are five periods distinguished in the publication; but as there is no clear line between the first and second they are both marked here as 1, including all down to the end of the xviiiith dynasty, 1330 B.C. Class 2 comes down to 800 B.C.; class 3 from 800 to 550; class 4 550 to 100 B.C. The few names that occur on these are not always satisfactory. The beqa 94.3 is very low, but is vouched as such, by the name on it. The peyem 112.2 is also very low, but likewise is named. The khourinē weights marked as such, with the multiple in italics in the list, are all well in their group. A weight with the name necef on it, however, is only of 143.2, obviously a qedet, 10 grains too light for the lightest necef; probably it was a necef ground down, or made as a qedet, and then marked necef by accident or fraud. The whole question of loss and alteration is unstated, and may easily increase many of these.

The relative numbers in each standard, and each period, are here given, reduced to percentages of the total (230).

Period	1	2	3	4	all
peyem	1	1	3	4	9
daric	3	—	3	2	8
stater	1	2	1	2	6
qedet	5	7	5	13	30
necef	3	2	3	2	10
khourinē	3	3	4	8	18
beqa	1	3	2	5	11
sela	1	2	2	3	8
Each period	18	20	23	39	100

The qedet greatly preponderate in every period. Next to that the khourinē; and it is strange how the three least usual units are what might be expected to prove the commonest, the well-known daric, stater or Attic, and sela or Phoenician. Looking at the different periods, the peyem increases in later time, the daric loses ground, the stater is not at all increased by the Greek influence, the qedet gains largely as well as the khourinē. These changes are instructive as they are not at all what might have been expected. It is as clear here, as it is in Egypt, that all of these units were in use as early as the xviiiith dynasty.

The comparison of these with the Egyptian weights has already been stated in the account of each standard.

CHAPTER XII

THE METAL WEIGHTS.

52. AS the purpose of studying the stone weights was the recovery of the original standards, and tracing their changes, it was needful to exclude the metal weights which have almost always undergone alteration. The metal weights, also, are mainly of later period than those of stone. Metal was rarely used for weights before the Greek period; and after it came into use, stone weights are only a minority, except for large sizes where metal would be expensive. The difference of period is so marked that a few stone weights of late age are included here in the metal group. Metal has usually both lost and gained in weight. The loss is by wear, by solution of compounds, and, especially on bronze weights, by scaling of compounds; the gain is by the oxygen and carbonic acid locked up in the compounds, for nearly half the weight of green carbonate of copper is gain from the air. The uncertainty in estimating the changes, obliterates the value of a weight for precise enquiries; but it generally leaves the weight of some value in coarser grouping, and only in few cases does it render uncertain the attribution of a weight to a standard. In comparing several estimates, made thirty years apart, there was found an average difference of 1 grain on a total change of $2\frac{1}{2}$ grains.

53. The considerations in the treatment of metal weights are different from those regarding stone weights. Owing to the late date, there is no question as to original values of standards, all those were long past; nor is there any historical difference to be taken into account, so far as we know. The use of metals in coinage has led to a depreciation of the standard in most cases, quite different from the casual variations before the influence of coinage; different types of one standard came into use, for trade and for coinage, as in the Attic and Roman systems,—stater and uncia. The use of coinage also led to fresh divisions, such as the drachma rather than the stater (Attic) or the shekel (sela); also to fresh subdivisions, as the twelfth of the stater (Attic). The ranges of variation became wider than before; the marked nomisma, or sixth of the uncia, is found from 59.6 to 73 grains, im-

plying a libra from 4300 to 5260 grains. In view of this vagueness and of the balance errors affecting very small weights, we must not hesitate at granting a much wider range to these little weights of the Attic system than is due to the early stater system; the uniform style of little square leaden weights from 57 to 74 for the drachma belong rather to the common Attic system widely in error, than to the daric, peyem, and qedet which occupied those limits in earlier times. Hence all the practical considerations of study in the great trading, coining, cosmopolitan age of the Roman Empire, must be widely different from those which have led us back to the isolated conditions of the origins of local standards.

In this late section there are many weights from Syria and Asia Minor; but as trade was so general in the Graeco-Roman age, it is not unsuitable to take together all the eastern weights. I owe all these Greek weights, and some of the Egyptian examples, to the zeal of my old friend the Rev. Greville Chester, whose collecting tours, down to his death in 1892, were a means of saving a great quantity of antiquities from ignorant destruction and loss.

A class of very small bronze weights here has been kept apart from the other metal weights, for two reasons. First, they are so small that the uncertainties of original balance error, and of corrosion, make it only just possible to class them aright, without any hope of their giving help in defining the standards. Second, they are nearly all from Defenneh, from the early Greek goldsmiths' workshops, and thus dated between 660 and 560 B.C. Their only value, therefore, is in showing what standards were used in the jewellery trade at one place and in one century.

54. In studying metal weights it is necessary to make allowance for the changes which they have undergone. The principles of this, and a table of the allowances needed for various corrosion, I published in *Naukratis*, I, pp. 70-71, in 1886. All the weights reported here have had changes estimated; and, as most have both gained and lost, the sum of the changes is entered in the list, to show how far the result is uncertain. The estimation of change must always be vague, in fact the only satisfactory material would be entirely uncleaned weights, reduced to a metallic state by chemical means. The main use of examination is to reject from the series such weights as have undergone

large changes. In the diagram of results, none are included which have more than two *per cent* of total change, and these results may there be fairly trusted to about one *per cent*.

In the diagram of metal weights, pl. ii, there are short curved lines below the row of marks showing the unit of weight. These lines show the *maxima* \frown , and the *minima* \smile of the distribution of the stone weights. The details of references to other sources will be described below, under each standard. In the following notes, numbers with star * are shown on pl. ix frontispiece.

55. PEYEM, xliii. A notable group here is of three square weights (pl. xii, 4747, 4751, 4764) with an anchor in relief, the Seleucidan emblem. These must be presumed to belong to one standard. That of 3503 grains, if halved (1751), is near 1816.; and the ratio to 4570 is as 3 : 4; the proportion between these is then 3 : 6 : 8, on a basis of about 570 to 605 grains. As this is Syrian, we cannot refer the base to 4 qedets, and as the multiples are by 3, the base cannot be 3 Aeginetan or beqa, as 9 and 18 are very unlikely in that system. This limits these to being 15, 30 and 40 peyem, and as that unit is well known in Syria, this is the more probable. The bronze weight bears the name of Papios in relief (pl. xii). The disc of bronze (4773) from Tartus, of 495 grains, with *tzo* in Phoenician, may refer to *tzo* small, as being the small division of a unit. The usual heavy weight is 400 peyem, and this weight would be a hundredth of that. There are only two animal weights, calf and frog, of this standard, 4749,* 4775.*

56. DARIC, xliii. The best known form for this standard is the Assyrian lion weight. There are here two fine examples of 2610 and 2635 grains, quite uninjured; one lion (4848)* is of the raging Assyrian style, the other (4841)* of the bourgeois Babylonian type (pl. ix). They agree with the high group of the standard (marked L in diagram), while the great lion weights centre on 127.2 (marked here AL) which is the low standard, and none of them reach 130 grains, unfortunately the amount of cleaning is not stated (see *Rev. Eg.*, ii, 174-176). No. 4782 is from Magnesia ad Sipylum; it is credited here to the daric, as there is no evidence of the peyem as far west as Lydia. The same may be said of no. 4783* from Ephesos, with heads of Severus and Caracalla. The small couchant lion, no. 4788,* has a ring on the back, a miniature of the Assyrian lions. The thick disc of lead with a

handle, no. 4789,* has in raised letters cast on it LPM α TOYP. This probably refers to its issue by a Roman governor at Tyre, like no. 5158 issued by a governor at Berytus. The only known family name to agree with these initials is Lucius Pomponius Molo, who was in the mint at Rome in 94 B.C. The weight from Lachish, no. 4799, is a square of sheet lead, stamped at each corner with a die (pl. xii) from the gold stater of Philip II, which gives its period. The large weight no. 4800, from Ephesos, with a tripod in relief, is of the same group as the other triangular lead weight from Ephesos, no. 4840.

A square bronze weight, xliii, no. 4806, has deeply incised letters on it, EM \perp ; \perp is known by the khoirinē series to be = 8, and an eighth of this agrees with the daric. On the other side it bears K, which may mean 20 drachms of the sela. On a brown serpentine weight no. 4821, Π is evidently for πεντε, five shekels. Another marked weight in the same material has B, referring to the double shekel, no. 4856. A rectangular bronze weight, no. 4849, bears a thunderbolt in relief on the top, and, incised below, a bull of curious disjointed style. By these types it is probably Seleucidan.

The distribution in the diagram, pl. ii, shows a clear gap at the same point as in the stone series, 129 grains. As this is the value of the daric coinage, it seems that the coinage had no influence on a standard value, but the weights continued to be copied from the trade standards. This unit had a wide range in the Greek world, being the regular standard of the earliest coinage of Asia Minor,—Cyzicus, Lampsacus, &c.—as well as of Corinth and early Magna Graecia, before it became modified to suit the Attic system.

57. STATER (Attic) xliii. In this system, the reduction to a unit is here continued on the stater basis, for convenience of comparison with the stone weights. But the actual numeration marked on the weights is nearly always on the drachma, or half-stater basis, and the divisors would be simpler on this drachma value. This was not so originally, as the two marked weights of early times show the stater basis.

The most usual class of this Attic standard are the small square leaden weights, the commonest of all in Greek times. The weights with two and three dots (4860, 4868) prove the usual division of the drachma into six obols. Among the animal weights, the "flat bull head" (4925)* of Greek work,

is in front view, and is flat on the back. The "bull head, Amarna" (4939)* is an all-round figure of purely Egyptian work of the xviiith dynasty. The haematite wolf head, or fox head (4938)*, is probably prehistoric Greek. The Asklepios weight (4946)* is a square of sheet lead, bearing an oval stamp in which is a figure of Asklepios. The weight no. 4964 apparently represents a flat seed; it is the only trace of the principle of the seed-weight, so essential in India and China. The distribution diagram, pl. ii, shows that the majority conform to the trade value of the Attic standard, and that the coinage value has had very little effect on the weights; the number agreeing with the coins is only what might be expected as a lower extension, like the upper extension, of the trade value.

58. QEDET, xlv. This is an almost entirely Egyptian standard; at Gezer, about a quarter of the weights agree with it, but it is rare in Syria, and unknown in the Greek series. The metal weights, by their forms, are nearly all distinctly Egyptian. There is only the figure of a dove, no. 5050*, which could be accounted as Greek work. The bull's head from Gurob, no. 5030, is in the round; the flat bull's head, no. 5073*, is of the form usual in foundation deposits. No. 5044, though stated as found in the tomb of Den, is apparently of late date; it has had a handle broken off, and is much battered, so, if really found there, it was probably dropped recently by a native. In the distribution diagram, pl. ii, it appears that the most usual values are 142-144 and 149-151. There is no prominence of the low 140 grain value. For other notes on these, see the qedet stone series, sect. 33.

59. NECEF, xlv. The first example (5096) is placed here, instead of with the qedet, as it resembles no. 5113 which is clearly the necef. In the higher values there are many animal weights; altogether, 23 per cent are animal weights, while there are only 4 per cent of these in the qedets. The distribution is much scattered, and shows no relation to the ranges of stone weights. This was the Greek system in eastern Asia Minor, and probably native to North Syria and the Hittites. It was also one of the systems later called "Alexandrian." The iron weight (5116) is the only one of that metal here.

60. KHOIRINE, xlv. There is sufficient gap between the last group and this to distinguish the beginning; and at the end is a marked weight (5152) certainly of this standard. Possibly some of the lighter beqa (or Aeginetan) weights which

follow, really belong here. The proportion of animal weights is as in the necef. The distribution of these has no relation to the grouping of the stone weights. This system was well-known in Asia Minor, used for the silver coinage of Phocaea, and passed on to Massilia.

61. BEQA (Aeginetan), xlv. One of the lowest examples of this (5154)* is so assigned because of the form of a tortoise, the type of Aegina. Another tortoise weight is no. 5186*. In Greek times the drachma, or half-stater, was the unit, and hence all these numbers of multiples should be doubled, which renders them much smoother, 3 and 5 and 150, in place of $1\frac{1}{2}$ and $2\frac{1}{2}$ and 75, also $\frac{1}{4}$ and $\frac{3}{8}$ in place of $\frac{1}{8}$ and $\frac{3}{16}$. The double drachma is kept here in order to compare it with the beqa or *nub* weights of earlier ages. No. 5158 records the name of Licinius Cnaeus, perhaps born in the joint censorship of L. Licinius and Cnaeus Domitius, 92 B.C. He appears to have been governor of Berytus. A group of weights with a head of a ram or lamb, probably belong together; they are nos. 5163*, 5169*, 5195*, of 3, 5 and $1\frac{1}{2}$ drachms, all cast in open moulds. These are probably of Phokis, as the ram's head is on the coins of Delphi with the Aeginetan standard. The heart shape, no. 5178*, is of Egyptian style. The little discs of calcite from Ephesos (5180, 5188, 5193) are of $\frac{1}{4}$ and $\frac{3}{8}$ of a drachma. An unusual type here is the square with concave sides, type 614; three here, nos. 5162, 5177, 5185, are of 10 obols, 5 and 150 drachms, which seem peculiar to this system.

The distribution of these weights shows no relation to that of the earlier beqa standard; but they closely conform to the usual range of the coinage, and the variation of the Aeginetan trade standard of Greek times.

62. SELA (Phoenician), xlvi. The most distinct series of this unit is that of the thin weights of cast lead, with a raised border and a letter-numeral, belonging to Berytus and Marathus, type 612. The similarity of the eight listed here (xiii, 5205-5208, 5228, 5237, 5273, 5275) is the ground for placing so low a unit as 197 grains (no. 5205) to this system. There is however as low a variant in a series of disc weights from Carthage (197 to 234 grains) which must belong to this standard. A large example is the pan-shaped weight with ribbed inside, no. 5214, which gives a mina of 60 sela; such a multiple is supported by xiii, nos. 5218, which is marked LIII, *librae tria*, showing a libra in Roman

times of 20 sela, and the use of a weight of 60 sela. Two Egyptian examples from Memphis are curious, roughly carved as a lion and ram, xvi 5215, 5230. No. 5235, xiii, bears *sigma* upon it, probably for *siglos*. The numeral 5 on no. 5243 is doubtless placed for a fifth of the sela. Among the animal weights that of the calf, no. 5253*, is unusual for the size and good work; it is a *cire perdue* casting, filled up with lead. The two weights from Cyprus are alike, nos. 5256, 5257, but clearly not double one of the other: the only relation is 25 to 12, and this would be 25 and 12 drachmae of the sela. In these, and many other instances, the multiples show that the drachm of $\frac{1}{4}$ sela was the unit regarded rather than the whole sela. A fine series was found at Tell Amarna (xiii, 5276–5281), dated to Roman times by a variegated glass whorl found with it. These six weights of lead are in good condition, not deeply corroded, and without any loss, each plainly marked. The details of them are given at the end of the list of the sela (xlvi), and the mean value entered in the list (5267). The mean variation and balance error is under five grains. In the diagram, the mean is a thick stroke, with a bracket over it showing the extent of variation. It is an unusually high value of the sela, suggesting that it may have been modified to agree with the weight of the denarius some time in the second century. In the diagram, the distribution centres on the group of earlier weights, and the rather lower value of the Ptolemaic coinage does not seem to have lowered the average.

63. UNGIA, xlvi. This Roman system does not appear in the earlier stone weights; and only a few stone ones are here, all of the regular Roman form. The standard of the libra was probably derived from the Aeginetan system, the descendant of the beqa; but being divided in Italy into 12 unciae, and these into six sextulae or nomismata (= solidus coin), and these again into 24 siliquae, this duodecimal series entirely broke the resemblance to the Aeginetan system.

The first three and last of the list stand so far apart from any other examples, that they are clearly fraudulent. The rest form so connected a series, that they must be granted to vary to the outrageous amount of a tenth of the whole; being marked weights there is no denying this irregularity. The usual marks on them are Λ for libra; Γ for uncia, uncia; N for nomisma or solidus; with the usual letter-numerals. The marks are often placed in a

wreath with a cross between them, sometimes in an archway supported by twisted pillars (xiv, xv, 5323, 5378). The peculiar types are noticed, in order. The reason for the abundance of these weights was the fixing of the solidus under Diocletian at 72 to the libra, or 6 to the uncia, at which it was long maintained; also the custom of weighing all gold in payments, which kept up its weight for coinage, but required weights on all occasions of purchase. No. 5293, xiv, has the *khirho* monogram inlaid with silver, which is very rare on weights; there are no others here, or in the British Museum. The weights which have been cleaned are inserted here at their present amount, and they have probably lost but little; + x is placed in the column of original weight to show that they are not complete. There are six official weights in the list, which should be noted together. No. 5296, xiv, xvi has on one side three busts with the letters KHT, evidently intended for Konstantinos IV (Pogonatos) with his brothers Heraklios and Tiberios, and therefore between 668 and 674 A.D. On the reverse is a female figure holding a balance. No. 5297 is a square weight with the head of Honorius inscribed D.N. HONORIUS and on the reverse a female figure holding a balance and EXAGIVM SOLIDI. This is too much worn to prove the original amount, so it is entered at the weight stated by Cohen. No. 5320 is inscribed Δ KEON, as being an exact standard. No. 5341 has two busts in relief, stamped in thin sheet copper, and then soldered on to a square weight with flat faces. 5332 A is of the same type, but solid. No. 5386 has three busts incised upon it, and is probably of the period 668–674 A.D. like no. 5296; the weight shows it to be for the double triens, or $\frac{2}{3}$ of the solidus.

Nos. 5300, 5369, 5371, were all together in a box for scales, but have no other connection. No. 5301 is a pan weight intended to hold a nest of fractions, such as was usual a couple of centuries ago. 5303 is marked *sigma* for the *semi uncia*. 5326, 5346, 5393 are marked IB for 12 *scripulae*. 5312 is marked H for 8 *siliquae*. 5304, 5349 are marked IB for 12 *siliquae*. 5391 marked IB is probably an error for NB, two *nomismata*. Unusual multiples are 5315, 4 *nomismata*; 5290, 5 *nomismata*; and 5384 marked 4, showing a division of an eighth of the uncia, probably the silver coin of Diocletian. No. 5317 is of alabaster, with IB on one side and on the other T, with small letters around it, apparently ΠΑΥΛΟ, or ΑΓΟΡΑ; the form is clearly of Roman age. What

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It shows how little the Egyptian demanded his old standard then. Probably the actual workmen were Greeks and Syrians. The day of the Persian had not yet come.

CHAPTER XIII

THE INDO-CHINESE-ETRUSCAN SYSTEM.

66. THE three sources to be considered here are:—

The Indian seed system in MARSDEN, *Numismata Orientalia*, edit. Edw. Thomas, 1874; indicated here as T.

The Chinese system in DECOURDEMANCHE, *Traité des Monnaies, Mesures et Poids de l'Inde et de la Chine*, Paris 1913; here D.

The Etruscan weights in *Monumenti Antichi*, I, 321, pl. x; here E.

The Indian system is based upon the weights of seeds, especially the wild Licorice, or *rati*, as the nominal standard. A higher weight was the cultivated bean, or *masha*, which appears to be the *Phaseolus vulgaris* of southern India, but as a cultivated plant its uniformity in different ages is unlikely. Other seeds whose weights are recorded as standards are rice, barley, common beans, and black beans. All of these are stated not only in simple relation to the *rati*, but in such numbers that they are all in simple relation to the larger unit of about 580 grains, called *Çatamana* in the silver standard, and *Pala* or *Nishka* in the gold standard. It is therefore the simplest course to regard each weight-seed as a source for fixing the original value of the *Pala* (T, 14, 65). The following are averages of large quantities:—

	Grains	×	Pala
Small beans	3.582	160	573.1
Rice	0.3585	1600	573.6
Barley, husked	0.5978	960	573.9
Common beans	9.10	64	582.4
Black beans	14.60	40	584.0
<i>Rati</i>	1.871	320	598.7

For the *Rati*, this is the average of the results of six observers, omitting the earliest as obviously wrong. The six agree, with an average difference of 0.05 on 1.87, or $\frac{1}{40}$; the mean having a probable error of 0.02, i.e., it is as likely to be between 1.85 and 1.89 as beyond those limits. This gives 599 ± 6 as the value of the *pala*. The *Rati* is therefore the outlying member of the group; yet, as the best

known, we must give it at least equal weight with the others. The average will be 581 grains, mean difference 7, probable error 3 grains. The Bactrian coinage unfortunately does not help the enquiry, as the Attic was the standard during the fine period; when the native standard came into use the regulation was imperfect, and degradation set in. Hence the silver coin results vary far more than the above values from different kinds of grain: The early examples would give a unit between 577 and 612 grains, and they quickly diminish to a unit of 500 grains and less.

The safest conclusion therefore seems to place the Indian standard *pala* at

$$581 \pm 3 \text{ grains}$$

or as likely to be between 578 and 584 as beyond those limits.

67. On the Chinese weights M. DECOURDEMANCHE quotes (D, 159) values of the tael from a work *Notions techniques* by P. Hoang (Shanghai), which are as follows:—

	Su-chow	565.0
	Amoy	572.0
	Wen-chow	573.3
	By <i>che</i> , cubic measure	575.6
	Official	575.9
add {	Fine set, University College	579.78
	Burgess's value	579.84
	Customs	586.5

The official tael is probably the most recognized, 576 grains; the customs office would take the highest value possible, as silver only is received there; the lower values are probably due to the usual loss of standards used for payment. The set of weights at University College are so concordant (see sect. 97) that they are accurate copies of some standard, and they agree with Burgess, who had good official sources.

This tael is $\times 16$ for the *kin* or catty of 9216 grains, which is decimally multiplied as the *teu* of 92,160, and *hu* of 921,600 grains. This last is the heavy talent of the Babylonian standard; the connection seems likely enough, and we may accept it without at all subscribing to the maze of theoretical connections of various standards with coins, which form the substance of the above work. The result of this connection would be that the tael was $= 4\frac{1}{2}$ shekels. The values of the shekel, and the equivalent tael, are traced in Egypt as follows:—

	Shekel	∴ tael
Early dynasties, two standards	127.5, 131.5	574, 592
Fused in xviii th dynasty, mean	129.0	580.5
Nebuchadrezzar's copy of Dungi's standard	126.0	567.0
Daric, Persian standard	129.2	581.4
Spartan duck weight	128.2	577.0

The history of the shekel (and with resulting values for the tael) seems then to be,—two early standards 127.5 (574) and 131.5 (592); their fusion by about 1500 B.C. as 129 (580); and the continuance at about this value into Persian and Greek times.

68. On the Etruscan side, there is published a series of 15 marked and 2 unmarked weights of one standard, and 8 other weights of different standards. As these have not been discussed, they are given here in detail. They are all from Marzobotto near Bologna, and therefore thoroughly in the Etruscan region. The weights are stated in grammes, and are quoted thus here to show how far rough the weighing has been; it should be repeated in a scientific manner. Of the main system, 11 weights have marks showing a unit of about 570 grains or 5700 (37 or 370 grammes), and 4 are of other multiples of that unit. Here they are all reduced to show a standard of about 37 grammes. The multiple signs are 1 = 1, + = 10, ++ = 20, √ = 50, ✱ = 100.

Weight grammes	Mark	Multiple	Unit grammes
3500	100	100	35.0
3600	10	100	36.0
3650	10	100	36.5
1835	5	50	36.7
3700	10	100	37.0
3700	—	100	37.0
745	2	20	37.2
560	—	15	37.3
1880	5	50	37.6
26300	70	700	37.6
37800	500	1000	37.8
114	1	3	38.0
3800	100	100	38.0
305	10	8	38.1
3810	100?	100	38.1
115	1	3	38.3
38300	100	1000	38.3

The first is so different to the others that there is probably some special disturbance of wear, damage, or fraud about it. With it the average is 37.3 ± 0.15, without it 37.5 ± 0.1; the latter we accept here. It gives for the unit

$$578.7 \pm 1.7 \text{ grains.}$$

69. We now compare these results together. The unit from the

Babylonian talent, yielding 574	
and 587, uniting in	grains 580
Indian seedweights	" 581 ± 3
Chinese modern weights (565-586)	" 576 ± 2
" by Burgess, and a fine set	" 579.8
Etruscan	" 579 ± 2

These agree together within the half per cent of known probable error in each country. The comparison of modern Chinese weights with earlier weights is allowable, considering the close continuity of Chinese civilisation.

If, then, we allow of a presumable connection of these amounts, what historical view must be taken of their descent? First, we know that there was a widely spread system (which we need not detail here) covering Babylonia, Assyria, Persia, Syria, and extending to Egypt as far back as the period of the Old Kingdom. The talent of this system was uniformly divided by 60 × 60; and this covers every region south of the Caspian and Caucasus.

Next, we find this talent differently divided, by 10 × 10 × 16; and this extends over early India and China.

Then we find the suggestion that the latter system was carried into Etruria. This could not be by way of Asia Minor or the Mediterranean, because, if so, the Assyro-Persian division of the talent would prevail. The only road for it must have been north of the Caspian and the Euxine, through Turkestan. Such then is the route which this fact indicates for the Etruscan migration,—Turkestan, the Kirghiz, south Russia, Hungary, Carinthia, the Tyrol, and so to Etruria. This would accord well with the style of the bronze buckets of Carinthia, and with Isaac Taylor's Mongolian affinities of the Etruscan numerals; coming from the Indian border, there would be no difficulty in a large proportion of Aryan influence in the language. If the Etruscans entered Italy about 900 B.C. their movement from Russia upon the Balkan people was the precipitating cause of the Dorian invasion of Greece 1100 B.C. The Dorians in Greece are an earlier stage of the same pressure from the east which brought the Etruscans to Italy. There now enters into possible consideration the strange similarity of types and ideas in the Etruscan and the early Japanese pottery. If the Etruscans started in contact with Indo-Chinese civilisation, the movement of pottery types eastward would not be further than that of the weight

standard westward. It is now an open question of study how far a similarity can be traced between early Chinese and Etruscan ideas.

CHAPTER XIV

STEELYARDS. PL. XVI.

70. THE steelyard was unknown in Egypt or Greece until the Roman age. Its source is Italic, by the evidence of examples; this accords with the statement of Isidore of Seville that it originated in Campania. It certainly was not primitive, as the balance was the legal emblem of sale. To the present time, it is the characteristic machine of Italy, except at Venice where the balance comes in from Oriental trade. In Egypt now the balance is universal in native hands, and the steelyard is only found in use under Italian influence. In the Middle Ages, however, the steelyard was used by Arabs, and then are two very large examples in the present collection (sect. 76).

The steelyards found in Egypt are always incomplete, the counterpoise being lost. In most cases the chains and hooks, or pan, are also lost or damaged. Hence no direct observation can be made on their ancient standard. This can nevertheless be recovered indirectly.

The regular form in Roman times was a steelyard with a groove at the end, in which a saddle rested, and from this hung the hooks or pan. Thus the steelyard could be revolved with any face of the beam upward, while the groove turned beneath the saddle. A suspensor was provided on each of two or three faces of the beam, at different distances from the pan; thus varying leverages were obtained, and one face would weigh from, say, 0 to 8 lbs., the next from 7 to 25 lbs., the next from 25 to 70 lbs. At the present time usually only two edges are used, and the pan hangs from a stirrup hingeing on the beam, and turning to either edge.

There seems to have been very little attention given to the right form of the parts. On the smaller steelyards there is a fixed ring for the suspensor, and this is placed parallel to the beam, so that a large error would occur by slightly different positions of the hook; especially in heavy amounts, where the length between suspension and pan is only a quarter of an inch. Sometimes the fixed rings are diagonal, in no case are they across the beam as they should be. The divisions of the beam are

often irregular. This may probably be due to errors in the weights by which the beam was graduated. No doubt they were all made empirically; a convenient pattern was found by trial and error, to give suitable scales, and this was copied again and again; the graduation was put on by placing weights in the pan, and these were probably irregular by four or five *per cent*, like the Roman weights already described. In no case can we expect to find results of value as to the exact amount of the standard; but assigning the steelyards to their respective standards is of use, as showing what standards prevailed at that age.

71. The divisions of the beam are of two classes; lines, with more or less indication of their meaning, and letter-numerals, which vaguely indicate the place without lines. The lines are often marked with only a dot on each side for the tens, and three dots on one side for the fives, abbreviated from the letter-numeral E. Where Roman influence was strong, the fives and tens are marked V and X without much more, though usually XX is marked and N is put for 50, borrowed from the letter-numeral. On some small beams the third side starts a higher multiple, 50 or 60 times that of the other sides. The first step is carefully to examine the scales, usually with a magnifier, and list all the marks. Observe how the second scale joins the first; sometimes a gap, sometimes an overlap, of a pound or two, the marks on the second scale proving the relation. Often the second scale will run up to 100 and then go on with tens, without repeating the 100 mark. If the third scale is lettered in multiples of the others, as 50 or 60 times as much, then it begins early in the alphabet, as Δ, €, C, Z, &c.; what its relation to the other scales may be, is proved as shown further on. The next step is to measure each scale, and find the mean scale in inches, avoiding the discrepancies. There are three ways of reaching the mean scale; the most practical for this case is as follows. Supposing there are 8 divisions visible,—measure from 1 to 8, from 2 to 7, from 3 to 6, from 4 to 5, add these four together, and divide by the number of units $7 + 5 + 3 + 1$. It is obvious that any one of these pairs might be shifted among the others without in the least affecting the mean. Hence this set of measurements gives all that is attainable. This mean scale is useful in reducing measures in inches to mean-scale values in the following processes. As the suspensor was always intended to be held up

by the right hand, the beam projects to the left, the direction of reading is retrograde, and often the letter-forms are retrograde.

72. To follow the method of examining a steelyard we will take the actual case of the Psykhario steelyard here, no. 2; the critical points of this on the three scales of different sides are here drawn full size (top pl. xvii), in three lines one below another. This is not a facsimile but a reasoned drawing, giving full numbering, and continuing the scales backward into *minus* quantities for the sake of study. All readings must be stated in terms of the scale on which they are read; for accuracy, it is usually better to measure actually in inches, and then reduce to scale values by the mean value of the scale, found as described in sect. 71. Of course the slide rule is necessary for all the proportioning in the subject. On this drawing, the centre of gravity of the beam is at the left; this is found by balancing on a knife edge, and should be pencilled on all sides of the beam. It may be thought that the position of C.G. cannot be used as it depends on the losses of chains, hooks, suspensors, and portions of the beam; but all these will also affect the weight, and thus the theoretical independence of all accessories is preserved. As the C.G. is a long way from the other critical points, slight errors are not magnified, and it is sufficient to read its amount on each actual scale, without referring to a mean scale. Of course any suspensors must hang free, or be placed exactly square with the beam, when balancing it. The suspensory points are here marked with a thick line, S, T, U on different sides. The saddle, for the hooks to carry the object, is at the right hand. For reference below, the lengths from C.G. to S, T, U are lettered *b*, *c*, *d*; and those from S, T, U to the saddle are lettered *h*, *j*, *k*. These lengths, as stated above, must be in terms of the scale in question. Let the weight of the beam be called *G*, grains or grammes. Regard that as a load on the beam at C.G. and the beam as without weight elsewhere; suppose the counterpoise at point of suspension, and inactive. Then

$h : b :: G : (\text{saddle, hooks}) \text{ and S units}$
also $j : c :: G : (\text{saddle, hooks}) \text{ and T units}$

$$\therefore \frac{b}{h} G = (\text{saddle, hooks}) \text{ and S units}$$

$$\frac{c}{j} G = (\text{saddle, hooks}) \text{ and T units}$$

$$\therefore \left(\frac{b}{h} - \frac{c}{j} \right) G = S - T \text{ units.}$$

(Saddle, hooks) may be any constant, modified by mutilations at either end. If beam is level when counterpoise is at S, then moving the poise the distance *h* away from the saddle will balance a weight equal to it on the saddle; that is, the counterpoise is always *h* units in weight. Therefore *h*, *j*, *k* are all an equal number of units; or the distance from suspensor to saddle reads the same on its own scale, whichever side is measured. If this is accurately so, then the formula can be simplified $\frac{b-c}{h(S-T)} G = \text{unit of weight}$. It will be seen that the insoluble cases are where the readings $b = c$ within the amount of errors of work; any near equivalence of *b* and *c*, therefore, cannot be dealt with. Further, if the saddle end of the beam is lost, the position can be recovered, by continuing the scales to the right, and finding the place where two scales show equal readings from their suspensors.

Thus a fragment of a beam, which has two scales and two suspensors remaining, suffices for the recovery of the unit.

73. The theory being settled, the actual example will be worked. The first step, after weighing (5892 grains here), and marking C.G., is to measure the mean value of each scale, as described in sect. 71. Then take the distances *h*, *j*, *k* in inches, and reduce them to mean scale values. These last should be all the same numbers, and any differences between them show errors in making. Where one scale is marked with multiples of another scale, as ounces on one and pounds on another, then the same proportion will exist in the numbers of *h*, *j*, *k*. All this should be checked by taking the distances with dividers and reading direct on the beam scale. The actual distances in this case (see no. 2, pl. xv) are in scale values *h* 3.63, *j* 3.50, *k* 3.41. The scale readings are *S* = +.12, *T* = +2.08, *U* = +8.7; the C.G. is at 3.92, 11.16, and 35.3 on respective scales. Hence $b = 3.80$, $c = 9.08$, $d = 26.6$. Therefore

$$\frac{\frac{b}{h} - \frac{c}{j}}{S-T} G = \frac{\frac{3.80}{3.63} - \frac{9.08}{3.50}}{-1.96} 5892 = \frac{\text{unit}}{4940}$$

Thus the unit shown by the 1st and 2nd scales is 4940 grains

similarly by the 1st and 3rd scales 4710 grains
similarly by the 2nd and 3rd scales 4530 "

To show on what actual quantities such differences as these depend, suppose that *k* is 3.25 in place of 3.41, a change of 0.036 inch due to uncertainties in the exact place of the suspensor, owing to long extension of the mean scale used. Then the values of the unit would be 4940, 4920, 4920. It is clear that even in a favourable example a greater accuracy than 5 per cent in the result is not to be expected. Only a thirtieth of an inch uncertainty in taking the scale value of U, modifying *d* and *k*, makes 5 and 8 per cent of difference in the unit deduced.

74. By similar reckoning on each of the steelyards, the values for the unit in grains are as follow:—

		S—T	S—U	T—U
1	Paulos	4440	4580	4440
2	Psykharido	4940	4710	4530
3		5240	4340	5520
4	Broken saddle	5200		
5	Smallest	5050		
6		464	435	454

These are evidently on the basis of the Roman libra and uncia. Also no. 7 (which cannot be reckoned owing to zeros being near the suspensors) shows 12ths of the unit, pointing to the libra and uncia, and works concordantly on this basis.

Another unit is found on other beams, as follows:—

	S—T	S—U	T—U	
8	2370	2710	2200	? 2 deben
9	Talit 7340			5 deben
10	F 2925	3400	3030	2 deben
11	Harpo 142.0	140.4	140.0	qedet & 5 deben
12		1340	3720?	× 60
13		111	300	106 2 qedet?

Some of these seem to belong to the Egyptian qedet and deben system. No. 11 is best given as 142, the other values depend on assuming an error in graduation on the U scale. No. 12 might rather be on the daric system, by the multiple being 60. No. 13 is very uncertain, but suggests the double qedet, by 300 grains. It should be noted that, in varying results, if only two agree they are in error, because an error in one scale will vitiate two results; the one result which differs from a similar pair is more likely to be correct.

There are, beside these, three others (14, 15, 16) whose scale zeros are so close to the suspensors that no result can be safely reached.

75. The work and condition of the steelyards are as follows:—

1. Name of Paulos. Heavy, fine work. Saddle, 2 chains and hooks, and 3 suspensor hooks, all quite perfect; with clean green patina. Pl. xvi.

2. Name of Psikharido, and other letters. Rather rough work, but solid and fairly accurate. Good state. No attachments.

3. Carelessly divided. Worn. No suspensors. Saddle; chains broken.

4. Beam broken through middle suspension. Erratic divisions. The lost dimensions are restored by continuance of the scales, to find the point of equal values on S and T scales; such restorations are in ellipses in the table, pl. xv.

5. The smallest beam. Moderately good work. No suspensors; 1 eye left, and two broken. Beam broken.

6. Roughly divided; signs vague. Suspensors lost. Saddle; chains broken.

7. Rough work, poor divisions. One suspensor, half eye of another, third eye lost. S loop for saddle. The zeros are too close to the suspensors to give a result; but units being divided in 12ths are probably librae with unciae. By trial, this unit works truly. All the above are for the Roman standard; the following are probably of Egyptian standard.

8. Tip of beam lost. Coarsely, but fairly well divided. One suspensor, and one detached. Green has been cleaned to bare yellow metal. Well preserved.

9. From Talit in the Fayum. Of rhombic section, with only two scales. Purely Roman in style. Suspensors and bearing-pins lost. No attachments.

10. Rough, careless work. Black patina. Good condition. One suspensor. No saddle.

11. Name of Harpo(-krates?). Round beam. Dot divisions, with letter-numerals between. Parts of two suspensors and counterpoise loop. Ring of U scale half gone.

12. Fairly good work. One suspensor, eyes of two others broken.

13. Average work. Only letters marked, and no real divisions. Two suspensors, one eye lost, beam broken. Knob beyond the saddle lost.

The following from bad division, and having zeros near suspensors, are so erratic that the standard cannot be fixed.

14. Well made. Black patina. Saddle; chains and hooks broken.

15. Fair work. Only letters, and no real divisions. No suspensors. Two eyes and one broken. Saddle. Unit in 10's and 60's, so probably daric.

16. Name of Herōdou. Stoutest work, lettering late Ptolemaic? three eyes broken, one whole; saddle. Unit divided in 8ths; perhaps sela.

The system of the marks (pl. xvii, lower part) is usually the Syro-Greek system, which is common on coins and monuments. The fives between tens are marked E alone. Numbers over 100 (P) are only marked in tens, as N for 50 or 150. The Roman V and X system is also used, but with only one X for tens above twenty (nos. 5, 7, 10, 12).

76. Two large steelyards of Arabic times were bought in Cairo, from the sale of *waqf* property. These are both of steel, inlaid with silver numerals, and the lesser one with inscriptions. In the drawings, pls. xviii, xix, the slings and hooks for suspension, and the saddles for hanging the scale pan, are omitted for clearness.

The length of the larger steelyard is $93\frac{1}{2}$ inches in all, of which 16 inches is occupied by the butt end with the suspensors. The support for the scale pan so far above the axis is very badly designed, as the whole accuracy therefore depends on the beam being exactly level, and from that position it tends to fall either way, as it is very unstable. Each of the four sides of the beam is divided; the sides one above the other belong to one way of suspension, *i.e.* the beam was read from the side, and not looking down from above. The counterpoise being complete with its hook, the values can be directly ascertained. Reading on face A, the distance of the support A from the fulcrum, 6.30 inches : the counterpoise of 140,320 grains in weight :: the unit of division, 3.186 inches : the unit of weight 71,000 grains, or 10.14 lbs. Face B will be noticed later. On reversing the beam, face C belongs to the support C. Here 2.58 inches : 140,320 grs. :: unit of division 1.275 inches : 69,300 grs. unit. On face D 1.30 inches : 140,320 grs. :: unit of division 0.643 inches : 69,400 grs. Thus the different faces give a unit of

A	71,000 grs.	8.5 to	32.0 units =	320 lbs.
C	69,300	31.5 to	90.0	= 900
D	69,400	80.0 to	182.0	= 1820

$\frac{1}{2}$ counterpoise 70,160.

It is obvious that the counterpoise is a double unit, which simplifies the divisions, as they are then based on half the distance of fulcrum to support.

The poise itself is of course the best defined, and is clearly a tenth of the Arab *kantar*, being 10.02 lbs., and the *kantar* at present is 101.31 lbs. The irregularity shown by different faces is merely due to the difficulty of division on so unstable a leverage. The numeration is on two systems, one for tens, the other for hundreds; the tens are proved by lying between the hundreds; the hundreds are proved by the thousand being marked *alf* "thousand," in the series on face D. The numerals are set out on pl. xix.

We turn now to face B, which is on a different unit. Dealing with this as before, 6.30 inches : 140,320 grs. :: 0.715 ins. : 15,927 grs. This unit of 15,927 grains is explained by the lesser steelyard.

The lesser steelyard is 53 inches long, of which 11 inches is occupied by the butt. Face A is complicated by having two sets of divisions, belonging to supports J and K. The lower set, J, belongs to the support J, and the upper K series to support K. Face B is entirely blank. Reversing the steelyard, face C is complicated by having the two series of divisions for supports L and M; for the sake of clearness here, there is copied off above the beam the L series separate from the M series. There are also a few marks of a third series which appear to be only mistakes for the two series. Face D has the series belonging to support N. The rule which serves to prove which support and scale belong together, is that the distance from the fulcrum to any support is always the same number of units of its own scale, whatever the position may be. This is the simplest way to state the matter, when there are several scales to compare. Here we find the fulcrum to the support at

J	K	L	M	N
0.693	0.675	0.655	0.660	0.631 unit.

N is so uncertain, (by its being so near the fulcrum and so high above it,) that it is best to take the mean of the others, which is 0.670. The unit of weight multiplied by this 0.670 is equal to the counterpoise. We know the counterpoise (less its hook) to be 104,800 grs. The theoretical value, deduced from the beam and divisions only, is 107,550 grs. The hook might be assumed as an iron rod $\frac{3}{8}$ inch thick and 9 inches long, about 2000 grs., so that the whole counterpoise would be about 107,000, or possibly rather more. Hence the unit of weight of all the series of divisions is $107,000 \div 0.67 = 159,700$ grs.; as both the factors

are liable to be greater, the result of differences would not much affect this, but it might possibly be 2000 or 3000 grs. different. Practical trials of the balance gave 159,800 and 160,700 grains as the unit.

The inscriptions, though partly worn away, afford some help. On face C, line L begins with the name *ṣṭr*, usually rendered *seer* in commerce. Forty seers make one maund; both these terms are vague general names, as shekel is. The weight of this seer is 2.28 lbs., so the maund would be 91.2 lbs. Among the various examples, the maund of Basra is 90.25 lbs., and we may assume that this steelyard was used for trade from the Persian gulf. On the face D is the guarantee *roṭl waf khazany*, "exact roṭl of the Treasury." This identification of the unit explains the meaning of face B on the larger steelyard; the unit there we found to be 15,927 grs., and the seer *khazany* is 15,970 grs. The close similarity does not mean much, as either might be one or two *per cent* different, but certainly they are intended for the same unit.

The source of the numerals here used is the alphabetic system of classical times, in a corrupt form of Greek minuscule. Such was used by the Copts, as Mr. Knobel has pointed out (see L. STERN, *Koptische Grammatik*). The 40-60 are also closely like the Gobar figures in the xth century in a Persian M.S., coming from India of the viiith century. The Greek E for five was continued as a subdivision mark from the steelyards of Roman times. The units of weight here are, however, the Egyptian kantar and the Basra seer. Besides the inlaid silver figures there is a punched series of lines for numbers, which have been marked since the silver inlay, as they are accommodated to it. These are obscure; the 40, 70, 90 and some hundreds, have a pair of curved lines; a C form is at half of each ten and half of each hundred, and might be degraded from *nusf* "half." The other lines are so corrupt and variable that it is difficult to trace the system.

CHAPTER XV

MEASURES OF CAPACITY.

77. COMPARATIVELY few measures of capacity have been recognized in Egypt hitherto. Eight vases of stone with the capacity marked in *hen*

measures are about all that have been acknowledged by Egyptologists. As these capacities are mostly odd numbers, and heavy alabaster vases are not suited for making measurements, it is probable that these markings are only records of contents, and do not imply that the Egyptians used them for gauges. Where then are the numerous measures which must have been commonly used among a people so fond of accounts and registers?

A considerable number of pots and vases are found which are obviously likely to be intended for measuring, such as plain cylinders (xxi, 77-80) and conical cups with broad flat brims (xxiii, 201-206). The difficulty really lies in recognising what is or is not a measure. There can be no possible doubt about xx, 102, which is a regular cylinder divided on the inside by bands marking quarters; each quarter is half a *hen*, and the whole is two *hens*. From this there is every grade of form, down to purely ornamental alabaster vases (xxii, 832); how far are we to credit them with being measures? When we look at modern usage it seems probable that there are three classes to be distinguished; (A) measures made for the purpose of gauging, (B) jars made for general use, approximately according to measure, like the usual pint and quart jugs which are the commonest vessels now, (C) jars which have been accurately gauged, and marked with contents, to show the amount placed in them, often an irregular quantity. The value of these for fixing standards is very different; class C serves to prove the approximate amount and name; A serves best to fix the exact amount; B is of little use, but should be included in lists, though not used for fixing the standard. Another consideration is that class A must have been filled to the brim, if there is no definite mark below that; whereas B would only be filled as much as was convenient to carry, and there is no certainty what that limit might be. In the present gauging of such vessels we can only fill them all to the brim, and therefore the contents of class B will be recorded in excess.

78. The safest way to begin to handle the subject is to start with forms of class A, which are most probably measures, and if they agree with a definite system, accept that as a framework. Then other vases, the purpose of which is uncertain, or of class B, may be accepted if they fall within the variation already known from class A. Considering that a range of variation of an eighth of

the whole amount exists in one standard of marked weights—the beqa, and a range of a tenth to a thirtieth in other standards, it is probable that a large range will be found in capacity measures. Another point to observe is that pottery measures—rough or glazed—cannot be made exact, owing to variability of shrinkage, and must not be relied on for accuracy. Only measures of metal, not seriously corroded, or of stone, can be accepted as good definitions. All of the vases here named were gauged by the weight of water contained up to the brim.

Several different standards may be expected among capacity measures. From the figures of such measures in the iiiird dynasty, there appears to have been generally used then the Egyptian *hen* and the Syrian *saton* (*Ancient Egypt*, 1915, 40). Other measures that may be expected are the Syrian-Hebrew *log*, and in late times the Persian and Greek standards. As there were eight standards of weight in use, there would probably be also several standards of capacity, due to the many mixtures of surrounding civilisations.

79. The plain cylinder is a form most likely to be made for a measure. It was so made in the iiiird dynasty (tomb of Hesy), in Roman times, and down to the present day. A cylinder without a brim, a spout, or a handle, is inconvenient for any purpose beyond merely filling and emptying it in bulk for gauging. There are seven such cylinders here, nos. 5, 10, 18, 30 (vases 77 to 80), and nos. 1, 14, 17 (vases 212, 213, 211); these are all simple multiples of the Syrian standard, 5, 4, 3, 2, 2, 2, and $\frac{1}{20}$. They form, then, a strong basis for this standard. Four of these are of bronze, giving values of 19.9, 20.6, 21.5 and 23.6 cubic inches. One of wood is as low as 19.2 inches; but a contraction of 3 per cent across the grain would be quite likely, which would allow this to be $20\frac{1}{2}$ c.i. Two of glazed pottery give middle values of 20.9 and 21.3. The stone cup measure from Edfu, apparently of the age of Khufu, is 20.8, see *Ancient Egypt*, 1923, p. 2. This has the triangle *q* on the brim, suggesting some original form of *kotyle*. The figures of measures of Hesy, give by the outside sizes 21.2 to 23.6 c.i., and, as the thickness might be about 1 per cent of the diameter, this would give 20.4 to 22.8 for the contents. From literary sources, the old Syrian system was on 21 c.i., and the Seleucidan 22 c.i. All of these agree as nearly as their uncertainty permits:—

	Mid
Khufu measure	20.8
Bronze cylinders	19.9–23.6 21.4
Glazed „	20.9, 21.3 21.1
Hesy „	20.4–22.8 $21\frac{1}{2}$
Early Syrian standard	21
Late Syrian „	22
25 beqa of water cube of	20.4–21.4
25 sela (mina) „ „	21.3–22.5

It appears, then, that the earliest measure 20.8 agrees with the larger form of the early beqa; the later measures 21.4 might connect with either beqa or sela. The connection is passably likely, but yet the variations leave some latitude for making a connection.

Having then a variation of 19.9 to 23.6 cubic inches for the unit, it is reasonable to include various other vessels which give multiples of quantities between those, as in the Catalogue, nos. 1–35. Another class of vessels, which seem obviously measures, are the conical cups with flat brims, pl. xxiii. Most of these are only fragments, and the capacity can only be found by linear gauging. All of them are of glazed pottery. On both accounts, therefore, no exactitude should be expected. They are all multiples of the same Syrian standard as before, 4, 2, 2, 2, 1, and $\frac{4}{10}$. The values they give are from 19.5 to 24.6, with 22.0 as the mid value. This agrees with the more accurate bronze measures more closely than could be expected.

The large situlae with handles are of nearly the same capacity, xxi, nos. 69, 70, and contain 4 of the Syrian standard, giving a unit of 21.6 and 22.4. In these different classes, in which all examples conform to one standard, there is good evidence that they are certainly measures, and that hence any vessels giving simple multiples of this unit, between 19.9 and 23.6, or 19.5 and 24.6 glazed, probably belong to the same system. Beside these, two border cases, just beyond those limits, are included in the catalogue, sect. 83.

Of all these, taking the bronze vessels alone, the median is 21.0 ± 0.25 c.i. The Khufu standard cup is 20.8. The two Old Kingdom vessels give 20.6 and 24.0, mean 22.3, but probably the larger one was intended to be not quite filled. The extreme values that could be allowed to the sela would be 216 to 224 grains, corresponding to 21.4 to 22.2 c.i. On the whole 21.0, or perhaps later 21.5, seems most likely to be the true value; and 21.5

is the median of the whole list. The multiples by 6, 18 and 24 are correct in this system, as the unit was $\times 36$ to form the saton measure.

80. Another class of vessels that belong to one standard are the tall drinking pots, xx, 27, 28, 29, which are copies of the usual pottery of the first half of the xviiiith dynasty. These are simply related as $\frac{1}{2}$, $\frac{1}{3}$, and $1\frac{1}{3}$, of the Egyptian *hen*, giving values of 27.1, 29.3 and 30.1 c.i. This same standard is that of all the pots with handles, of Roman age, xx, 103, 104, 105, 106. The multiples are 2, $\frac{1}{3}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{24}$. These are regular fractions, $\frac{1}{3}$ *hen* is known as the *khdy*, and it was also binarily divided into $\frac{1}{8}$ and down to $\frac{1}{32}$. Though these little bronze jugs do not promise much accuracy, they agree almost as well as the larger measures, giving 27.8, 27.8, 28.6, 29.3, and 31.1 c.i. for the unit. The *hen* was ultimately divided by 120 at Edfu (BRUGSCH, *Recueil*, IV, xciv).

The class of open cups also belongs to the *hen*. The only one that appears to be accurate is the finely made spouted cup, xx, 76, which is half a *hen* of 30.4. The little cast cups, xx, 139, 128, are $\frac{1}{10}$ *hen*, giving 29.4 and 30.3. The pottery cups, xxiii, 208-210, of $\frac{4}{10}$, $\frac{1}{4}$, and $\frac{1}{10}$ cannot be accurate; they show 29.9, 31.0, and 31.7 for the *hen*, but they may not have been intended to be brimful. A blue glazed cup or bowl, 41, fig. 207, xxiii, was of 2 *hen*, of 28.5; only a fragment remains.

Between the limits of size of the bronze vessels which appear to be measures, 27.1 to 31.1, there are various others, as in the catalogue, nos. 36 to 63, which should probably be included in the series. Of these, there are four good bronze vessels, making 10 bronze, in all, of fair size. The median of these is:—

10 bronze vessels	29.0 \pm 0.3 cubic inches
8 marked vases	29.2 \pm 0.6 " "
Hesy figures of measures	28.8 \pm 0.6, allowing thickness
5 debens of water	28.8, limits 27.5-30.0

Looking at these, it does not seem that we can do better than keep to the most accurate of this material, the bronze measures, and take the *hen* at 29.0 cubic inches.

81. Having now grouped the two commonest standards, the residue remains to be examined. There are several capacities which are obviously connected, 16.11, 16.86, 32.01 to 33.8, 49.6, and, putting all of such together, there is a group of

12 vessels giving from 32.0 to 34.1 for a unit. This is evidently the Syrian log, which is stated at 31 in Phoenicia, 32 Judaea, and 33 Babylonia. All are of bronze or alabaster, and therefore may be accurate. The most probably correct is that with the cartouches of Amenhetep III, which is just at the mean value. The median of

11 vessels is	33.1 \pm 0.15 c.i.
log is	31 to 33
necef mina of water	30.3 to 33.3
" early values	30.7 and 32.1

As the *necef* was the standard of the north Syrian tribute, used later in Antioch and Cilician coinage, it is in the position to be connected with a Syrian and Babylonian measure. The amount of 33.1 c.i. is however too large for the early *necef*; and, if the connection be true, the log cannot have been started before the xviiiith dynasty, when the standard varied up to, and over 166 grains. Yet the log was used at an early period, as the two spouted copper pots (xxii, 3, 5) of the Old Kingdom are 1 and $1\frac{1}{2}$ logs; so this throws some doubt on the connection of weight and measure.

82. Another group of measures clearly connected (xxii, 52, 57, 58, 59, 61, 64) are 8.87, 17.41, 25.26, 33.4, 35.3. These are all of bronze, all but one are similar to bowls of early Greek period. They give multiples $\frac{1}{2}$, 1, $1\frac{1}{2}$ and 2 of a capacity varying between 16.7 and 17.7. This is the Attic kotyle, as nearly as that is fixed. The sources for that, in standards cut in stone slabs, give 14.6-19.6, 16.2-18.2, 17-18, and probably $17\frac{1}{2}$ in the best value. The Egyptian median is 17.2 ± 0.15

Attic about 17.5

if chous = 8 minae, therefore 17.6 to 18.2, limits of mina.

There is no proof that the chous measure was 8 minae, but that is the only practicable connection of Attic weight and capacity. The sextarius measures of Pompeii (see Appendix) would show a kotyle of 17.73, if the Roman and Attic were connected.

83. Beside the above there are two bronze bowls of about the Persian age (xxii, 60, 66) containing 37.25 and 37.63 c.i. These might be $1\frac{1}{4}$ *hen*, but the multiple is unlikely; on the other hand they are half of

74.5 and 75.26 c.i.

and the Persian *kapetis* is 74.4 c.i.

They are probably therefore Persian measures.

5*

This comprises all the vessels that are likely to be measures, or to have been made to correspond to such.

The resulting values for the standards are:—

	Cubic inches	Cub. centim.
Syrian 20·8, or	21·4 ± 0·3	341 or 350 ± 5
Hen	29·0 ± 0·3	475 ± 5
Log	33·1 ± 0·2	542 ± 3
Attic kotyle	17·2 ± 0·2	282 ± 3
Persian kapetis	74·9 ± 0·3	1227 ± 5

These values appear to be more accurate than the various information that we already have about these measures, mostly of late date. This is however the Egyptian version of the standards, which might differ slightly from the native values.

84. Catalogue of Capacity measures, pls. xx-xxiii.

The second number of each is that in the Catalogue of Stone and Metal Vases, except those marked 201-215 which are of pottery published here.

No.	Vase	Material	Cub.ins.	×	Unit
Syrian standard.					
1	212	Wood, shrunk	38·4	2	19·2
2	53	Bronze	76·8	4	19·2
3	98	"	39·0	2	19·5
4	203	Blue glaze	19·52	1	19·5
5	77	Bronze	99·66	5	19·9
6	91	"	159·7	8	19·9
7	859	Alabaster xviii	20·2	1	20·2
8	99	Bronze	366·2	18	20·3
9	65	"	81·4	4	20·3
10	78	"	61·79	3	20·6
11	11	Copper	123·8	6	20·6
12	835	Alabaster xviii	41·4	2	20·7
12 A		Durite, Khufu	20·8	1	20·8
13	201	Lt. bl. glaze	41·6	2	20·8
14	213	Blue glaze	1·046	$\frac{1}{20}$	20·9
15	68	Bronze xxi	63·0	3	21·0
16	217	Blue glaze xii	0·53	$\frac{1}{40}$	21·2
17	211	Hard br. pottery	85·2	4	21·3
18	79	Bronze	42·96	2	21·5
19	15	"	21·62	1	21·6
20	69	"	86·55	4	21·6
21	922	Alabaster xxv	21·72	1	21·7
22	206	Lt. bl. glaze	8·71	0·4	21·8
23	832	Alabaster xviii	43·9	2	21·9
24	204	Gy. bl. glaze	44·25	2	22·1
25	70	Bronze	89·6	4	22·4
26	834	Alabaster xviii	11·3	$\frac{1}{2}$	22·6
27	92	Bronze	546·5	24	22·8
28	822	Alabaster xviii	11·5	$\frac{1}{2}$	23·0
29	202	Gy. bl. glaze, frags.	92·0	4	23·0
30	80	Bronze, Gr.	47·2	2	23·6
31	216	Gy. bl. glaze, frag.	72·1	3	24·0
32	10	Copper	144·2	6	24·0
33	821	Alabaster xviii	24·5	1	24·5
34	205	Gy. bl. glaze	49·3	2	24·6
35	906	Alabaster xviii	24·7	1	24·7
Egyptian Hen.					
36	27	Bronze xviii	13·55	$\frac{1}{2}$	27·1
37	105	" Ro.	1·74	$\frac{1}{16}$	27·8
38	55	" xix	6·95	$\frac{1}{6}$	27·8
39	102	" Ro.	55·90	2	27·9
40	905	Alabaster xix	14·07	$\frac{1}{2}$	28·14
41	207	Lt. bl. glaze, frags.	57·0	2	28·5
42	106	Bronze, Ro.	9·55	$\frac{1}{3}$	28·6
43	214	Wood	0·80	$\frac{1}{36}$	28·8
44	97	Bronze, Ro.	14·40	$\frac{1}{3}$	28·8
45	23	Bronze & glaze xix	3·61	$\frac{1}{8}$	28·9
46	104	Bronze, Ro.	1·22	$\frac{1}{24}$	29·3
47	29	"	44·0	$\frac{1}{9}$	29·3
48	139	" Ro.	2·94	$\frac{1}{10}$	29·4
49	67	" Gr.-Ro.	58·8	2	29·4
50	62	Horn, Kahun xii	1·18	$\frac{1}{25}$	29·4
51	858	Bronze, Gr.	59·2	2	29·6
52	923	Alabaster xviii	59·4	2	29·7
53	209	" xxv	9·92	$\frac{1}{3}$	29·8
54	28	Pottery	7·48	$\frac{1}{4}$	29·9
55	63	Bronze xviii	15·05	$\frac{1}{2}$	30·1
56	128	" Gr.	30·1	1	30·1
57	76	" Ro.	3·03	$\frac{1}{10}$	30·3
58	904	"	15·22	$\frac{1}{2}$	30·4
59	210	Alabaster xix	3·84	$\frac{1}{8}$	30·7
60	103	Pottery	3·1	$\frac{1}{10}$	31·0
61	96	Bronze	3·88	$\frac{1}{8}$	31·1
62	208	"	1·58	$\frac{1}{20}$	31·6
63	127	Pottery	12·68	$\frac{4}{10}$	31·7
64	90	Bronze, Gurob	1·60	$\frac{1}{20}$	32·0
Syrian Log.					
65	939	Bronze	32·01	1	32·0
66	16	Alabaster	16·11	$\frac{1}{2}$	32·2
67	840	Bronze xviii	32·4	1	32·4
68	3	Alabaster xviii	32·9	1	32·9
69	841	Copper iv?	32·9	1	32·9
70	5	Alabaster xviii	33·07	1	33·1
70 A	5	Copper iv?	49·62	$1\frac{1}{2}$	33·1
		Copper xviii	33·26	1	33·2

No.	Vase	Material	Cub.ins.	×	Unit	
71	935	Alabaster	8.35	$\frac{1}{4}$	33.4	21. Alabaster; perfect.
72	18	Bronze xviii	16.86	$\frac{1}{2}$	33.7	22. Lt. blue glaze, chip off edge.
73	109	Bronze, Ro.	33.8	1	33.8	23. Alabaster; perfect.
74	75	Bronze	8.53	$\frac{1}{4}$	34.1	24. Gy. blue glaze; perfect.

Attic Kotyle.

75	64	Bronze	33.4	2	16.7	25. Bronze, green and red patina; holes in side for handle; perfect.
76	61	"	8.36	$\frac{1}{2}$	16.7	26. Alabaster; perfect.
77	58	"	25.26	$1\frac{1}{2}$	16.8	27. Bronze, grey face, stout metal; perfect.
78	59	"	17.41	1	17.4	28. Alabaster, cracked and joined.
79	52	"	35.3	2	17.6	29. Gy. blue glaze, half of side and base. Guaged lineally.
80	57	"	8.87	$\frac{1}{2}$	17.7	30. Bronze, green patina, crack round half bottom, hole in side.

Persian Kapetis.

81	60	Bronze	37.25	$1\frac{1}{2}$	74.5	31. Gy. indigo-blue glaze, only quarter of side, slight indication of base. Chip in edge, patched with pitch anciently. Saqqarah.
82	66	"	37.63	$\frac{1}{2}$	75.3	32. Copper, green patina; perfect.

85. Notes on condition of measures.

SYRIAN.

1. Wood cylinder, split in two, warped, bottom shrunk. Guaged lineally.
2. Bronze, green patina; cracked.
3. Bronze, side broken out. Guaged by proportion.
4. Blue glaze, burnt, blackened; perfect.
5. Bronze cylinder, thin coat of black oxide; perfect.
6. Bronze bowl, edge partly broken.
7. Alabaster; perfect.
8. Bronze, very thin, brown patina, perfect, except loss of handles.
9. Bronze, black patina, perfect.
10. " " " small break in edge.
11. Copper, green patina; perfect.
12. Alabaster, cracked and joined.
- 12 A. Durite, broken and rejoined. Of Khufu? (Pls. xvi, xxvi.)
13. Lt. blue glaze faded; perfect. Inscription impressed slightly, *Nefer user neb tauu*. User probably blunder for *neter*.
14. Lt. blue glaze, broken and joined.
15. Bronze, thin brown patina; perfect. Funeral vase of Nesitanebasheru.
16. Blue-green glaze, apparently xiith dynasty.
17. Hard brown pottery; perfect.
18. Bronze, black patina; crack in edge.
19. " part bright, part red and green; perfect. Inscribed for the "washer of the sandals of Amen."
20. Bronze, figure of Isis standing, incised; green patina, perfect.

21. Alabaster; perfect.
22. Lt. blue glaze, chip off edge.
23. Alabaster; perfect.
24. Gy. blue glaze; perfect.
25. Bronze, green and red patina; holes in side for handle; perfect.
26. Alabaster; perfect.
27. Bronze, grey face, stout metal; perfect.
28. Alabaster, cracked and joined.
29. Gy. blue glaze, half of side and base. Guaged lineally.
30. Bronze, green patina, crack round half bottom, hole in side.
31. Gy. indigo-blue glaze, only quarter of side, slight indication of base. Chip in edge, patched with pitch anciently. Saqqarah.
32. Copper, green patina; perfect.
33. Alabaster; perfect.
34. Gy. blue glaze, complete.
35. Alabaster; perfect.

EGYPTIAN HEN.

36. Bronze, red rough patina; perfect.
37. " green patina, neck cracked round; complete.
38. Bronze, green patina; perfect.
39. Bronze, green patina; perfect. *Cire perdue* casting. Contents to lower ring 14.5, to middle 28.9, to upper ring 42.7, top 55.9 c.i. Mean unit 28.0 c.i.
40. Alabaster; chip from edge.
41. Lt. blue glaze, a third of the side and base. Guaged lineally.
42. Bronze, green patina; perfect.
43. Wood; perfect.
44. Bronze; lumpy green patina; perfect.
45. " green patina, marked " $\frac{1}{8}$ "; upper part, blue glaze.
46. Bronze, green; part of brim broken.
47. " bright, partly green; perfect.
48. " cast; little break in brim.
49. " green patina; long cut in neck.
50. " black patina; perfect.
51. Alabaster; chip from edge.
52. " perfect.
53. Pottery, drab, xxviii dyn.? perfect; found with 59 and 62.
54. Bronze, green patina; perfect.
55. " black patina; perfect.
56. " casting; clean brown, perfect.
57. " black patina; crack in edge.

58. Alabaster; perfect.
 59. Pottery, light brown, buff facing, chipped.
 60. Bronze, green and brown; perfect.
 61. „ clean, and green patina; edge broken.
 62. Pottery, light red; perfect.
 63. Bronze, thick green patina, Gurob; perfect.

SYRIAN LOG.

64. Bronze, thick green patina; part of brim lost.
 65. Alabaster; perfect.
 66. Bronze, thin delicate work; bruised by pick on neck and shoulder.
 67. Alabaster; perfect.
 68. Copper, green patina; perfect. iind dynasty.
 69. Alabaster; perfect.
 70. Copper, green patina; end of spout lost. iind dynasty.
 70 A. Copper, with cartouches of Amenhetep III.
 71. Alabaster; perfect.
 72. Bronze, green patina; perfect, and elastic cup.
 73. „ casting, Roman; part of foot lost.
 74. „ thin, green patina; perfect.

ATTIC KOTYLE.

75. Bronze, green patina.
 76. „ brown and green patina; perfect.
 77. „ thick, sharp, casting; perfect.
 78. „ thin as 76, 80; black patina; edge slightly broken.
 79. Bronze, green patina; perfect. Tell Yehudiyeh, tumulus IV, 20.
 80. Bronze, inside clean, out brown and green; perfect.

PERSIAN KAPETIS.

81. Bronze, green, thick, sharp, casting; perfect.
 82. „ black patina; perfect.

86. *Gold dust measures.*

A unique set of seven measures (pl. xxiii) was found in the South Town at Nubt (*Naqada 67*): as there were some traces of the xviiith dynasty there, such is probably the date of these measures. They are a series of binary divisions, the largest holding piled gold dust of 742.5 grains or $\frac{1}{8}$ deben, the others down to $\frac{1}{128}$ deben, which was the Ethiopian gold unit of the *pek*. The mean scale is to a deben of 1488 grains. As these are too small for liquid measure, and agree with the deben of gold dust, there can be no doubt of the meaning of them. The mean error is 6.5 grains.

CHAPTER XVI

LINEAL MEASURES.

87. THE cubits are all of wood, excepting a standard slab of limestone, and four fragments of stone cubits. The latter were made as ceremonial objects, of importance for the inscriptions which cover them, but varying so much in the amount of the digit that no precise result can be obtained from the short lengths of the pieces. The cubits are here arranged in the order of length.

For measuring these, a standard brass scale by Dollond was used, divided into tenths of an inch, supplemented by an ivory scale of fiftieths, read to thousandths by estimation. The brass scale is of true length at 62° F.; it was one of Capt. Kater's original standards in 1824, since verified at the Standards Office in 1876.

(1.) Square wooden rod, 0.75 × 0.75 inch, with caps of cast bronze on the ends, rather loose, Roman? The mean scale of the divisions is fairly regular but shows a much shorter unit than the butts; it appears as if the cast caps were put on entirely in excess of the scale length. As they were rather lumpy with rust, the ends were ground down on slate until the metal just showed on parts of the surface. The scale values were read along both ends of the cuts.

The divisions are in six palms of 3.4 inches in a cubit of 20.4, the end palm divided in one, one, and two digits. The palm spaces are, on opposite edges,

cap 3.611	3.407	3.396	3.412	3.424	3.623	cap
	3.606	3.406	3.408	3.407	3.417	3.623

Thus the most skew line is not more than 0.012 askew. The mean palm value is 3.409 inches mean difference 0.003 inch; and the end caps are 0.20 and 0.21 in excess. The cubit of six palms would be 20.45 mid 0.02; and the total length is 20.868. The digit divisions agree to the palm scale, leaving all the excess on the end cap. The division in six is influenced by the Assyrian and Jewish cubit.

(2.) Very rough irregular slip from Gurob, Roman? (0.9 to 1.4 × 0.35 inch), cut from a scrap of furniture; marking lines are wide and faint. Divided into six palms in a cubit of 20.6, end palm is of four digits, second palm halved, sixth in four digits. The palm spaces, along the axis, are

butt 3.38	3.29	3.85	3.04	3.51	3.46
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Beyond the end is another digit space. The mean, excluding the very rough butt, is 3.43 m.d. 0.24;

six such palms give a cubit of 20.58 m. d. 1.4. The total length from butt to a cut is 20.58; but no exact value can be taken from a measure so obviously rough.

(3.) A flat slip of wood from Kahun, 0.5 × 0.3 inch (xiiith dyn.?), with wide cuts roughly made across it. The spaces are

butt 0.85 1.23 1.07 1.10 0.86 1.08 1.00

Excluding the butt, this gives a mean value of 1.03 m. d. 0.09. This is a twentieth of a cubit of 20.6 inches, m. d. 1.8. The result is very rough, but a decimal division of the cubit is known elsewhere (*Pyramids and Temples of Gizeh*, p. 180).

(4.) A round rod, 0.7 diameter, with two holes near one end. Rough cuts are made about a third around it, giving eleven digits. The lengths of the spaces are

butt 0.71 0.58 0.74 0.60 0.93 0.81 0.70 0.81
0.58 0.65 0.71

The mean digit, omitting the butt, is 0.737, mean difference 0.09; showing a cubit of 20.6 m. d. 0.3. This is just a normal value, though the divisions are so irregular.

(5.) A flat slip broken from the end of a bevelled measure, 0.75 × 0.17 inch, from Kahun, xiiith dynasty. It only has two spaces, butt 2.89, 5.85, and traces of rough ink division in digits. This gives a space between lines of 2.96 palm, seven making a cubit of 20.72.

(6.) A thick bar of wood, 3.10 × 1.56, with bevel edge 0.9 wide. From Gurob, xviiiith dynasty. It is divided on the bevel into six palms, forming the short cubit of 17.7 inches. At one end is a cut a tenth of an inch short of the butt. The cuts are very fine and sharp; but the surface is a good deal decomposed and powdery, and the ends decayed. The worst skew of the cuts is 0.012, average skew 0.005:

butt 0.114 2.946 2.976 3.034 2.916 2.972 2.76 butt

The mean palm is 2.97, m. d. 0.03, six making 17.83, or seven = 20.8 m. d. 0.2. This is rather long for the palm of the normal cubit, 2.95, and still more in excess of the palm of the digit 2.92. Hence it seems impossible to take the cut near the end as belonging to the digit standard, and the excess of the butt as agreeing with the cubit standard, though this might naturally be expected where a measure seems to show a small variation of standard. The end cut was perhaps a correction, marking 17.72, corresponding to a cubit of 20.67.

(7.) A long rod, 0.75 × 0.50 inch, with a middle mark, and one near one end. From Gurob, xixth dynasty? It has been broken, but can be replaced within probably 0.01 or 0.02. The lengths are, butt 20.61 break (10.3–10.25 cut added) 20.32 0.73 butt.

How these are to be understood is not clear. 20.61 is obviously the cubit; but what can 20.32 and an additional digit mean? Both together, 21.05, is too much for a cubit. It seems like a true cubit of 20.61, and a cubit of 28 digits of 0.726 inches, with another digit added on.

88. (8.) A rectangular rod, 0.90 × 0.63 inch, with one edge bevelled. The whole of the narrow side is occupied with the titles and names of Tutonkhamen and his queen Onkhesamen. Found at Gurob, xviiiith dynasty (*Illahun* 20, xxiv). One end has been broken off at a knot. The remaining end has a round hole sunk in it, 0.32 wide, 0.36 deep, as if to hold a terminal stud; therefore the butt length is only a minimum, and the real end is unknown. The divisions, from the butt end, are a palm, two halves, a palm, half and two quarters, a palm, a palm, and one lost. The palm series of spaces is

butt 2.811 2.973 2.885 3.062 3.000 3.035
2.846 2.962 2.865 3.051 3.010 3.060 broken

The worst skew of the marks is 0.018 and the average 0.012. The lines measured along were the back of the top, and the front of the bevel.

The mean palm, excluding the butt, is 2.99, m. d. 0.06; seven such would make a cubit of 20.9 m. d. 0.4. If the butt was of full length, the plug in the end must have projected 0.15 or more.

This concludes the class of the normal royal cubit of Egypt, divided into seven palms.

89. Next are four examples of the Assyrian and Jewish cubit of 21.4 inches, divided into six palms.

(9.) Rectangular wooden rod, 0.60 × 0.75 inch, with six palm divisions on the narrow side, the end one divided into four digits. The palms are butt 3.518 3.502 3.507 3.555 3.498 3.466 butt
The mean palm, excluding the butts, is 3.518, m. d. 0.02; and six such are 21.11, m. d. 0.13. The butts are, one exact, the other 0.05 short.

(10.) Rectangular wooden rod; 0.50 × 1.05, with six palm divisions on the narrow side. At one end the name ANOYTI incised. The end palm is divided into digits, the fourth digit halved; the third and the fifth palm are divided into digits. The palms are

butt 3.614 3.566 3.592 3.572 3.464 3.674 butt
The mean palm is 3.555 m. d. 0.04; and six such
are 21.33, m. d. 0.2. The ends are 0.06 and 0.12 in
excess.

(11.) Rectangular wooden rod, 0.60 × 0.85 inch,
with six palm divisions on the narrow side, alter-
nate palms divided in digits. The palms are

butt 3.44 3.51 3.65 3.56 3.50 3.41 butt

The ends are evidently worn, 0.11 and 0.14 short;
the mean palm is 3.555 m. d. 0.05, as previous.

(12.) Rectangular wooden rod, one edge bevelled,
1.25 × 0.6 inch; divided in palms, and a half at
4½ palms, broken away beyond.

butt 3.02 3.10 3.06 2.91 1.65 broken

The mean palm is 3.02, m. d. 0.07; of which seven
would be 21.16 m. d. 0.10.

90. (13.) Roughly rectangular wooden rod, 1.1 × 0.65
in middle, tapering to pointed ends: divided in
7 palms, and a middle cut. Divisions at

butt 3.41 4.49 3.68 3.52 3.11 4.08 4.21 butt

The mean palm from the divisions is 3.64 m. d. 0.16,
or for 7 palms 25.48 m. d. 1.1. The divisions are
so wildly irregular and rough that the present
total length 26.50 seems more likely to be true,
especially as the mean of the two end palms is
rather over the mean palm of divisions. This means,
then, two feet of 13.25 inches.

(14.) Roughly rectangular wooden rod, with a
bevelled edge. Divisions across the top and the
bevel, marking 7 palms, and a middle cut.

butt 3.53 3.90 4.00 3.67 3.89 3.68 3.00 burnt butt

The mean palm is 3.82 m. d. 0.03, of which seven
would be 26.74 m. d. 0.21. The cuts are well formed,
and square with the edge. The butts are obviously
shorter than the average palm, and one is burnt.
This shows then two feet of 13.37 inches.

(15.) A piece of palm rib, 1.1 × 0.7, with ten
very rough cuts upon it, 0.10 to 0.15 wide and
askew. The fifth mark is larger, and there is a
wide space after the tenth.

butt 0.93 0.85 0.67 0.80 0.93 0.93 0.74
0.73 0.80 0.69 0.98

Mean value 0.816 m. d. 0.025, multiplied by 10 = 8.16
m. d. 0.25. The only likely origin for such a unit
would be $\frac{1}{25}$ of the cubit of 28 digits, 20.40. This
would require exactly the normal digit 0.729 inch.
But the weathered condition of this, and the rough-
ness of the divisions, suggests a late Arabic source.
This completes the wooden measures.

91. The stone scales are, one of the 26.8 inch
cubit in seven palms, and three fragments of the
20.7 cubit.

The 26.8 measure is remarkable, as the only
known standard measure for comparisons in Egypt.
It is a slab of limestone 26.9 × 12.75 to 12.9 wide
× 2.3 to 3.0 thick. It is smoothed on the upper
face, and across the whole breadth of it are six
drawn lines. The average error of straightness and
parallelism of these is 0.007 inch; the mean of the
palms between the lines is 3.829, mean difference
0.006, or for seven palms 26.80, m. d. 0.04, ± 0.015.
This is obviously the same unit as the two Kahun
wooden measures of 26.5 and 26.74 which take
back the history of the standard probably to the
xiith dynasty.

The date of the stone standard is probably
Ptolemaic or Roman; it was found in surface
digging in material of that age at Memphis. The
links of this to the northern countries will be
noted below.

92. The fragments of other stone measures were
ceremonial, without any accuracy of division. The
first, pls. xxiv, xxvi, is of hard white limestone of
smooth grain, very finely engraved with hieroglyphs;
these are certainly not later than the xiith dyn-
asty, while from the style, and the presence of
Horus and Set as the double rule, the vth dynasty
seems to be the age. It comprises parts of the
7th, 8th and 9th digits, marked by those nomes
of Upper Egypt.

The second piece is of hard, almost crystalline,
limestone, like that used at Amarna. It is clearly
of late age, Saite or Ptolemaic. It comprises the
7th to 10th digits.

The third piece is of black basalt, the end of a
cubit marked "royal cubit," and comprising the
1st, 2nd and 3rd digits, with a prayer to Tehuti-
ap-rehui below. The mention of Baken-nefu recalls
the prince Baken-nefi on the stele of Pionkhy,
who is likewise linked there with the city of Te-
huti-ap-rehhu.

The fourth piece is of a different character, being
entirely private, and without any divisions. The
form with a bevel shows that it has been a mea-
sure; it was dedicated for a lady Aset-reshu, who
"beheld Isis," or died, in the age of 89 years
4 months and 20 days.

93. The various cubit rods that are already
known elsewhere show several lesser units marked
upon them, which are copied on pl. xxv from

LEPSIUS, *Die Elle*. A length of six digits is marked, or 4.35 to 4.4 inches: Eight digits or 5.8 to 5.9 inches: 10 digits called the "small span"; the only value which can agree to the name on all the rods = 7.3 to 7.4 inches. The "great span" of 12 or 13 digits, 8.7 to 9.6 inches. The "glorious measure" *zeser* of 15 digits, 10.9 to 11.1 inches. The *remen* cubit of 18 digits, or 13.1 to 13.3 inches. Another unit of 19 digits, or 13.8 to 14.0 inches. The lesser cubit of 22 or 23 digits, or 15.2 to 16.2 inches. Finally the royal cubit of 28 digits or 20.6 inches. It should be noted that though the lesser cubit is usually stated to be 24 digits, it is distinctly limited as not over 23 digits on the two most detailed cubits.

These various lengths are evidently other standards, approximately marked on the royal cubit; there could be no sense in specially marking such numbers as 15, 18 or 19 digits merely as such fractions of the great cubit. We must look to other sources to see what standards were known which could thus be notified. Apart from the decimal digit, which is a well recognized measure, a quarter of the diagonal of the cubit, there are

Digits	Inches		Pyramid courses
6	4.35-4.4	× 3	13.1-2, Northern foot
8	5.8-5.9	× 2	11.6-8, Roman foot 11.61 23.2
12, 13	8.9-9.6	× 2	17.8-19.2, Persian cubit 19.2 38.2
15	10.9-11.1		Punic foot 11.1 22.2
18	13.1-13.3		Northern foot 13.2 26.3
19	13.8-14.0		Philetarean foot 13.8 28.0
22, 23	15.2-16.2		

Thus all but one of these lengths are measures known in other countries. The Roman foot is old Italic or Etruscan, and early Greek; also the diameter of Stonehenge is 100 feet. The Persian cubit remains yet in its double, the modern *arish* of 38.27 inches. The Punic foot is best found from the sarcophagus at Byblos, 11.10, and varies from 11.08 to 11.17 over the Punic colonies (*Ancient Egypt*, 1923, p. 34). The northern cubit is the most interesting standard known, for its long history and wide spread. It was a third of a fathom of about 79 inches, and the double of the 13-inch foot. The varieties are

	Foot	Cubit	Fathom
On cubit rods	13.2	26.4	79.2
Standard block		26.8	80.4

	Foot	Cubit	Fathom
Kahun rods	13.2	26.5	79.5
	13.3	26.7	80.2
Asia Minor	13.3	26.7	80.1
Greece	13.3	26.7	80.1
Roman Africa	13.4	26.9	80.7
Stambuli cubit	13.3	26.6	79.8
Silbury hill	13.0	26.0	78.0
Belgic foot	13.1	26.2	78.6
English land measure	13.2	26.4	79.2
„ mediaeval foot	13.2	26.4	79.3
French architects	13.0	26.1	78.24

At Silbury hill the stones around it were a fathom apart, and the radius 40 fathoms. The Belgic foot was too firmly established to be ousted, and the Romans had to adopt it on the German frontier. The English land measure of 10 fathoms 1 chain, 10 chains 1 furlong, 10 furlongs one old mile, is much older than the foot and yard, which were inserted on the awkward basis of $5\frac{1}{8}$ yards one pole. The mediaeval 13.2-inch foot is much commoner than the 12-inch in buildings. French architects used the *canne* of 78.24 inches.

The pyramid courses above stated, are thicknesses frequently repeated in the Great Pyramid, which suggest that standards of these values were known and used,—perhaps by foreigners,—side by side with the Egyptian standards, see *Ancient Egypt*, 1925, p. 39.

94. There remains the difficult question of possible relations of the lineal standards to those of capacity, which we have already seen to be probably linked with weight standards. An immense amount of theorizing has been spun upon this subject, and it is very hazardous owing to the uncertain values, the abundance of multiples that may be tried of both capacity and lineal units, and the effect of the complication of cubing the units. It seems highly unlikely that a primitive connection should exist between lineal measure and weight, as capacity measures are not likely to arise till both are fixed. Also it is unlikely that the attention should first be given to great amounts of cubic feet and talents, and not rather to pints and pounds. The most probable field for examination is in lesser amounts, as follow.

The Syrian standard of 21 cubic inches is the cube of a palm of 2.76 inches, giving a foot of 11.04, rather short for the Punic foot. Yet this is so near, and so probable in its local connection, that it seems likely. If the early measure is really

as low as 20.8 c. i. the palm would be 2.75, or foot 11.00, which would be too short.

The Egyptian hen of 29.0 cubic inches, defies any likely origin in Egyptian measures; 10 hen, 290.0 inches, is the cube of half the northern foot of 13.26, as found in Egypt. This is as close as our knowledge goes, but seems very unlikely. It would point to weight and capacity measures coming in by way of Syria from the north.

The Syrian log of 33.1 cubic inches is the cube of $\frac{1}{3}$ of the Persian foot of 9.62 inches; but there is no ground for taking that as divided into 3 palms of 3.211. The locality, however, is possible.

There is no satisfactory explanation of the Attic kotyle of 17.2 cubic inches. It is possible that the half a Northern foot of 13.01, cubed, might have been repeatedly halved down to $\frac{1}{16}$ th. The fair Achaeans being probably northern in origin would be a likely source; and though the foot is a shorter variety than that which belongs to Egypt, yet it is in accord with Silbury Hill and the Belgic foot, as well as the later French *canne*. Another possibility is that as the *chous* was 8 minae, the mina was $1\frac{1}{2}$ kotyle or 26.0 cubic inches of water, the side of which was 2.96 inches; this might be a palm $\frac{1}{7}$ of the 20.75 cubit, formed from the Greek foot of 12.44 inches.

The Persian kapetis of 74.9 cubic inches multiplied by 16, or $\frac{1}{3}$ of the artaba, is the cube of 10.62 inches, half a cubit of 21.24. The four Egyptian cubits of this unit, described here, average 21.23. The length then agrees, and this unit, rather longer as 10.7, is that of Persia.

So far as those relations go, it may be fairly said that the Persian 74.9 is well explained, but the others are rather too inexact or far fetched, though quite possible.

CHAPTER XVII

BALANCES.

95. SOME boxes of balances, with or without weights, have been obtained; these weights have been dealt with before in their place, under the Ungia. The means of weighing, apart from the weights, have to be described.

The oldest balance beam is of red limestone. From the nature of the material it is apparently prehistoric. It is 3.35 inches long, 0.16 to 0.20 wide, 0.17 to 0.20 deep (*Prehistoric Egypt*, xlvi, 36). The middle hole for suspension has a short tube rising

from it; hence the centre of motion is far above the suspension of the pans, and the balance is very rigid, so that equality can only be seen by the exact level. There is a difference of 1 in 120 in the arms; and a change of 1 in 500 can be seen by the change of level.

96. After that, there is not here any balance till Roman times. The finest (pl. xvi) is a box, 12.2 × 5.6 × 1.5 inches, with an iron band round one end, studded with iron nails. This retained the end of a wooden tray 10.6 × 4.4 × 0.6 inches. In the box is a balance beam, with suspender-loop and vertical tongue, of very slight make, 9.5 long; and two pans of brass 3.2 diameter. Five brass weights are sunk in square holes fitted to them, all in perfectly fresh condition with original polish. These are nos. 5399-5403, pl. xlvi, from six ounces down to two nomisma, with an average error of 2.4 grains. Also a loose weight marked .1., which does not belong to this series: one empty square pit shows a weight to have been lost. In the tray is a lesser balance beam, 6.8 long, with two pans of 1.75 wide, which fit the tray; also a second pair of pans 2.1 wide. Two round weights of ounce and half ounce are here, two coins slightly ground, and two glass lumps, nos. 5405-5410. The coins of Constantine II and Constans as Caesars, must be between 333 and 337 A.D., and were probably not placed here later than 350. The tray has six square holes, to which nothing fits, and two lids to holes.

Another box, 5.8 × 1.85 × 0.9 inch, contains a beam 3.95 long, with pans 1.2 wide. A lid slips under a catch on one end, and has two hooks projecting to hold studs on the sides of the box. There are two square pits for weights, but none fit in them; four lie loose, nos. 5411-5414. No. 5412 has a faint impress, apparently of a pegasus.

Another box is 8.5 × 2.5 × 1.3, with a lid. A square hole, and a round hole, are cut in the block for weights. Beam 5.7 long, pans 1.6 wide. In it was an odd lot, in which no unit is obvious; white glass bottle stamp, with Eros, 85.0 grains; Ptolemaic coin 76.3; triply forked piece of hard wood, 58.0; a blue glazed melon bead, 41.6; a glass weight of El 'Azyz (975-996 A.D.), 22.8; a slip of blue glass inlay, 9.6; lastly a bone hair pin with scoop end. These seem as if dropped in by a sebakh digger as they turned up.

Box 8.4 × 2.6 × 1.2 inches; lid split in two, drilled for repair. Beam 6.2, pans 1.6 wide and a second

pair 1.85. A square pit has a thin lid, and a scrap of stuff at the bottom; there are two round pits. Three nomisma weights here, are nos. 5300, 5369, 5371. Fourteen cowries of very various sizes, five cone shells, and an iron ring, may all be later additions.

Box $6.75 \times 3.07 \times 1.2$, side broken away. Tray for a balance 5.3 long, and pans 1.6 wide, all lost. In the body 2 large square pits and 8 round: in the tray 2 oblong pits.

Box $6.5 \times 2.4 \times 0.6$. Two square pits. Two pans left, 1.3 wide.

97. Of other countries there are a few examples of scales.

Frankish balance, beam 4.5 long, pans 1.6 wide: no case.

Box, cut in a block with rounded corners, $4.8 \times 2.0 \times 0.85$; lid attached by wire hinges. Beam 3.7 long, round pan 1.05 wide, triangular scale 1.6 wide. Nest of cone weights of XUD, XXXD, VS, of 92.0, 229.2, 457.7 grs., mean value 91.6, mean error 0.3. Round brass weights of George II guinea (128.1), 21S (129.0), 21S (120.5), 13S6D (83.3 grs.). Paper in lid of "proclamation on 24th June last" of limits of light weight allowance on guineas before and after 1771.

Box, constructed, $5.75 \times 2.75 \times 1.1$, lid with wire hinges. Beam 5.1 long, pans 2.0 wide. Paper in lid of standard weights of moidores, £3 12s piece, £1 16s, 18s, 7s, guinea, half guinea, pistole.

Nest of weights, turned in brass. 1 pound down to $\frac{1}{4}$ ounce. The outer pan is 7.1 grains light, on the mean scale, and apparently worn below. The mean scale of the others is to a pound of 6993.4 grains, or 6.6 grains light. The mean error of the weights is 1.0 grain. Probably late xviiiith century.

Chinese balance in a box with two drawers, and upright stand to fit on box. Made for European use, with numerals of style of xviiiith century. Box $10.5 \times 5.25 \times 4.3$ high. Beam 8.9 long, pans 3.9 wide. Box ends to beam. Brass weights of native form, of 0.2 tael, 2 to 10 taels, and 20 to 50 taels. Mean scale 579.78 ± 0.06 grains; mean error per tael 0.11 grs.; the error is less on the larger weights, 20 to 50 taels having average error of 0.4 grs. or $\frac{1}{5000}$ th of the weight.

CHAPTER XVIII

OTHER COLLECTIONS OF WEIGHTS.

PLS. XLVII-LIII.

AS the material is much scattered, it seems desirable to put together, in brief outline, the prin-

cipal collections of weights to which reference has been made in describing the College collection.

Naukratis, Defenneh, and Cairo. PLS. XLVII-XLVIII.

98. When I went to excavate Naukratis, there were only a few dozen weights known from Egypt. After two seasons there, and at Defenneh, nearly 1300 were collected and classified. These were all published, and then the collection lay in reserve for some years, and were finally given by the Egypt Exploration Fund to museums in the United States. A few had been selected for the Cairo Museum; these, and others in Cairo to the number of 214, are included in the outline list here issued, pls. xlvii, xlviii. The fuller account of all in this list is in the volumes on *Naukratis I* and *Defenneh* (in *Tanis II*), and the Cairo Museum Catalogue by Weigall. In the present list the less useful material is omitted, such as weights with serious amount of alteration, small weights under 50 grains which are less exact and difficult to attribute, and metal weights which are always the most liable to damage. After the gatherings above named, more weights were found at various sites and bought, and the whole of these were kept for University College, and form the present collection of over 3400 examples.

Gezer. Pl. XLIX.

99. The weights found in the excavation of Gezer by the Palestine Exploration Fund, have all been weighed and published by Prof. STEWART MACALISTER in his *Excavation of Gezer*. These are summarised here in a classified list, pl. xlix. As there does not seem to have been any allowance made for chipping or wear, these amounts are *minima*, and may have been somewhat larger. For remarks upon them, see chapter XI.

Troy. Pl. XLIX.

In 1887 Dr. Schliemann kindly obtained the following particulars of thirty-one weights, from Dr. Krause, keeper of the Völkerkunde Museum, Berlin. He also added details of eight in his own possession. These were all weighed to the nearest decigramme, and they are here reduced to grains to make them comparable with other collections. It is notable that the necef of Syria does not appear there. The limits of the different standards are very distinct.

6*

Weights in the British Museum. Pls. L–LIII.

100. Forty years ago I weighed all the weights in the Graeco-Roman Department of the British Museum, and supplied a list of them, with estimation of gain and loss. As that list has not yet been published, I have here revised it, in view of the later discoveries of the early standards and names, though hardly a single instance of re-attribution proved necessary. This list is a useful appendix to that of the Egyptian weights, as it shows how the early standards were continued in rather varied form in classical times. This material was used for the article *Weights* in the *Encyclopaedia Britannica*, 1890.

The system of this list is as follows. 1st col. the Museum reference, the year, month and day of reception, and the number in the day list. 2nd the material; B, bronze; G, glass; L, limestone; M, marble; P, plumbum, lead; S, serpentine; Sy, syenite. 3rd column the present weight in grains. 4th the total weight of changes estimated. 5th the estimated original weight. 6th the multiple. 7th the resulting unit. 8th the resulting mina. 9th the source, marked A, Athens; Ae, Aegospotamos; B, Budrum; C, Corfu; Cg, Carthage; Co, Corinth; Cr, Crete; Ct, Catania; E, Ephesos; G, Gaul; Ge, Gela; H, Herakleia; K, Knidos; Kl, Kalymnos; Km, Kameiros; Kr, Kyrenaica; Ky, Kyme; L, Lyons; Lk, Lykia; N, Naxos; R, Rhodes; Ro, Rome; S, Smyrna; Sy, Syria. 10th column, the marks or inscriptions; these are usually self-explanatory, or will be readily understood on looking at the multiple.

Daric. After a mixture of Peyem and Daric confused, the second group is of a remarkable class of large rectangular marble weights, with two breasts on the top, sometimes joined by a handle. They belong to the daric and sela standards, see also 3 in Univ. Coll.; 14 come from the temenos of Demeter at Knidos, 2 from the temenos of the Muses at Knidos, 2 from the temple of Diana at Ephesos, others from Budrum (Halikarnassos) and Lycia, 2 from the temple at Jebail (Byblos), 1 from Der el Kalaat, S.E. of Beyrut, and 1 from Cyrenaica. Thus they are mostly, perhaps all, from temples, and therefore sacred standards. It is notable that, though with breasts on them, they do not come from Aphrodite temples or Cyprus. The usual Assyrian mina of 60 shekels or darics was used at Antioch, and at Cyzicus, where it was a stater or double shekel ("tris," tri-stater), and mina

of 30 staters. The third group from Carthage has 3, 6 and 12 as multiples, owing to the mina of 60 shekels being divided by 20, 10 and 5.

Litra. The Italic litra seems to have been a confused group coming from three standards, peyem, daric, and Attic stater.

Stater. The Attic stater and mina is the commonest Greek standard. The marks, HH , are a row of drachma signs —|— conjoined. The often blundered inscription ΔHMO , is for $\Delta\text{HMO}\Sigma\text{ION}$ "treasury" standard, or "public" weight. In several marked instances, the standard seems to have been a double mina, *tritē* or $\frac{1}{3}$ is 4587, *tetart* or $\frac{1}{4}$ is 3180, *hemitart* or $\frac{1}{8}$ is 1796, 1808, 1836, all showing a mina of 100 staters or about 13,600 grains. One weight of Antioch is on the single mina.

The types which appear, whole or halved, are of the following fractions of the mina.

Half crescent, 5 of $\frac{1}{8}$, 1 tetradrachm,

" " + star 1 of $\frac{1}{8}$,

Crescent 3 of $\frac{1}{6}$, 2 of $\frac{1}{5}$, 1 of $\frac{1}{4}$,

Crescent + star 3 of $\frac{1}{6}$,

Half tortoise, 8 of $\frac{1}{4}$, 1 of $\frac{1}{6}$,

Tortoise 3 of $\frac{1}{2}$, 1 of $\frac{1}{3}$,

Quarter amphora, 1 of $\frac{1}{6}$,

Half " 2 of $\frac{1}{3}$, 1 of $\frac{1}{4}$,

Amphora 5 of $\frac{2}{3}$,

Dolphin $\frac{1}{5}$, $\frac{1}{4}$, $\frac{1}{2}$, 5 whole mina.

Though there is some variation in most signs, yet the half sign is in weight a half or two thirds of the whole sign; there seems no distinction between the standards of different signs. They may belong to different families of makers. The obolos seems to have retained some independent position, as the fractions of $\frac{1}{6}$, $\frac{1}{3}$, $\frac{2}{3}$ of a mina, and $\frac{8}{9}$ of a drachma, are the simple numbers of 100, 200, 400 and 16 oboli.

Necef. A few examples of this standard occur, half of them as small weights, others as mina, halves, and quarters.

Khoirtne. A few examples of this are likewise partly small weights, partly mina and divisions: but usually the mina was taken over in Italy and divided in the familiar way there, into 12 unciae, each of 24 scripula.

Beqa. This standard seems to have been the origin of the Aeginetan and Roman systems. The Aeginetan range is 9060–9960, or 180–199, rather degraded from the low beqa 188–203. The Italic and Roman uncia ranges from 380–420, or 190–210, nearly agreeing with the whole beqa range 188–216.

The types and half types of this system show a method like that of the Attic.

Half crescent 3 of $\frac{1}{10}$ of mina,

Crescent 3 of $\frac{1}{8}$,

Half tortoise $\frac{1}{8}$,

Tortoise $\frac{1}{4}$,

Quarter amphora 2 of $\frac{1}{8}$,

Half amphora $\frac{1}{4}$,

Amphora $\frac{1}{4}$,

Dolphin 2 of whole mina.

The marks on 46.4, 47.3 and 82.5 refer to the obolos, and the latter weight of 5 oboli shows the obolos as independant of the drachma. 282.0 bears a double mark, as 3 Aeginetan drachmae of 93.7 and four Attic drachmae of 70.2. The double standard, or whole beqa, is shown by 752.3 marked Δ , = 4. The weight 294.2 can hardly be 20 oboli, and K is probably not a number but an initial. A light, or half, mina is named on 4823.3; and a still lighter, or quarter mina is named on 1159.7 which is called half, this would imply a mina of 10 beqas. In the next section is a litra mina of 12 beqas or unciae, the light Italic litra. Weight 194.4 is double marked as 1 uncia on one side, and with S as half uncia on the other side.

The great series of the Roman libra shows much corruption, the variations extending to a quarter of the whole amount. The median is 4905 and mean variation 100 grains. Even weights of the same nature and period show almost equal irregularity. The early black serpentine weights average for the libra 4956 with a mean variation of 86. The solidus weights average the libra at 4819 m.v. 60. The latest ungia and nomisma weights average 4857 m.v. 122. The weights tested by a single official and certified by him vary from 4362 to 5625; and those made in a uniform set vary from 4770 to 5168 for the standard. It would have seemed incredible that with the Roman legality, and the fine balances that were made, such gross errors would have been tolerated. On the other hand, sets of small weights, that are less pretentious, show exactitude, as in the set in a scale box at University College. Of the marks on this series there is no uncertainty, Λ for libra; Σ or Γ for ungia, uncia; SOL or N for solidus or nomisma; S for semis or solidus; and the usual Greek numerals. The series of scripula from Lyons are fairly made, the average error being only 0.8 grain.

Sela, Phoenician or Alexandrian. For the series of breast weights, see the remarks in the daric

series. In three instances the multiples prove that a double mina was used. The general series is mostly Graeco-Roman, on the duodecimal division of the mina into 12 unciae; only one fifth of all belongs to the original Phoenician system of 100 drachmae in the mina. Apparently this standard was much confused with the lighter libra derived from the beqa. The Carthaginian weights are naturally on the Alexandrian system, which was so widely spread by the Ptolemaic coinage. The series of small weights with concave sides has a basis of 12.5 grains; this is like an eighth of the Aeginetan or a quarter of the Alexandrian, but falls between the two.

CHAPTER XIX

THE DIALS AND DRAWINGS.

101. THE Egyptians regularly worked with a dial for measuring the altitude of the sun, by a shadow on a horizontal,—or later a sloping,—surface, with scales for the variation in each month. This form is best explained by the upper figure in pl. xxvi, which is a copy of a dial sold in lot 456 of the Hoffmann sale, 1894. The names of the months are all given. Below this copy is a dial cut in black steatite, the full inscriptions on which are copied in pl. xxv. It was made for Sennu, who held many priesthoods, but the inscription does not relate to the dial itself. At the lower point a mass has been broken off which rose up, doubtless to carry the edge which was to cast the shadow on the slope. The slanting lines on the slope show the place of the shadow for six hours, before and after noon, in different months. On the slope were six spaces, one for each month of spring and of autumn. Down the middle was a strip inlaid for the two months of the equinoxes. The graduation is not exact, and the latitude cannot be deduced from the maximum readings. When the dial was moved about, it was provided with a plumb bob, hanging down the projection which is now lost: this enabled the dial to be set upright.

102. The Greek form of dial, shewing the direction of the sun by the shadow of a polar gnomon, is independent of variation in altitude, but it must be fixed, or adjusted to the north whenever used. Of this form, a concave of a quarter of a sphere, ruled with hour lines, there is half a dial of large

size in the collection, published in *Roman Portraits*, pls. xvi and xxiii. Also half of a small dial in limestone, pl. xxvi here, with the *uzat* eye in relief on the outside.

103. On pl. liv two drawings on papyrus are photographed. They were bought as one roll, broken across the middle, found at Gurob, and therefore probably of the New Kingdom. The papyrus is divided into squares by red lines, averaging 1.3614 inches apart; this has no close connection to any measure, the nearest being $\frac{1}{8}$ of a foot of 10.89 inches which, before contraction of the papyrus by age, might be near the Punic foot of 11.1. The whole roll was 21.7 inches wide, and the two drawings were each 30.3 inches high, before one was broken at the top. The subject of the drawings is a front and side view of a wooden shrine; this was suspended by twisted ropes, from the roof of a framework like a four-poster bed, and it was further secured from swinging by twisted ropes below, attaching it to the basis of the frame. The top of the frame is shaped like the usual lids of Egyptian coffers, sloping gradually up from the back, till it sharply rounds over to the front. There is no obvious use in such a form of lid, but it was copied from the roof of a canopy as shown here. The purpose of the form was highly ingenious; the top was of thin springy board, the sling near the flat end would tend to shorten it when loaded, the sling near the curved end would equally tend to lengthen it. Thus the total length of the spring top would be unchanged, although loaded with weight or unloaded. In this way the spring could act without expanding or contracting the framework in which it was fixed. When we see a shrine being drawn along over a desert road in a funeral scene, we might well wonder how its contents bore the jerks and jolts; this drawing explains the skilful arrangement of spring and slings, to reduce the roughness of the transport. For further detail, see *Ancient Egypt*, 1926, 1.

APPENDICES

Western Standards.

The use of a definite unit of weight in Egypt as early as the use of metal suggests that it is not unlikely that weight standards might be used for precious metals at the same stage of culture in Europe. This is confirmed by the weights in the form of a double axe (with an impossibly small

haft hole) found in Germany, Serbia, Switzerland and France; these conform to three main standards, the gold beqa or Aeginetan, the sela or Phoenician, and the necef or Syrian (*Tools and Weapons*, 14).

The collection of gold work of the Royal Irish Academy has been so well published by Mr. E. C. R. Armstrong (1920), that it is a favourable ground for enquiry on weights. Some groups of related objects show that there is good reason to expect the use of standard units. The gold box (371), weighing 467 grains, had in it a gold ring of 467 grs.; another box (372) of 476, had in it a ring of 482 grs.; clearly these are all made to one definite unit. Another box (373) is 290 grs., half the weight of a gold cup (376) of 588 grs.; these numbers are $2\frac{1}{2}$ and 5 units, of which 4 equal each of the other boxes and rings, the unit averaging here 117.6 grs. \pm 0.6. Another group is of six gold balls found together (341-5, 347), which are in the proportions of 10, 8, and 6 of a unit of 113.9 grs., \pm 0.8. Another group is of flat band armlets found together (413-6) which are in the proportion of 6, 7, 8, 9 of a unit of 84.0 to 85.2 grs., average 84.8 ± 0.2 , or half of 169.6. Another group of armlets (193-6) has proportions of 50, 4, 6, 6 of a unit of 166.5 grs. \pm 0.5. Of two remarkable ribbed bracelets, one has 8 grooves, the other 6, and they weigh 8 and 6 of the 100 grain unit.

It is, then, evident that we have here not only regular proportions between objects found together, but also general units, such as 117.6 and 113.9, 169.6 and 166.5, varying a little as they do in all other ancient countries. As different classes of objects are likely to vary in their periods and their sources, the most likely line of enquiry was to set out in diagram the weights of objects of each of the fifteen different classes separately, and then study them to see where clusters of similar weights had any relation one to another. In this way it was found that the most usual unit of three of the classes was about 100 grains, another three classes showed about 113 grains, two other classes showed 129 grains, and four classes agreed on 165 grains. Such were the direct results, and it was only afterwards that I observed that these were the three units of the European double-axe weights, and also the Babylonian daric weight. This may be taken as confirming the probability of these units having been used. After this, the remainder of each class, which did not conform to its most obvious unit already found, was examined;

it proved to be nearly all in conformity with some of the other three units. Fourteen of the residue agree together on a further unit of 145.1 ± 0.6 , which is the usual Egyptian standard; and eight are on the khorinē unit, 182.9 ± 1.0 .

In the following table each class is averaged separately, as this shows what variation existed in various times and places. The upper number of each entry is the number of examples, then the unit in grains, lastly the probable error.

Lunulae		(8)	109.8 ± 0.5	(2)	125.9 ± 0.5		(12)	167.0 ± 3.6		1071		
Gorgetts	(3)	101.0 ± 0.8					(2)	169.6 ± 2.2		1092		
Torques	(1)	101.0	(2)	111.0			(11)	166.3 ± 0.7				
Ribbon torques				(6)	126.5 ± 1.0	(2)			(1)	189.2		
Slug links	(13)	100.4 ± 0.5	(10)	110.8 ± 0.6	(2)	130.4 ± 0.3	(2)	145.3 ± 0.8	(2)	179.5 ± 0.5		
Trumpet links			(2)	109.7 ± 0.3	(14)	131.6 ± 0.7	(1)	145.4		1391		
"					(6)	122.1 ± 0.4						
Trumpet armlets			(6)	113.9 ± 0.6	(6)	132.6 ± 0.7		(16)	165.7 ± 0.8			
Bangles	(27)	101.5 ± 0.6	(8)	114.8 ± 0.9	(7)	127.0 ± 0.3	(1)	145.8	(4)	182.1 ± 1.0		
Armlets	(1)	97.5	(1)	115.2				(4)	162.3 ± 1.5			
Discs	(1)	100	(8)	111.0 ± 1.0			(2)	143.5	(1)	182		
Balls			(6)	113.9 ± 0.8					(1)	162.2		
Boxes, cup-grooved bands			(8)	117.0 ± 0.5								
Bracelets	(5)	100.4 ± 0.4	(1)	112.5	(1)	125.3	(2)	148.6				
" flat					(1)			(4)	168.2 ± 1.0			
Rings					(1)	129.0		(4)	143.2 ± 0.6			
Limits		97.5-101.5		109.7-117.2		125.3-132.6		142.8-148.6		162.2-169.6		179.5-189.2
Eastern units		$2 \times 94-101$		$2 \times 107-114$		$125-133$		$140-148$		$160-168$		$177-188$
		Lower beqa		sela		daric		early qedet		higher nefef		higher khorinē
		Gold unit		Phoenician		Babylonian		Egyptian		Syrian		
												Residue

Thus there are only four objects which do not fall in with the units frequently found here, and the range of variation of each unit in different classes agrees with the range of variation found in Egypt, or is rather less than that. Names have been applied to some classes, as those already in use were very long but not descriptive. The small rings, commonly called "ring-money," are not included, as they have

no distinct grouping, and cannot therefore indicate any result in their general diffusion.

Notes from Italian Museums.

SOME results obtained when on a photographic tour in 1891 may be worth recording, and the notes on what awaits further examination will be useful for any future students.

Weights. In Bologna, Museo Civico, are 5 large stone weights dome-shaped with iron rings and adjusting pieces; between 1 and 2 cwt. each. Over 100 stone and bronze weights.

In the Capitoline Museum are several large weights.

In the Kircherian Museum are 17 flatted globe weights, 12 edged disc, 6 disc, 22 pendant weights (? for steelyards), 18 small weights.

In Naples Museum are a hundred flatted globe weights (74179 to 74278) from 10 librae to $\frac{1}{4}$ uncia; a set of 13 bronze edged discs with silver marks, \times to $\frac{1}{8}$ uncia (74280-92). About 30 pendant weights. A set of corn-shaped weights, 10 librae to $\frac{1}{4}$ uncia (74293-74305). Lead weights 20 lbs. to 1 lb. (74394-74438).

Steelyards. In Bologna, 5 with hingeing loop reversal and 2 suspensors; 3 with saddle and 3 suspensors. In the New Capitoline are two reversing steelyards, and three rotating.

In Perugia is a rotating steelyard.

In the Kircherian, 3 with 2 suspensors, one with 3 suspensors.

In Naples, 27 with ring at end for reversal and 2 suspensors, 2 with saddle for 2 and for 3 suspensors.

Capacity measures. Two cylindrical bronze vessels (Naples 74600-1) have each an axial rod supporting three radii of bronze which form the top, and define the contents accurately for dry measure. The larger has the whole base dished upward, the smaller has the base dished over rather more than half. This is obviously done to stiffen it, and prevent pressure bulging it. The two crossing diameters were measured at top, mid, and base, and the depth at 9 points. From these measurements the means are,—diameters 10.20 and 7.38 inches, depths 8.72 and 6.66, contents (after allowing for axis and cross arms) 709.7 and 283.5 cubic inches. If these are intended for 20 sextarii and 8 sextarii ($\frac{1}{2}$ modius), they result in 35.48 and 35.44 for the sextarius, or 1703 and 1701 cubic inches for the amphora. This is rather higher than the three other standards known. It would be desirable to weigh the contents of water; but one measure has the bottom partly cracked and a bit gone, the other has the bottom patched with solder. It is best to stop all defects with wax when gauging by liquids. On the lesser vessel is pricked by points D. D. P. P. HERC. The axial pin in the lesser vessel has sunk 0.09 inch below the cross arms,

to which it is not attached. If due to sinking of the bottom, the contents may be now an inch or two in excess. Both vessels are turned. There is also a similar vessel of iron (74602) too much rusted to give accurate results.

The celebrated Farnese congius was inspected with a view to its antiquity. There is no true patina upon it, only a little superficial green; what appear to be patches of red oxide are drops of shell lac left when stopping a hole in the edge. The age of it must therefore entirely depend on the style of the inscription. It cannot be gauged by lineal measure.

In Naples (74165) is an ingenious weighing vessel for liquids. The pan has a long handle, with a slit along the middle, at the end of the handle was a counterpoise; a sliding suspensor travelled in the slit, and the vessel balanced at different suspensions according to the amount in the pan. The numbers in the graduation range from I to XII; it would not be difficult to restore the unit by trial. There are also some small bronze mug measures, probably for oil.

Foot measures. In the Capitoline museum are two monuments of architects. The most complete is that of Statilius; among his implements is figured a foot scale, divided in $\frac{1}{16}$ ths. This, by the average of all the divisions, gives 11.42 \pm 0.04 inches for the foot, but the total length is 11.61. With it is a long rod represented, with widened ends (evidently metal terminals), and a knob which divides the rod in the proportion of 2 : 3. The total is 37.80 ins., with a variation by irregularity of \pm 0.06. The knob divided it into 15.13 and 22.67 inches. As $\frac{2}{3}$ of 22.67 is 15.11, the uncertainty of the total length (0.06) far exceeds the difference in the proportion (0.02). The ratio of 2 : 3 looks like the usual one of a foot to a cubit, but no foot of 15.13 is known, nor a cubit of 22.67. There is however a cubit rod mark at 22 digits = 15.2 inches.

The other monument is to M. Aebutius; a foot rule there has two digits and two quarters marked, giving a mean foot of 11.63 \pm 0.03. Another slab, known as the Lapis Capponianus, with a foot divided in quarters, gives 11.67 \pm 0.03.

In Naples the plain foot measures of bronze are 11.500 (no. 76692), 11.600 (76694), 11.662 (76697). Those divided clearly in half are 5.792 + 5.760, 11.552 (76695); 5.806 + 5.798, 11.604 (76693); 5.801 + 5.803, 11.604 (76696). Two are divided in 12ths; one is very well divided, the mean value being

11.68 \pm 0.01, on total 11.64; the other is badly divided and only the total can be trusted, 11.68.

The whole of these foot measures, then, are

Statilian	total length	11.61
Aebutian	mean	11.63
Capponian	mean	11.67
Bronze measures	(76692)	11.50
	(76695)	11.552
	(76694)	11.60
	(76693)	11.604
	(76696)	11.604
		11.64
	(76697)	11.662
		11.68

Thus 11.613 \pm 0.01 is the mean. Previous means from measures give 11.616 and from buildings 11.607, with probable errors of about 0.01. From the agreement of all these results it seems that it is unlikely to have been either 11.60 or 11.62.

Balances. The large conical sockets ending with a hook, are usually at Naples set up as supports for balances; but as 16 out of 24 are paired it is probable that they were generally the ends of large wooden balance beams. An observation of the exact position of finding would settle the purpose. The metal balance beams are always tapering; round, square or octagonal, but never deeper than the width. There are 8 examples of a beam divided in 12 for a rider weight. There are no tongues to the beams at Naples. In the Capitoline and New Capitoline are beams with tongues. In Perugia is a beam with both arms hinging up to the long tongue.

These notes will show what a large amount is waiting to be done, to render the Italic collections of scientific use.

The Cowry as a weight.

On enquiry from Prof. D'ARCY THOMPSON, he quoted several Greek references to the *Xoiplyn*, cowry, adding "The Mediterranean species are all small . . . but the larger species from the Red Sea, Indian Ocean, &c., have been articles of trade from time immemorial . . . you want for your hypothesis a cowry of 170 grains, *Cypraea moneta* and its allies (*C. erosa*, &c.), are too small, *C. tigris* and the like are too big."

M. LOUIS GERMAIN in *Les Mollusques recueillis dans les anciens monuments égyptiens*, quotes as having been found in Egypt, *Cypraea annulus*, *arabica*, *camelopardalis*, *caput serpentis*, *carneola*, *caurica*, *erosa*, *erythraensis*, *histrionis*, *moneta*, *pantherina*, *reticulata*, *tigris*, *vitellus*. By the kindness of Dr. Bather, I have received from the principal authority on the species, Mr. COSMO MELVILL, the following:—"Six species of *Cypraea* or cowry shell inhabit the Mediterranean out of a total of 215 recent species. Three of these are very small (of subgenus *Trivia*) and one British species is one of these (*C. Europea*). It weighs 9 to 10 grains only. The remaining three are called *C. spurca*, *physis* and *lurida*. I have had a fair sized adult specimen of this last weighed, the result 214 grains. *Spurca* and *physis* are both smaller, and would not weigh more than 120 or 130 grains, if that."

Dr. HARMER (British Museum) states that *C. lurida* is the largest species inhabiting the Mediterranean. One from Cape Verde Islands weighs 240 grains, and a smaller from St. Helena 142 grains.

[It is thus evident that the standard of the five syenite cowry weights, 170 grains, may well have its name and form from the known variation of the Mediterranean species *Cypraea lurida*.]

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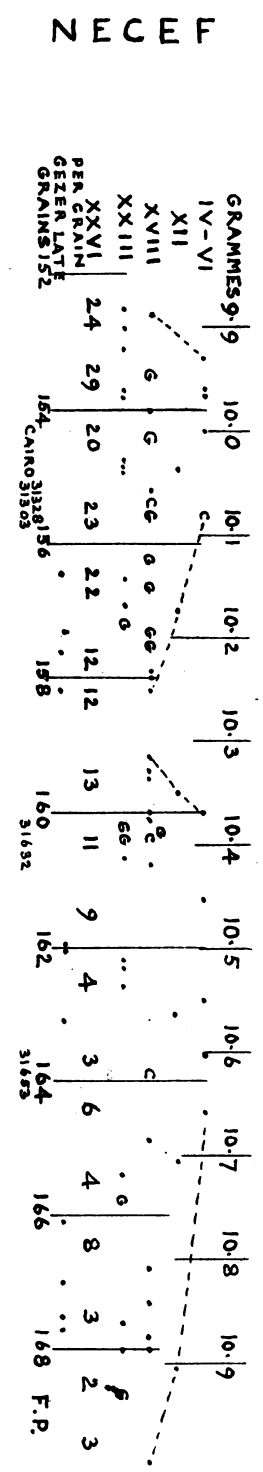
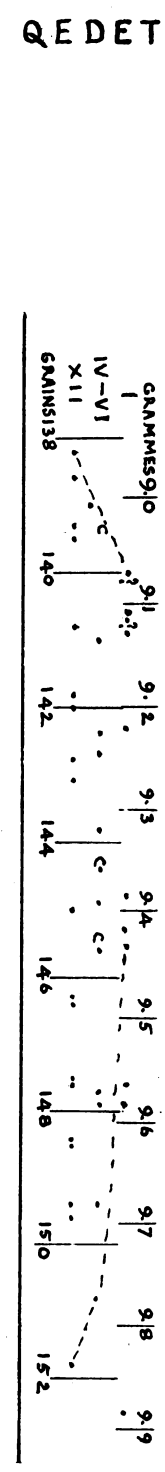
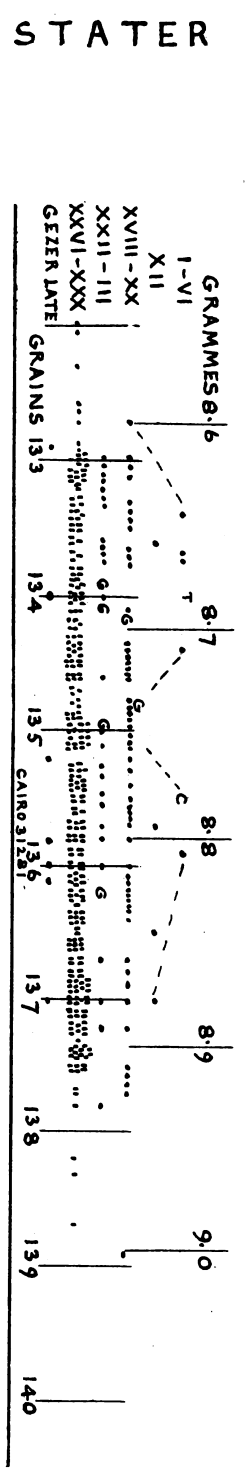
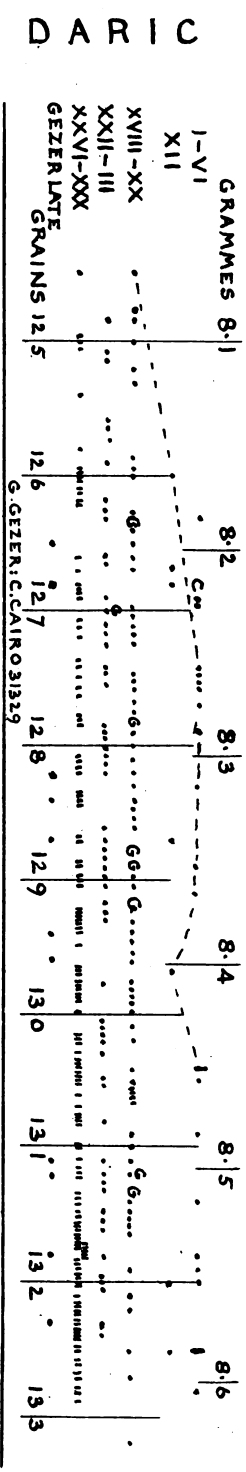
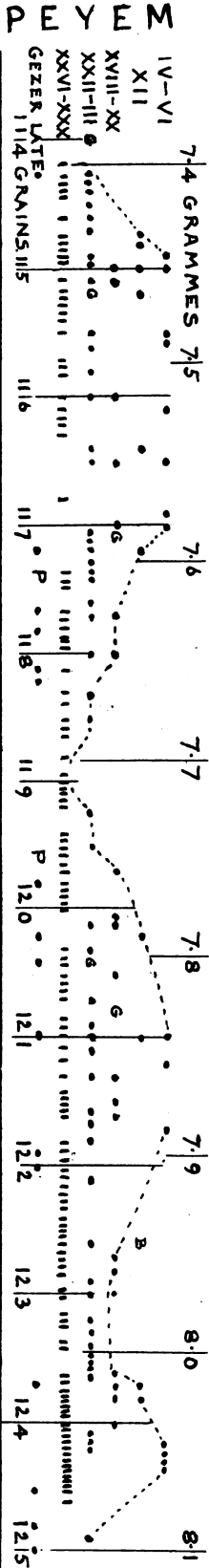
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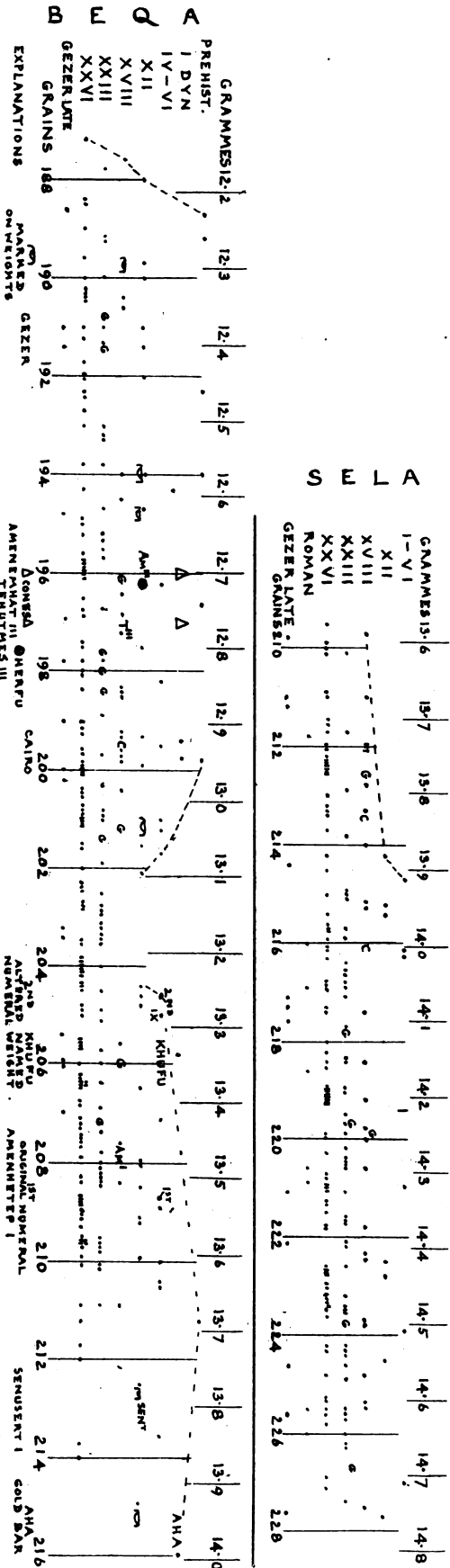
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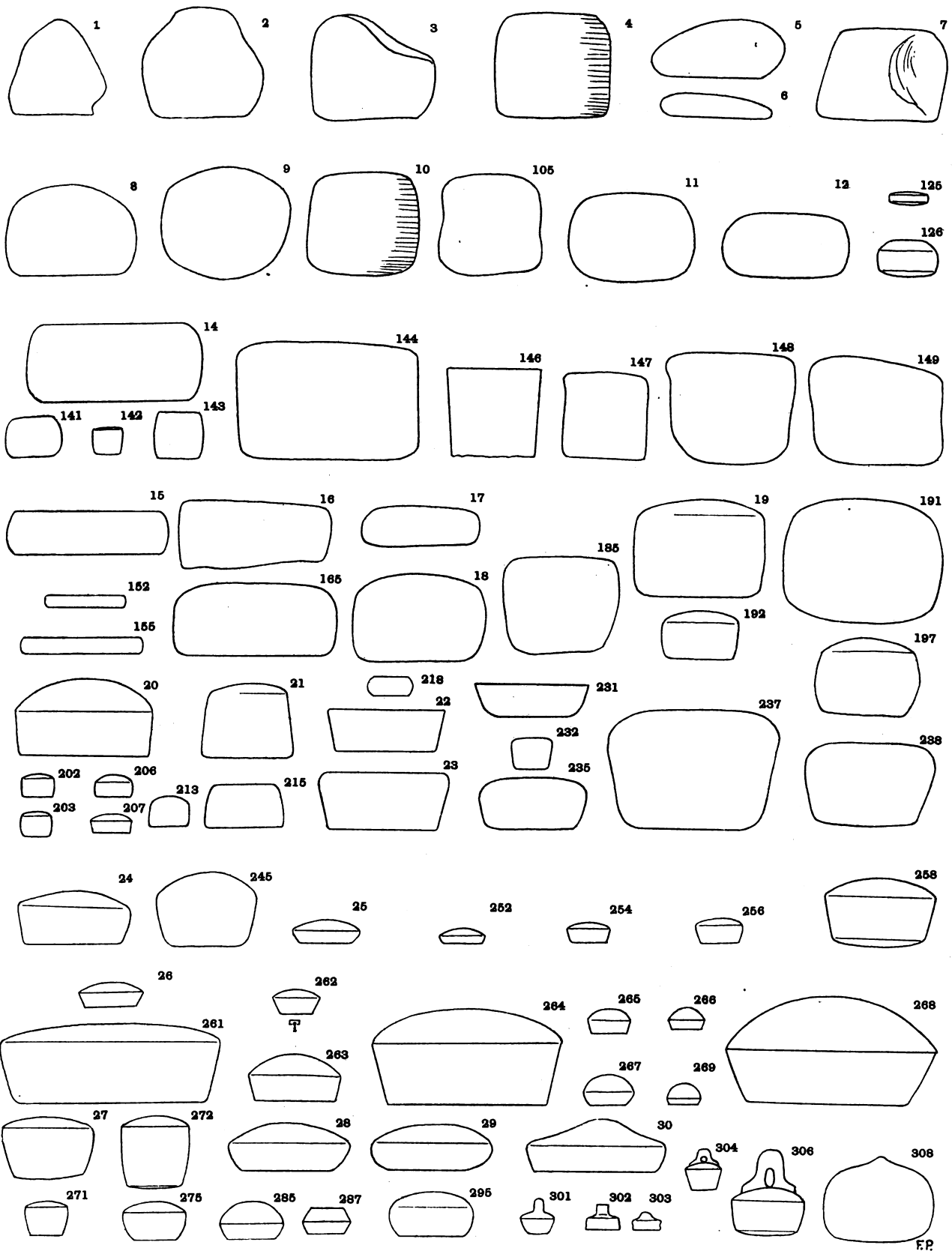




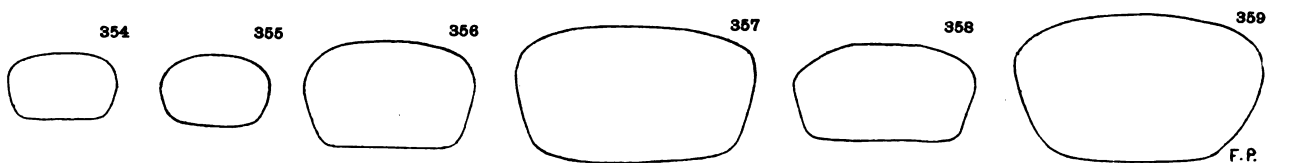
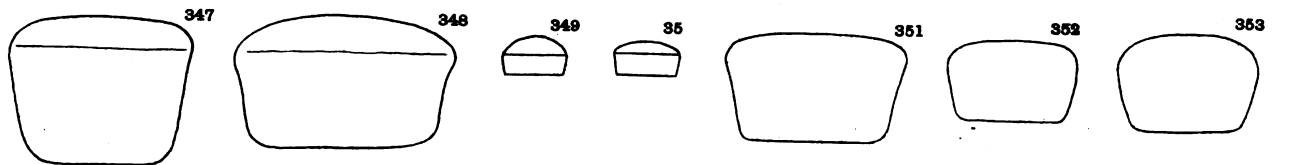
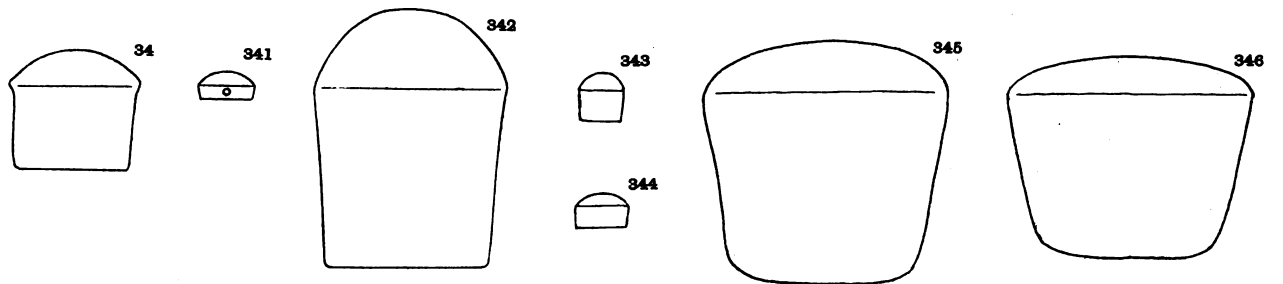
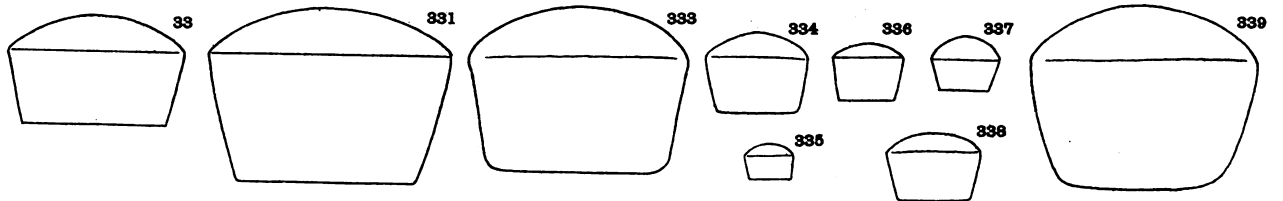
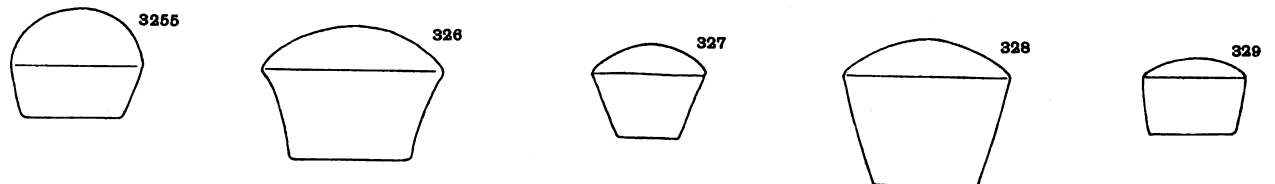
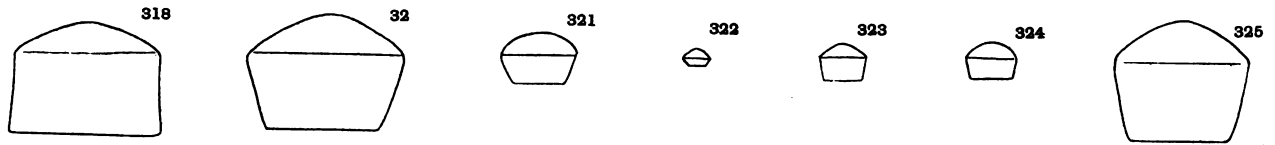
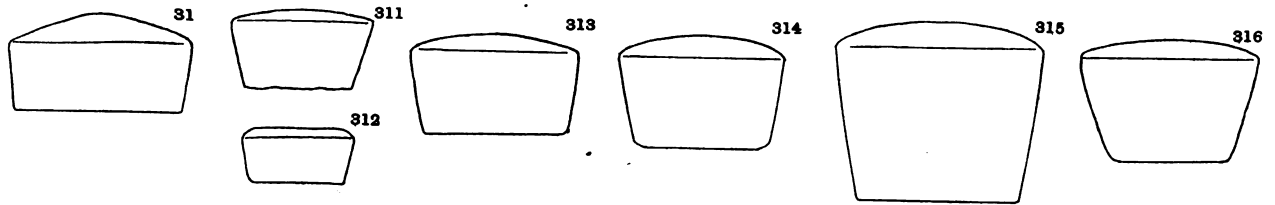
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	15-2	15-2	
	15-4	15-4	
NECEP	15-0	15-0	
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	16-0	16-0	
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	18-4	18-4	
	18-6	18-6	
BEQA	17-0	17-0	
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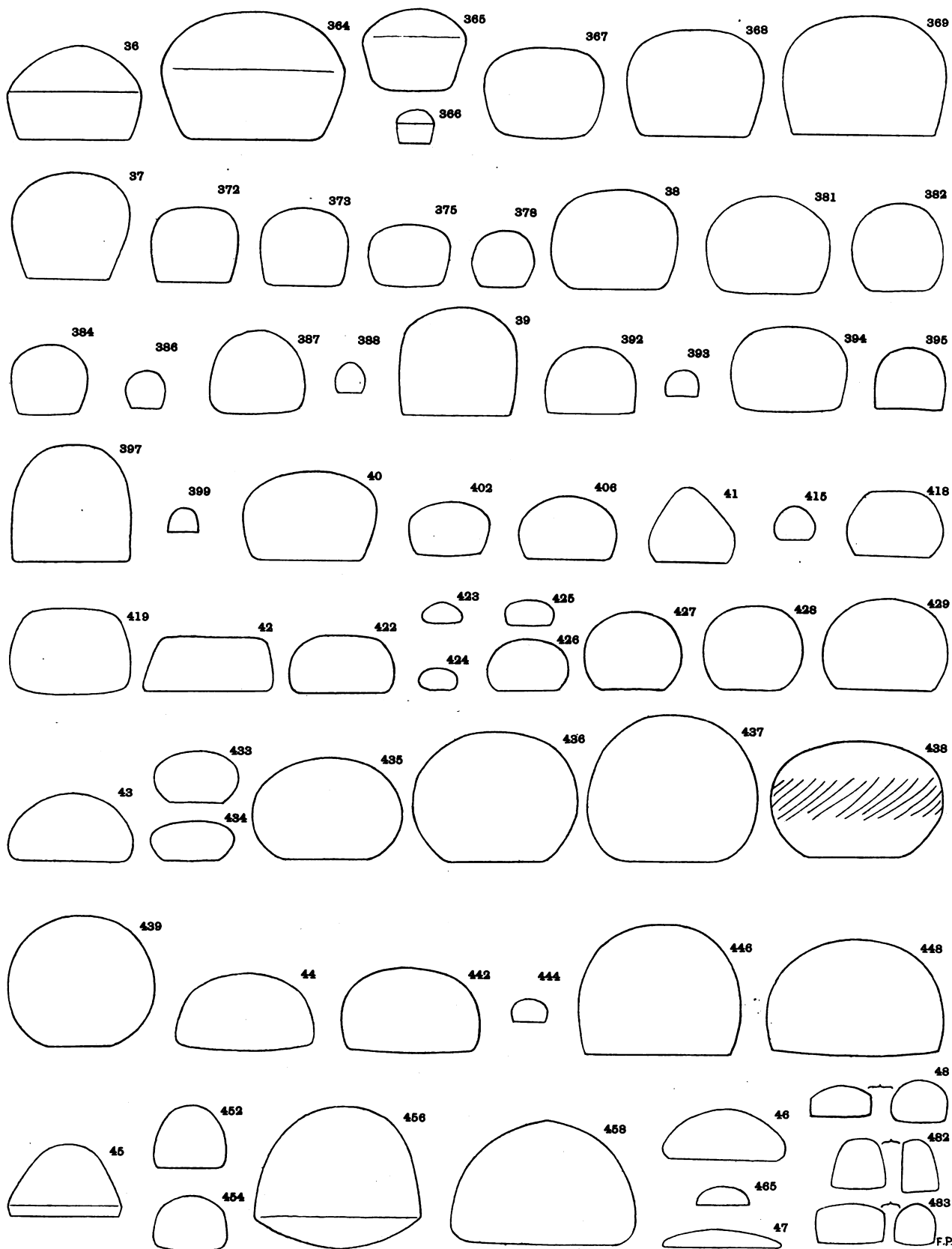
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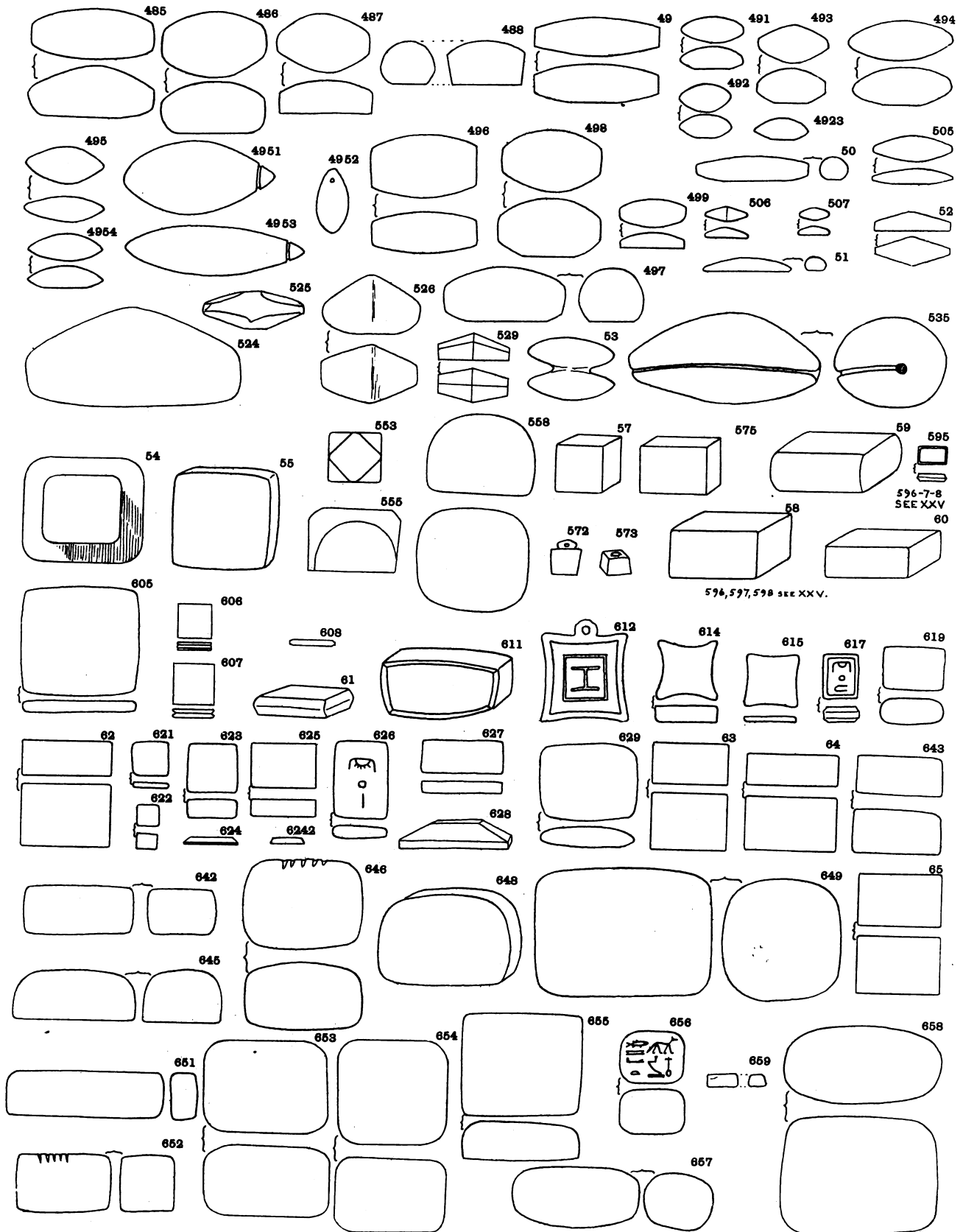


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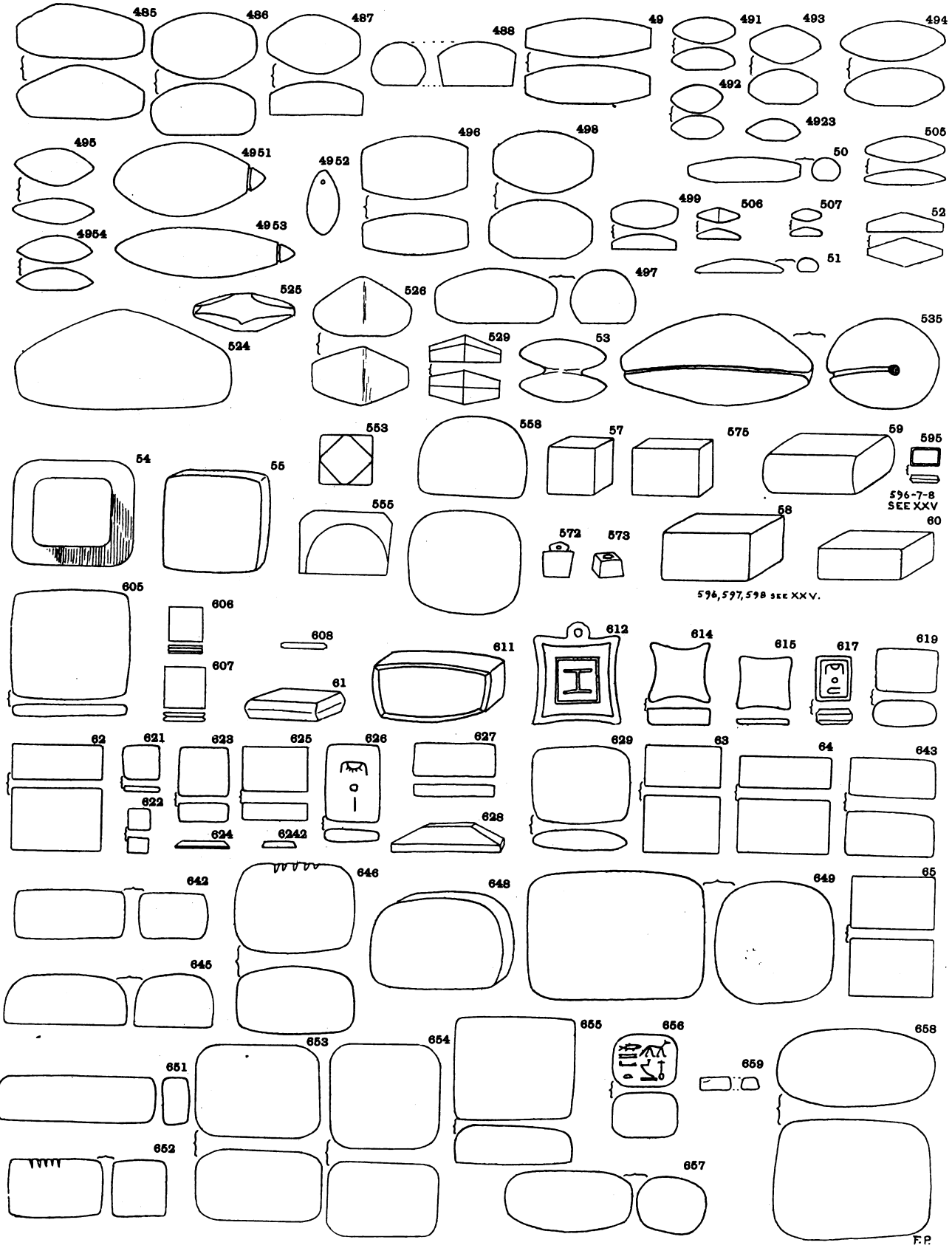


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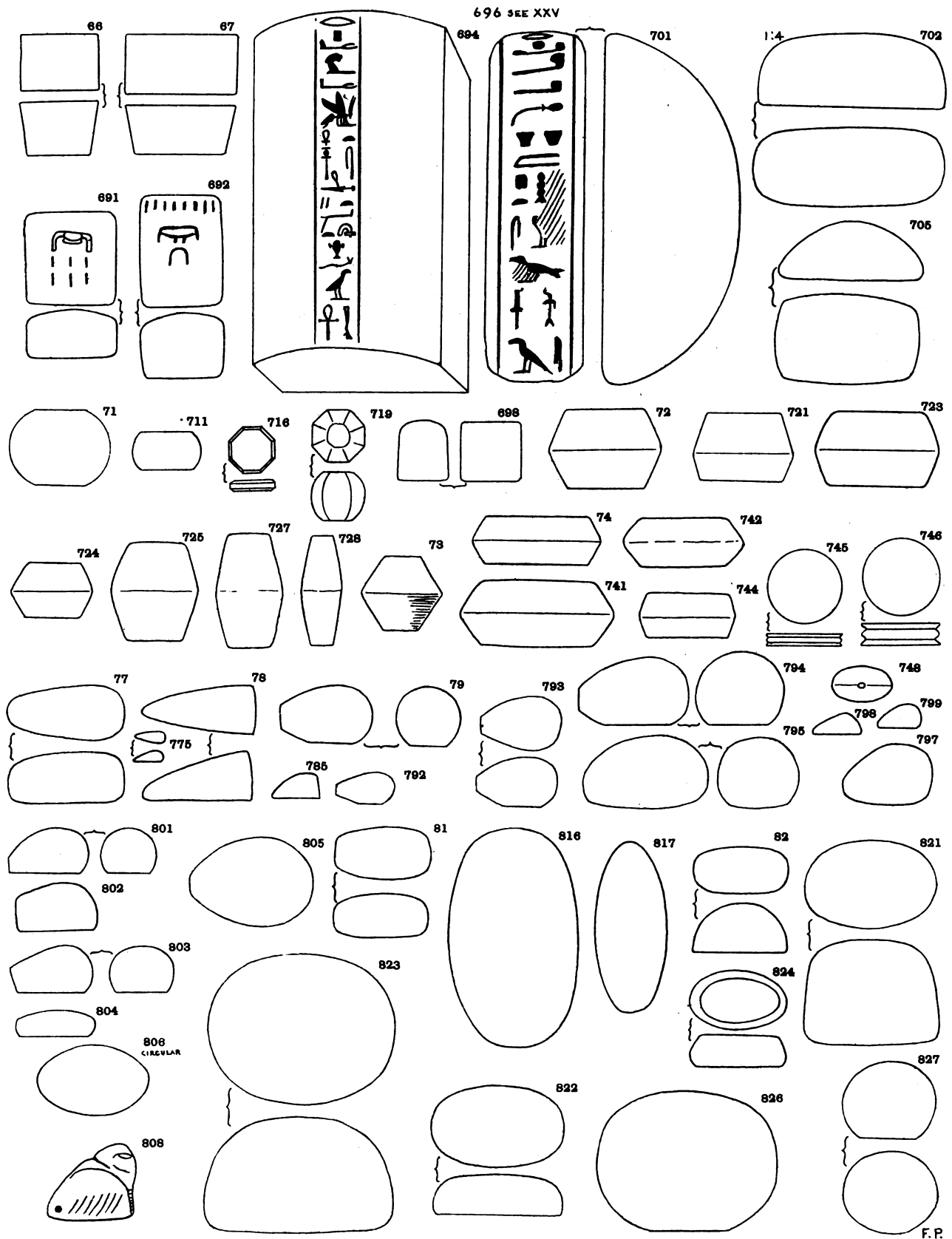


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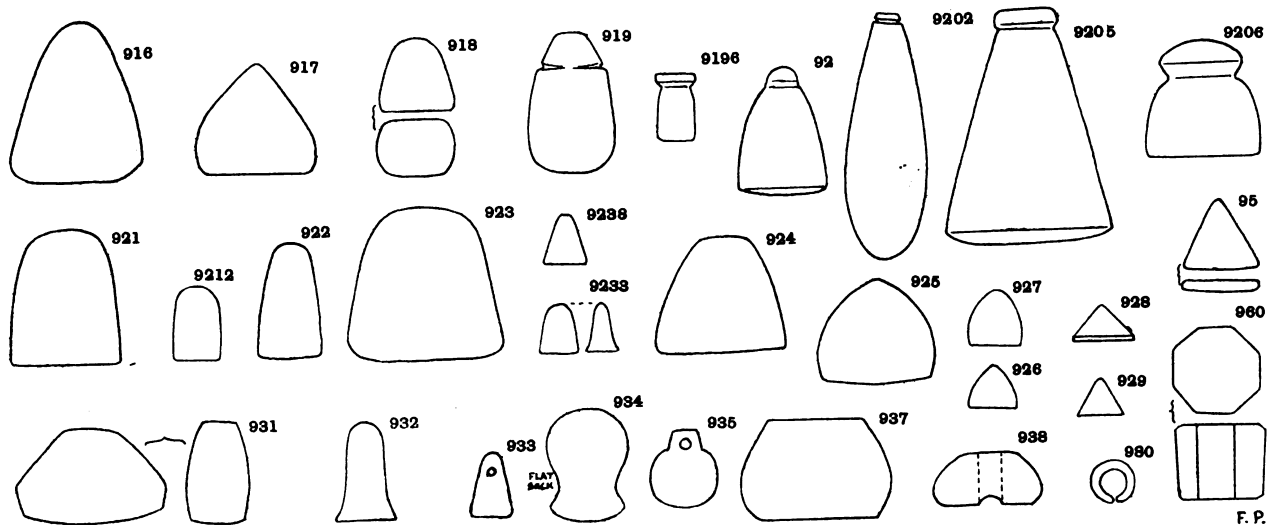
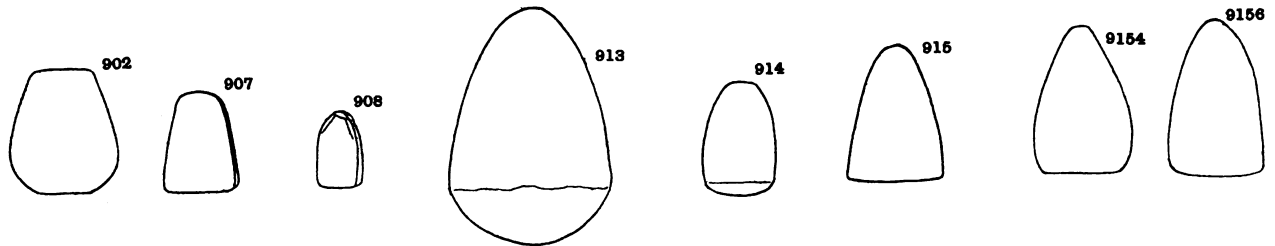
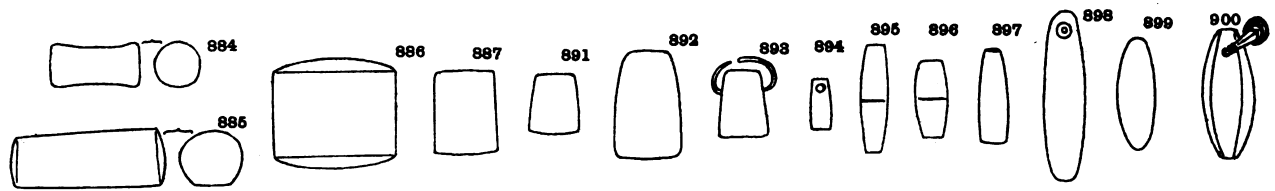
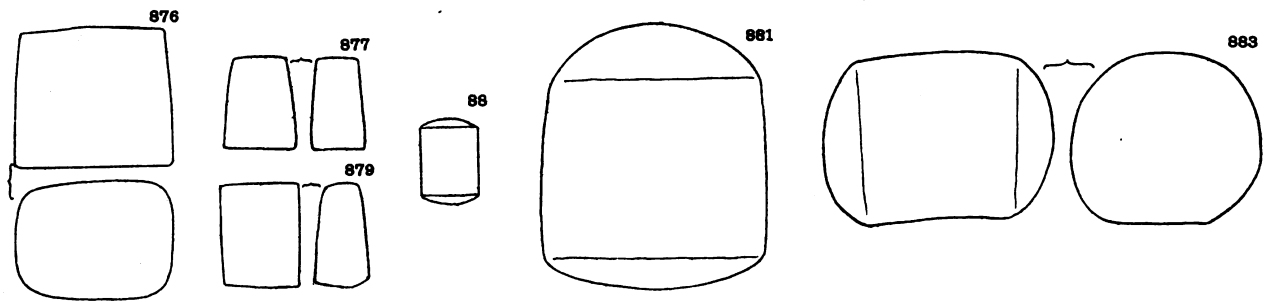
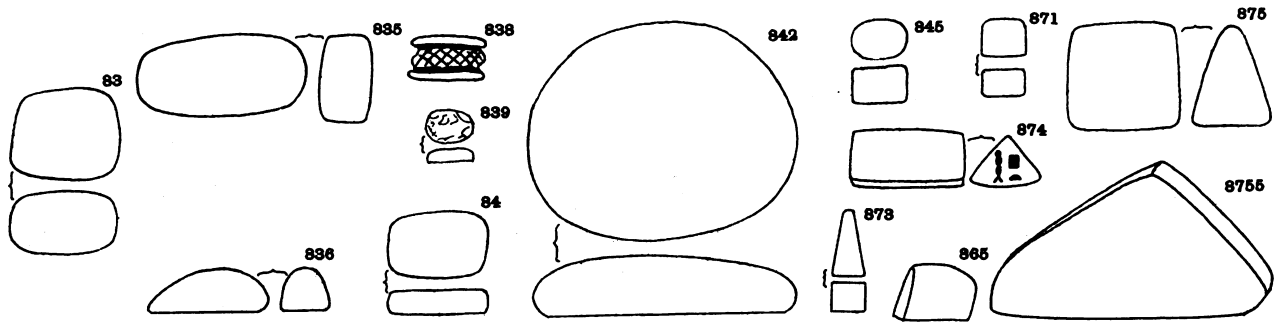
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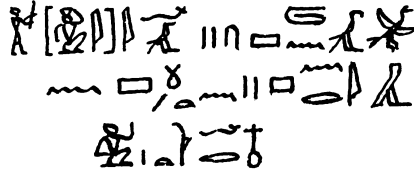
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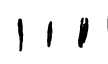
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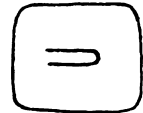
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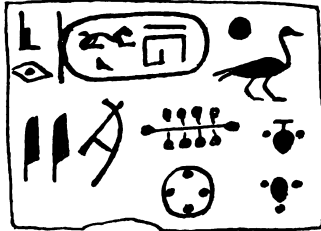
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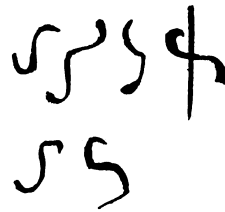
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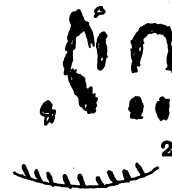
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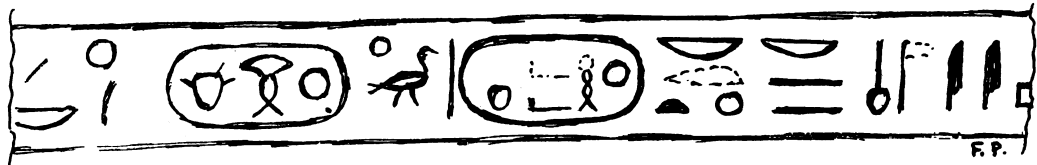
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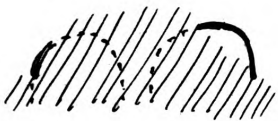
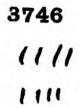
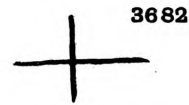
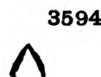
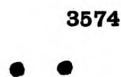
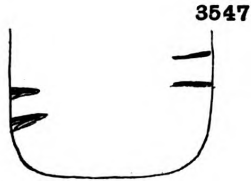
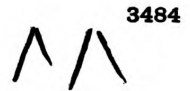
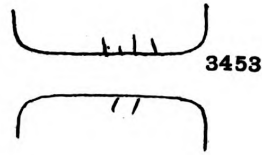
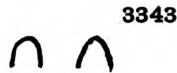
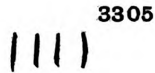
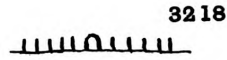
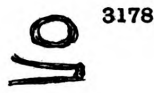
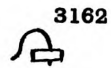
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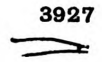
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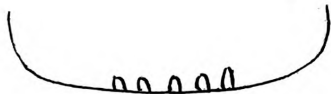


NECEF



KHOIRINE

4149



BEQA

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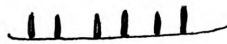
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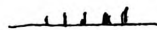


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4355 SEE VII, 694

4372



4394



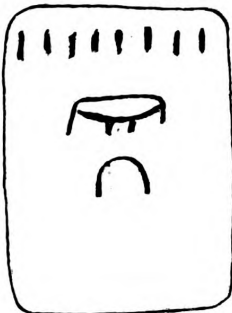
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4434 A



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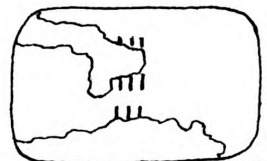
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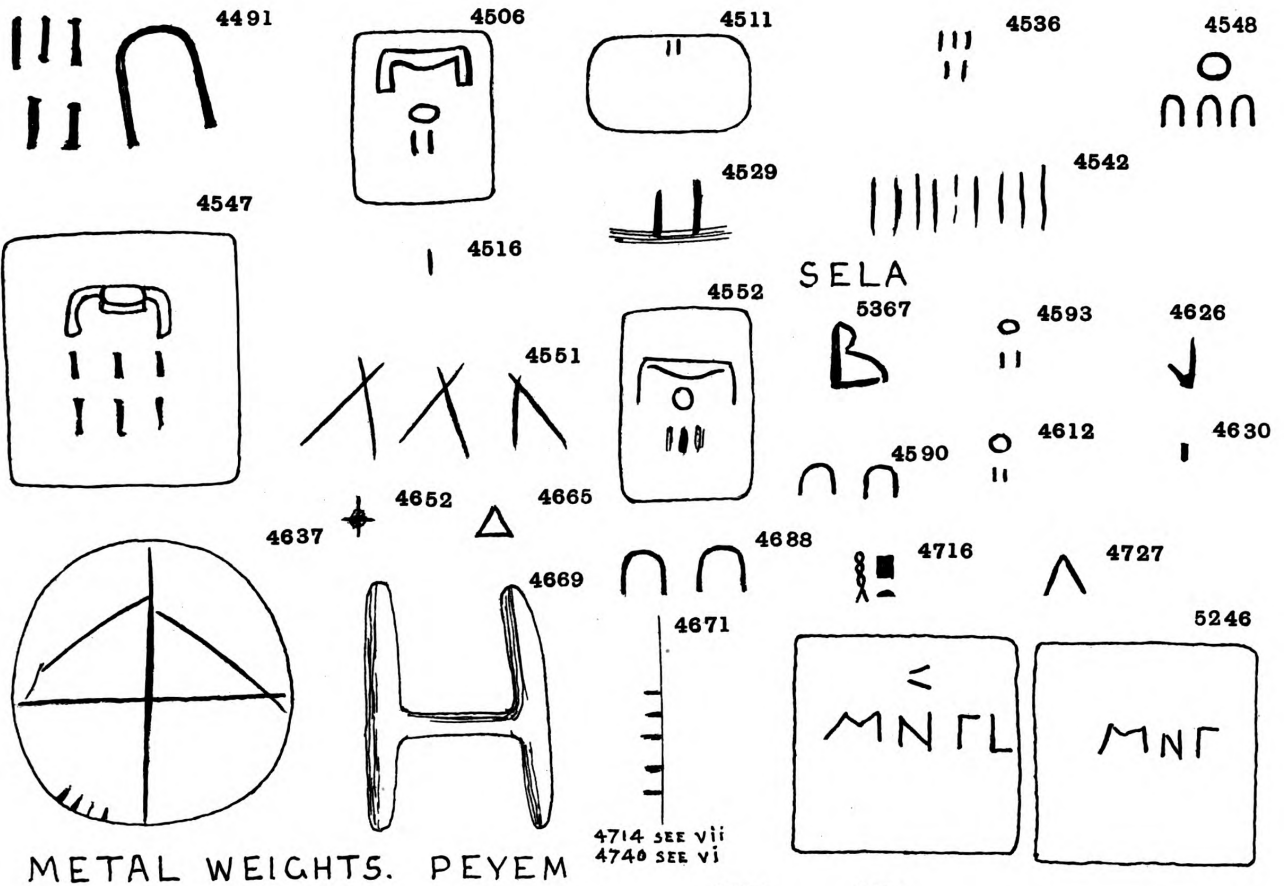
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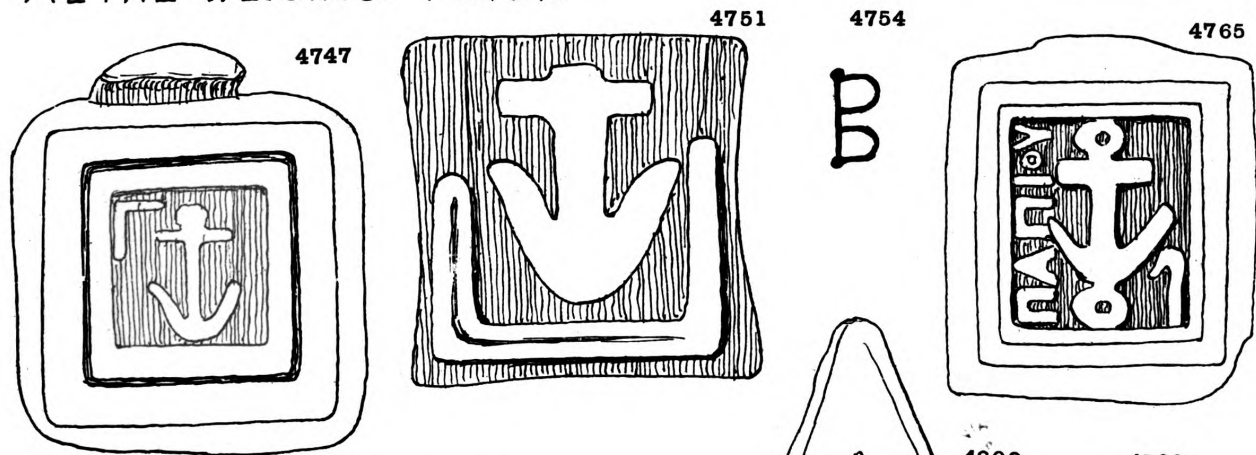
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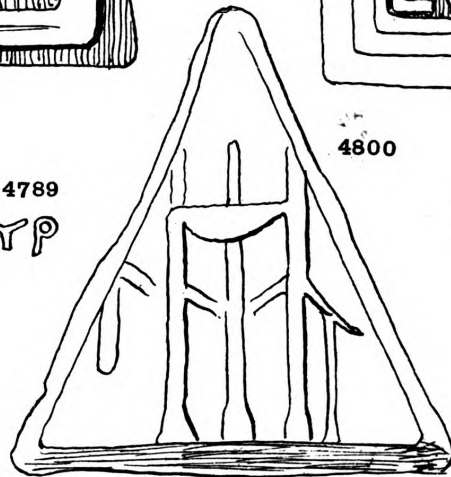
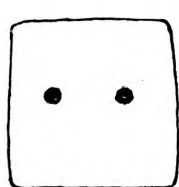


METAL WEIGHTS. PEYEM



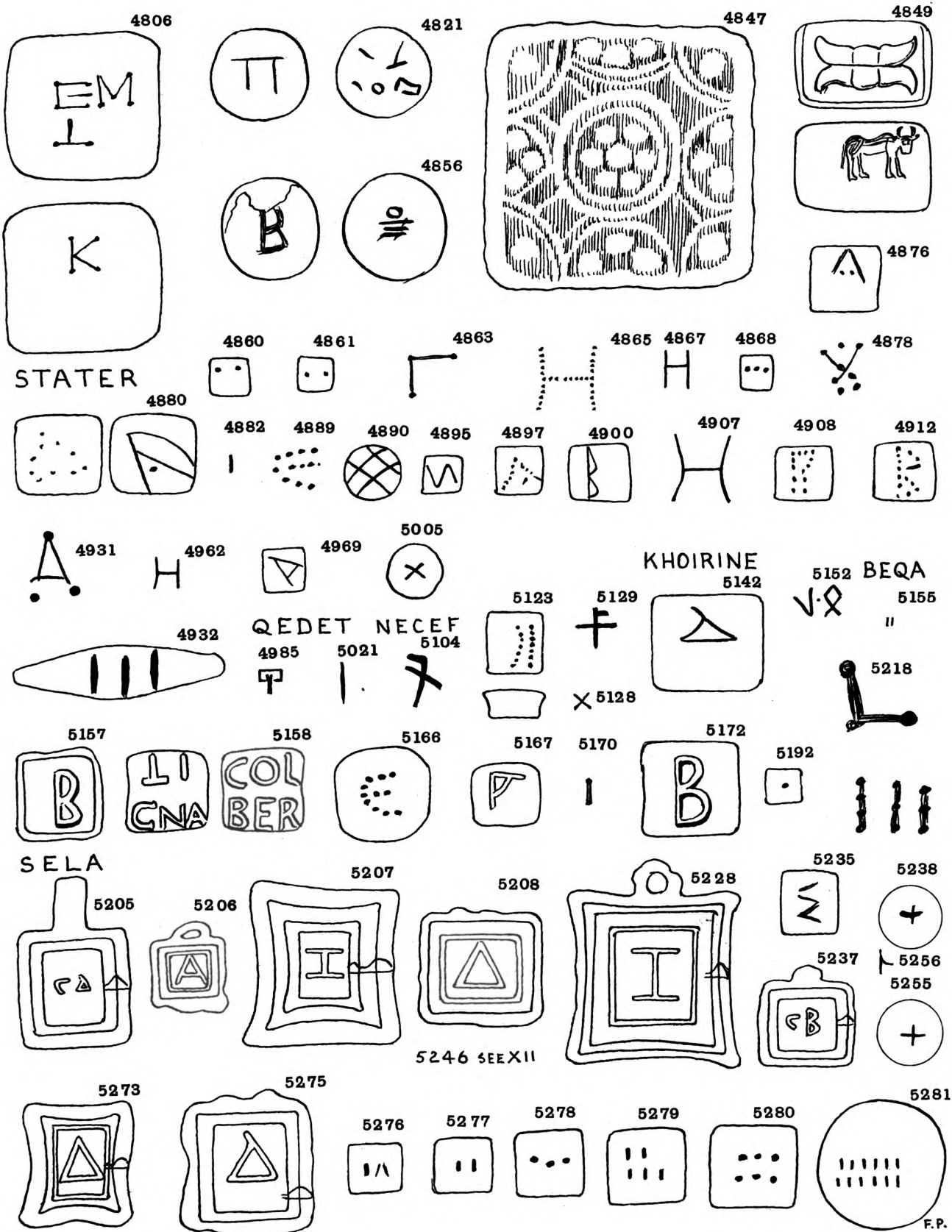
DARIC

4773 LPM α ↑ TOY P



4797 A
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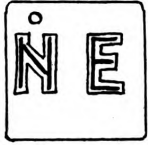


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UNGIA
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5299



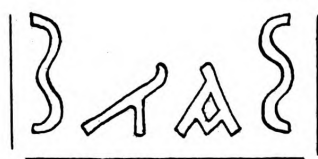
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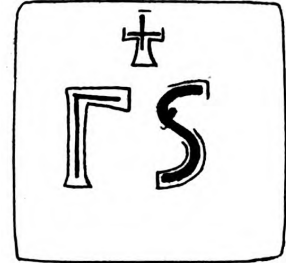
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5310



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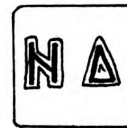
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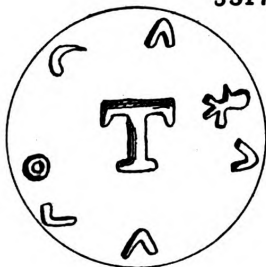
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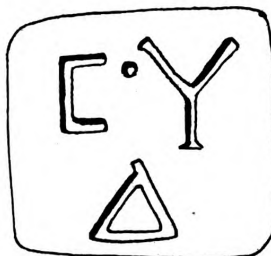
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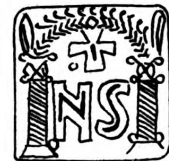
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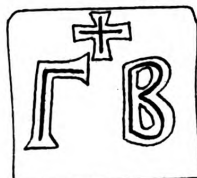
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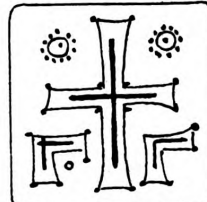
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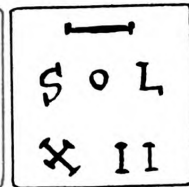
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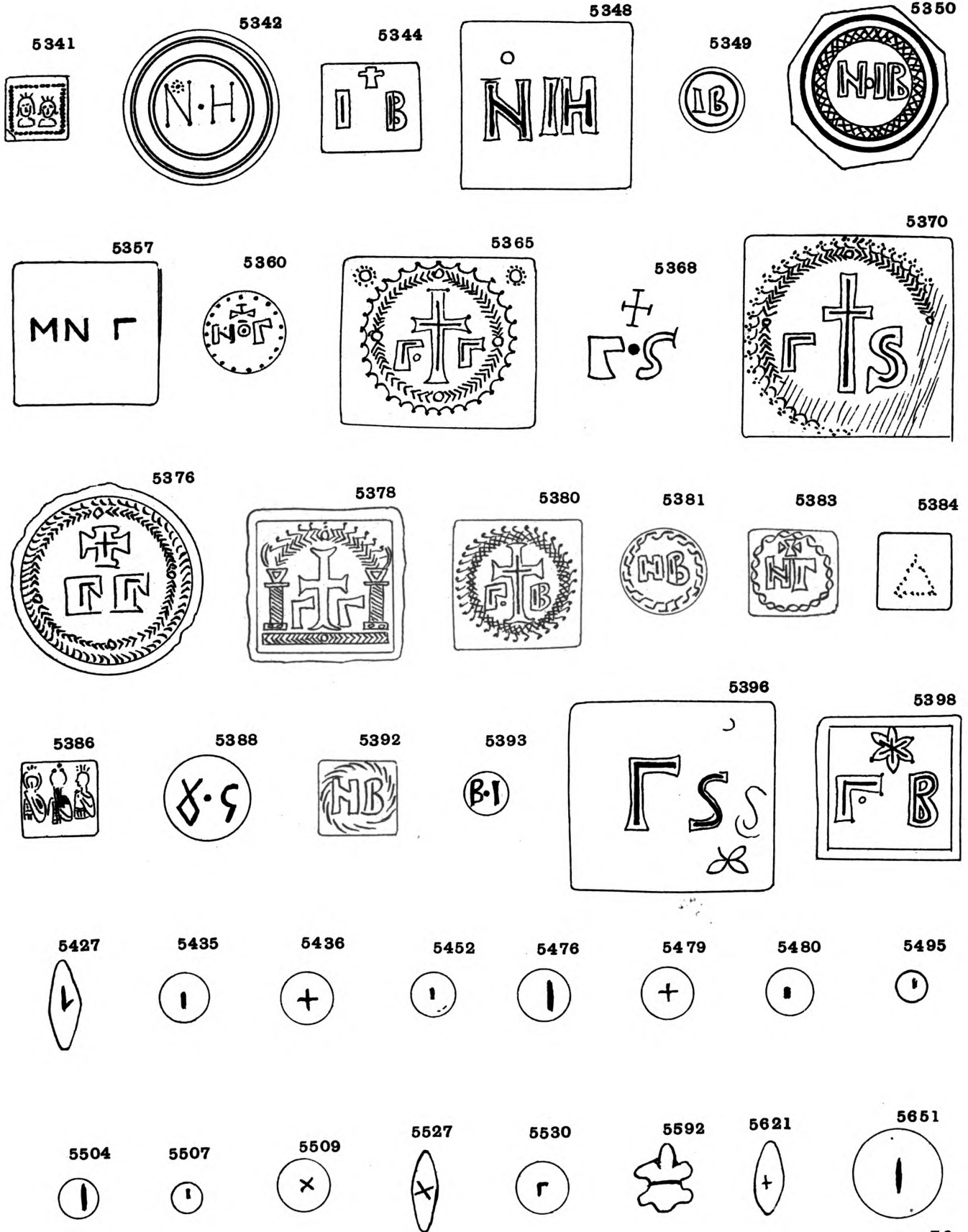
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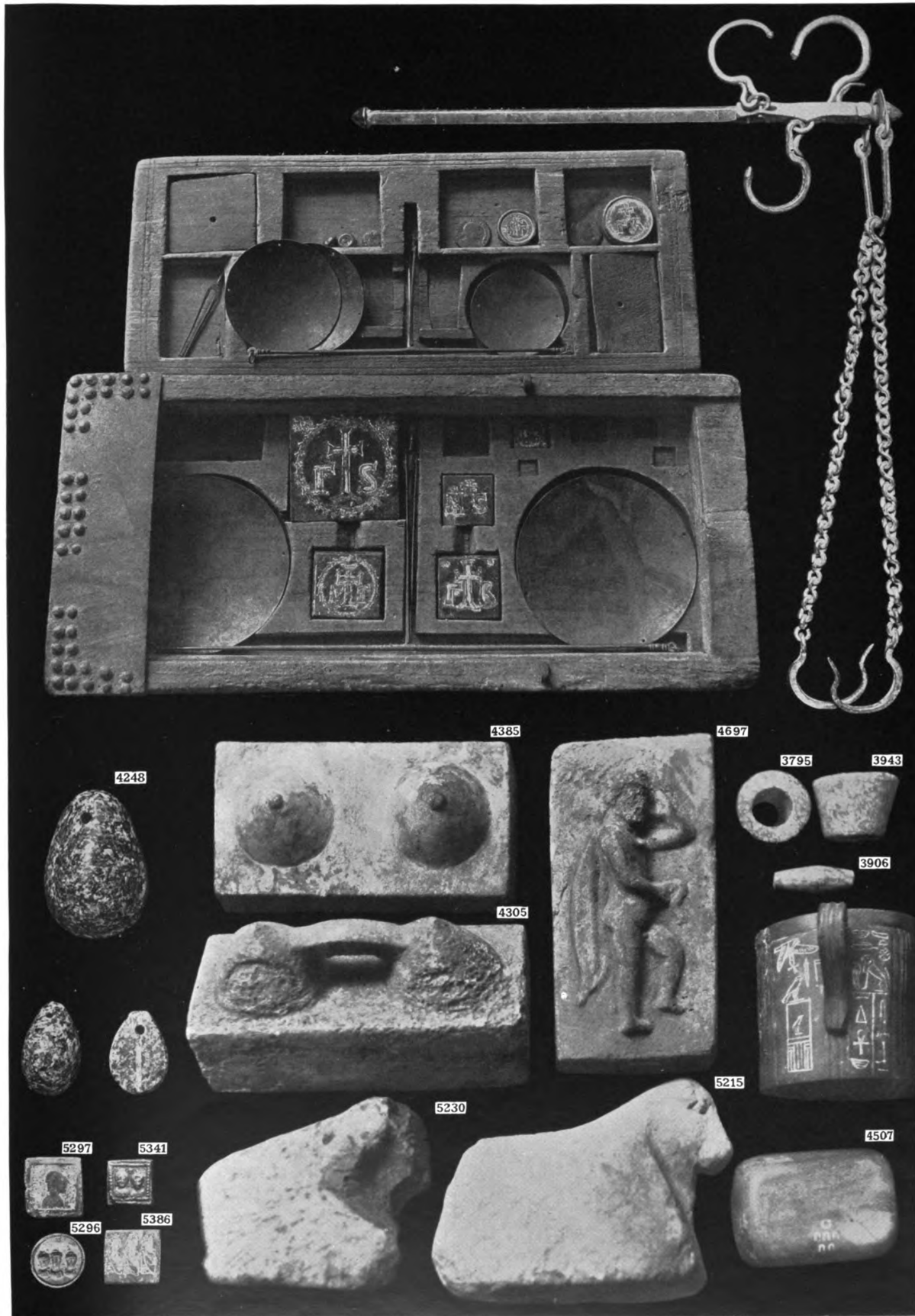
5339



F. P.



F.P.



CENTRE OF GRAVITY C. G.										HOOKS & SADDLE					
4	3	2	1	b	h	1	2	3	h	4					
12	11	10	9	8	7	6	c	5	4	3	2	1	0	-1	-2
37	35		30			25		d	20		15		10	5	0

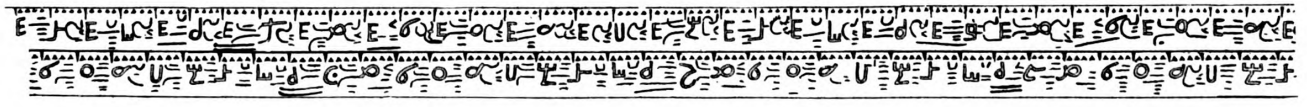
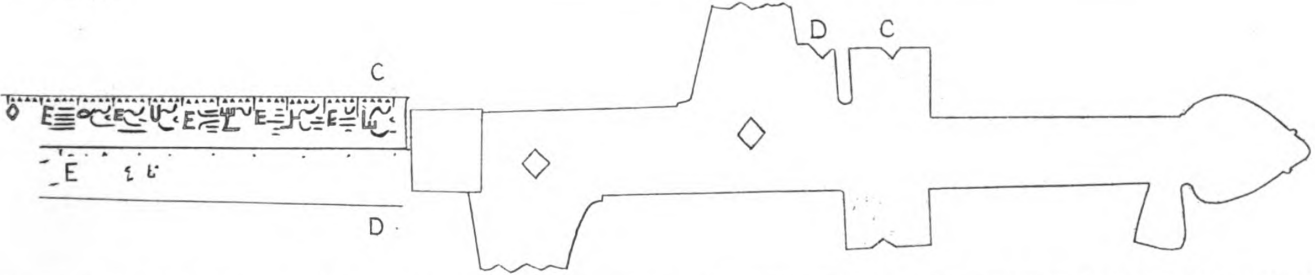
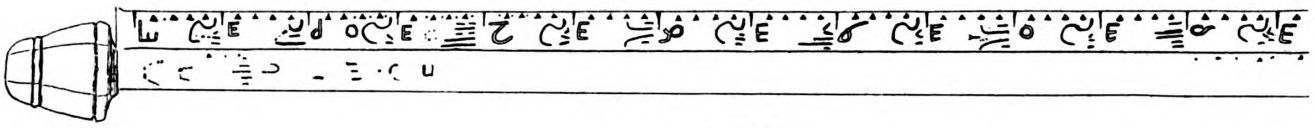
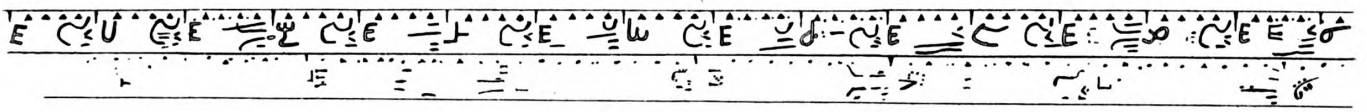
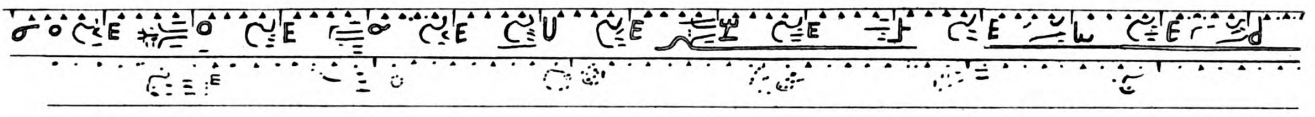
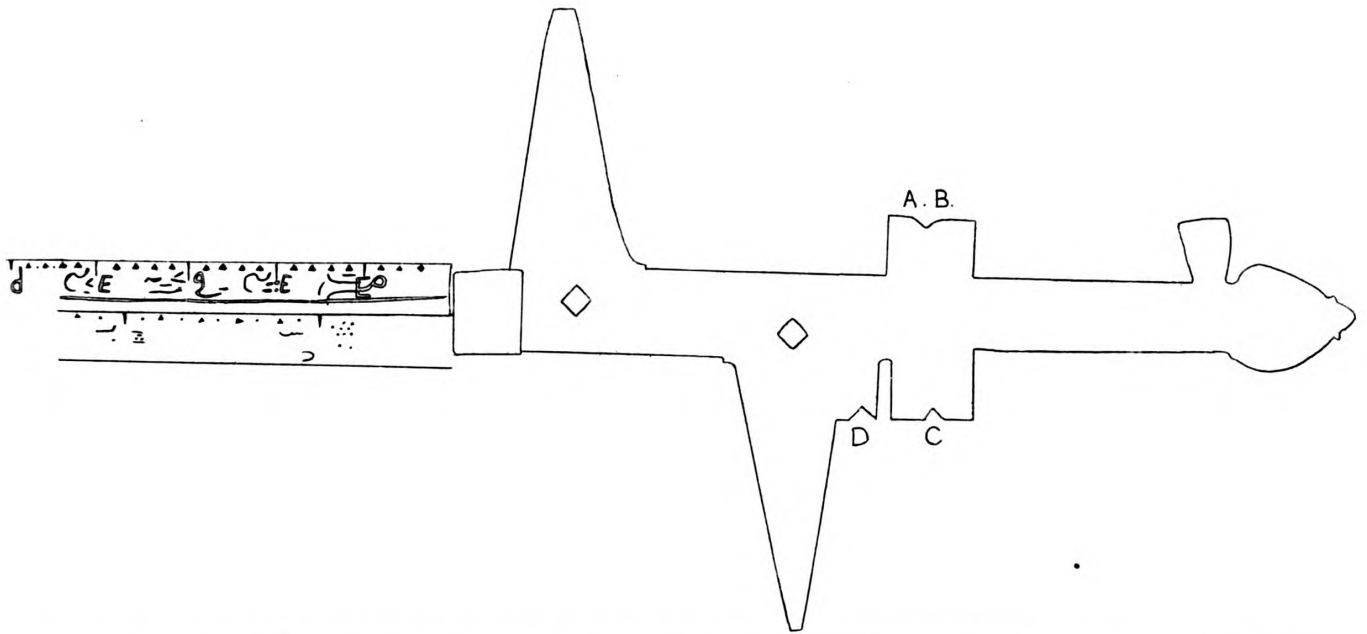
No. 2. PSYKHARIDO STEELYARD, DETAIL OF SCALES 6/7 SIZE.

DIMENSIONS, SCALES AND MARKS OF EGYPTIAN STEELYARDS.

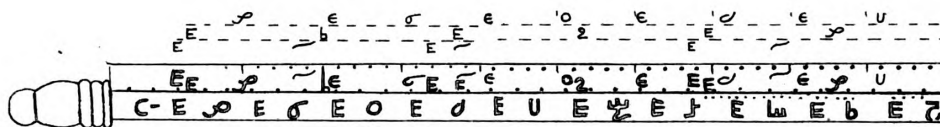
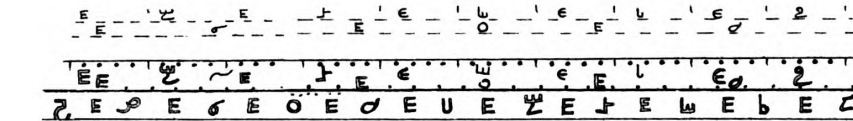
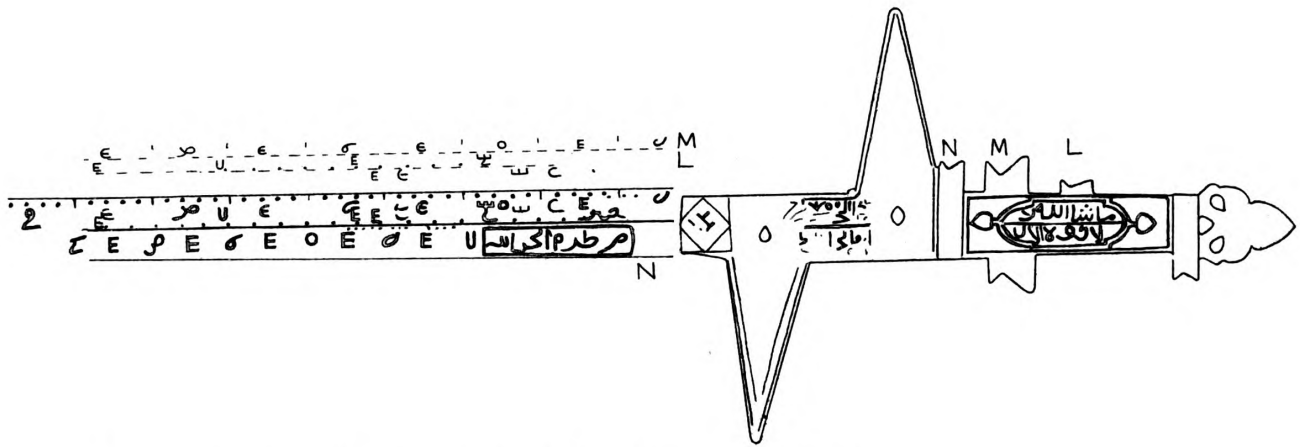
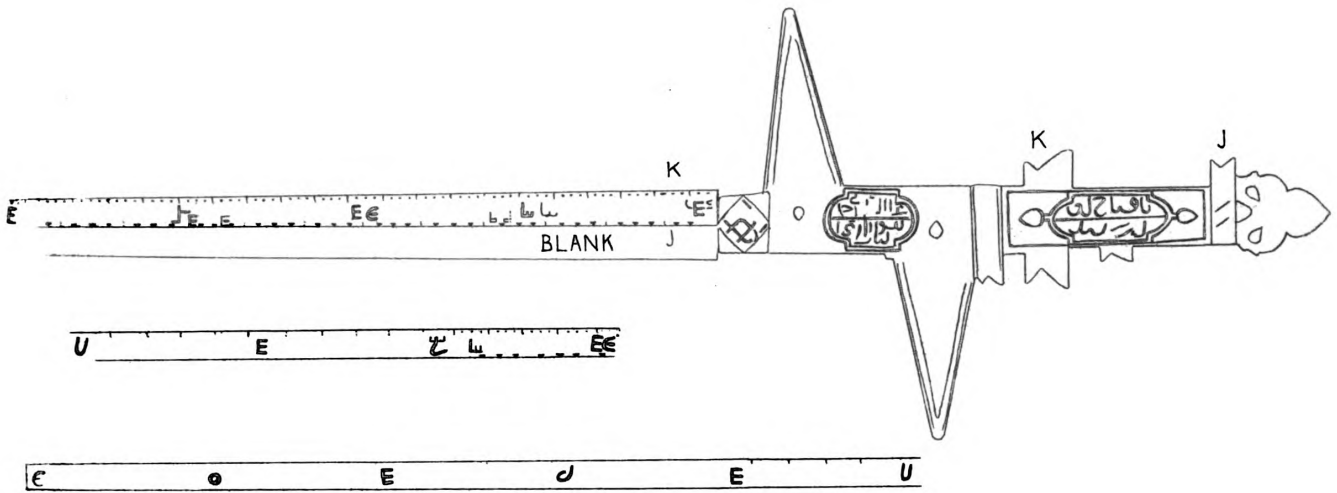
No.	GRAINS WEIGHT	TOTAL	INCHES SADDLE TO C.G.				E S UNIT			SCALE VALUES SADDLE TO SUSPENSORS			READINGS ON SCALES C.G.						
			S	T	U		S	T	U	S _h	T _j	U _k	S	T	U				
1	12479	19.0	6.79	3.82	2.20	.88	.733	.444	.178	5.15	5.00	5.08	+1	+3.5	+15.9	4.1	13.85	48.5	
2	5892	15.5	6.70	3.27	1.84	.75	.909	.526	.224	3.63	3.50	3.41	+12	+2.08	+8.7	3.92	11.16	35.3	
3	4123	15.3	6.42	3.64	2.18	.99	1.044	.650	.273	3.45	3.36	3.6	-69	+4.3	+3.3	1.88	7.0	23.25	
4	4187 +x	14 +x	0 (8.46)	4.80 (3.64)	6.58 (1.9)	LOST (.87)	.86 .91	.94 .513	.484 }	.218	(4.0)	(4.0)	(4.0)	0	+1.72	(+7.6)	4.92	15.15	42.3
5	247	5.7		1.04	.40	.14	.698	.475	.743	1.49	.84	1.0	+1	+6	-5	1.95	4.75	14.0	
6	829	8.4	3.36	2.35	1.43	.56	1.67	.876	.352	1.43	1.65	1.61	-16	+1.75	0(4)	.45	3.9	8.15 (12.15)	
7	965	8.3	2.72	1.84	.56	.24	1.30	.448	.154	1.42	1.25	1.56	-06	+8	+85	.57	5.6	16.5	
8	5630 +x	14.4 +x	4.38	4.23	2.22	.96	1.156	.586	.248	3.64	3.78	3.84	-68	+1.35	+7.6	.55	5.11	20.72	
9	7970	16.2	6.20	NONE	2.20	.82	NONE	.57	.212		4.05	3.8		.6	5.7		7.45	31.2	
10	3074	14.0	5.30	3.52	1.91	.82	1.0	.546	.25	3.50	3.55	3.42	-65	+5	+4.17	1.12	6.76	22.2	
11	596	7.9	2.86	2.10	1.18	.33	.0697	.0374	.582	3.0	31.5	.566	+4	+8	+2.5	15.5	53	4.7	
12	658	8.1	3.13	1.76	.70	.25	.895	.368	.138	1.97	1.91	1.8	0	.45	5.2	1.5	6.75	26.8	
13	905	8.1	2.53	2.07	1.18	.42	.0705	.0387	.0138	29.4	30.5	31.2	-4.2	-1.5	+36	2.0	34	189	
14	3645	14.6		3.36	1.73	.72	.952	.491	.183	3.52	3.50	4.0	-13	+1.5	+2.5	2.5	9.7	30.3	
15	1005	8.1	3.11	2.23	1.07	.32	.0748	.0344	.0100	29.8	31.1	31.9	-2.6	+4.0	-8.4	1.6	58	252	
16	903 +x	5.5 +x	1.51	1.78	1.36	.86	.36	.524	.0418	.0157	.0112	34.2	32.6	? 31.8	-72	-2.5	? +16		

MARKS ON U T S

1	† ΠΑΥΛΟΣ †	ΜΕΝΕΡΕΠΕΡΕ	Ι Ε Κ Ε	Ε Β
2	✕ ΛΑΡΙΑ ΔΟ ✕	Κ Ε Λ Ε Μ Ε Ν Ε	Ζ Ε Κ Ε	Α
3		Κ Ε Λ Ε Μ Ε Ν	Ε Ε	Ε
4		Ν Μ Λ	Ε Ι Ε	Ε
5		X=30 V X=20 V X	X V III	
6		Κ Ε Κ	Ε Ε 7 4	Α=1
7		N, V, X, V, X, V, XX, VX	V X V	
8		Ε Ν Ε Μ Ε Ν Ε =25	Ζ Ε Κ	Ε Α
9		Ν Μ Λ	Ε Ε Ε	
10		N, V, X, V, X, V, XX	X V X V	V
11	ΑΡΡΟ	Α=11 Θ Η Ζ Σ // Δ	Ν Μ Λ Κ Ι Ρ ρ Ν Μ	Ο = Ν Μ // Κ Ι
12		X, V, N, V, X, V, X, V, XX	V X	V
13		Σ Ε Δ Γ	Ρ ρ Π Ο // Ν Μ Λ	Μ Ε Λ Ε Κ Ε Γ Ε Α
14		Ο Ε Ν Ε Μ Ε Ν Ε	Ε Κ Ε Ε Ζ	Ε Α
15		Α=11 Θ Η Ζ Σ Ε Δ	Π Ο ρ Ν Μ Λ Κ Ι Ρ ρ Π Ο ρ Ν	Σ Ε Ν Ε Μ Ε Λ Κ Ε Γ Ε Α
16	Η Ρ Ψ Δ Ο Υ	Η Ζ Σ Ε Δ	//// //// //// //// //// Ν Μ	Π Ο Ξ Ν Μ Λ Κ Ε Ρ



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ON STEELYARDS 10 20 30 40 50 60 70 80 90
 د ل ط ز U س O م

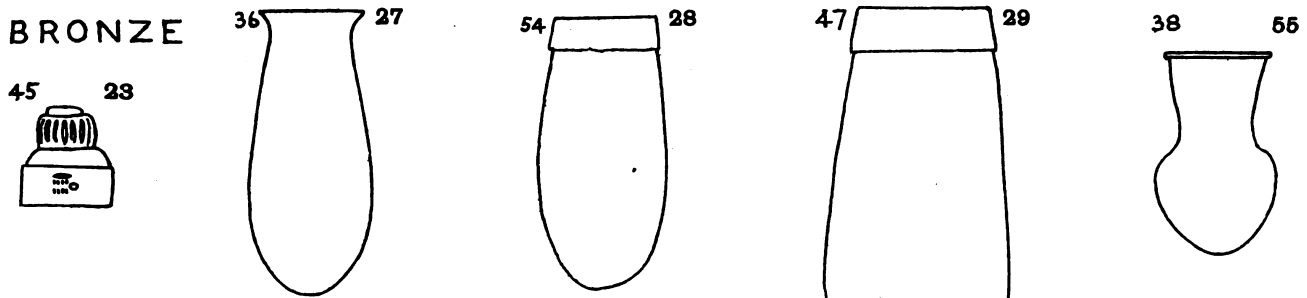
CURSIVE GREEK λ κ μ ν ξ ο π

STEELYARDS 100 200 300 400 500 600 700 800 900 1000
 ρ ς ζ Ϸ φ χ τ ω

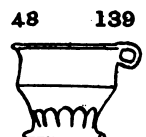
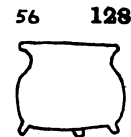
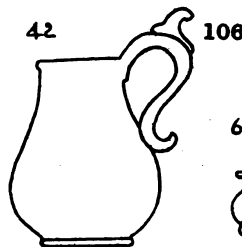
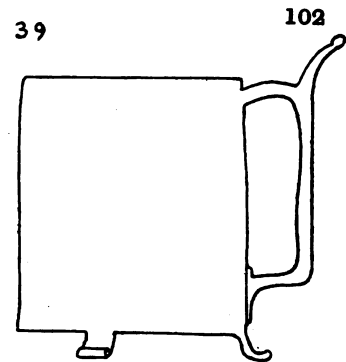
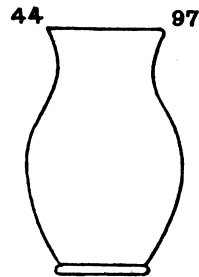
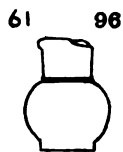
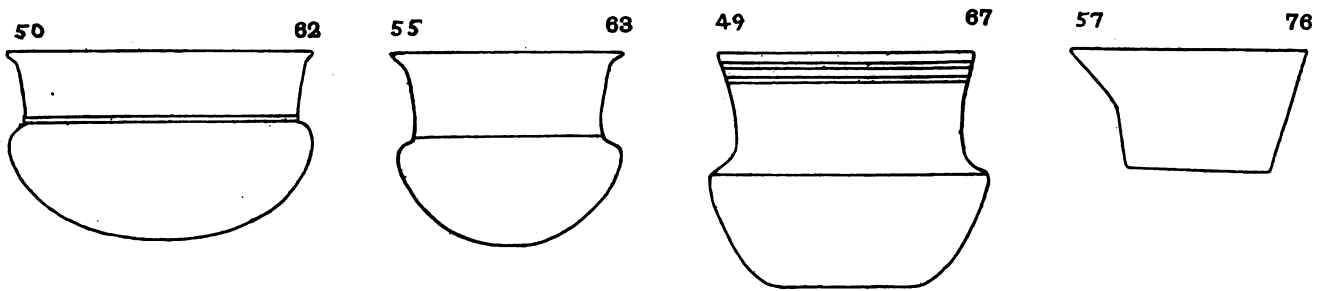
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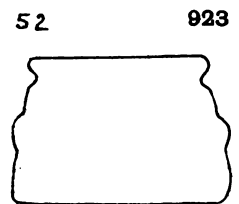
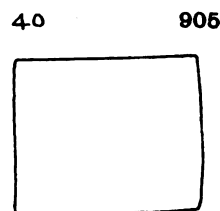
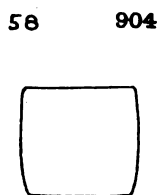
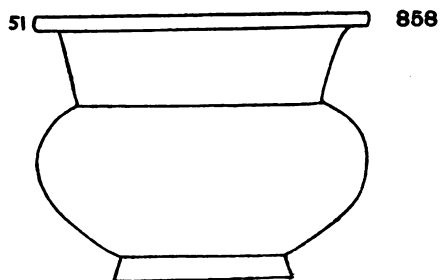
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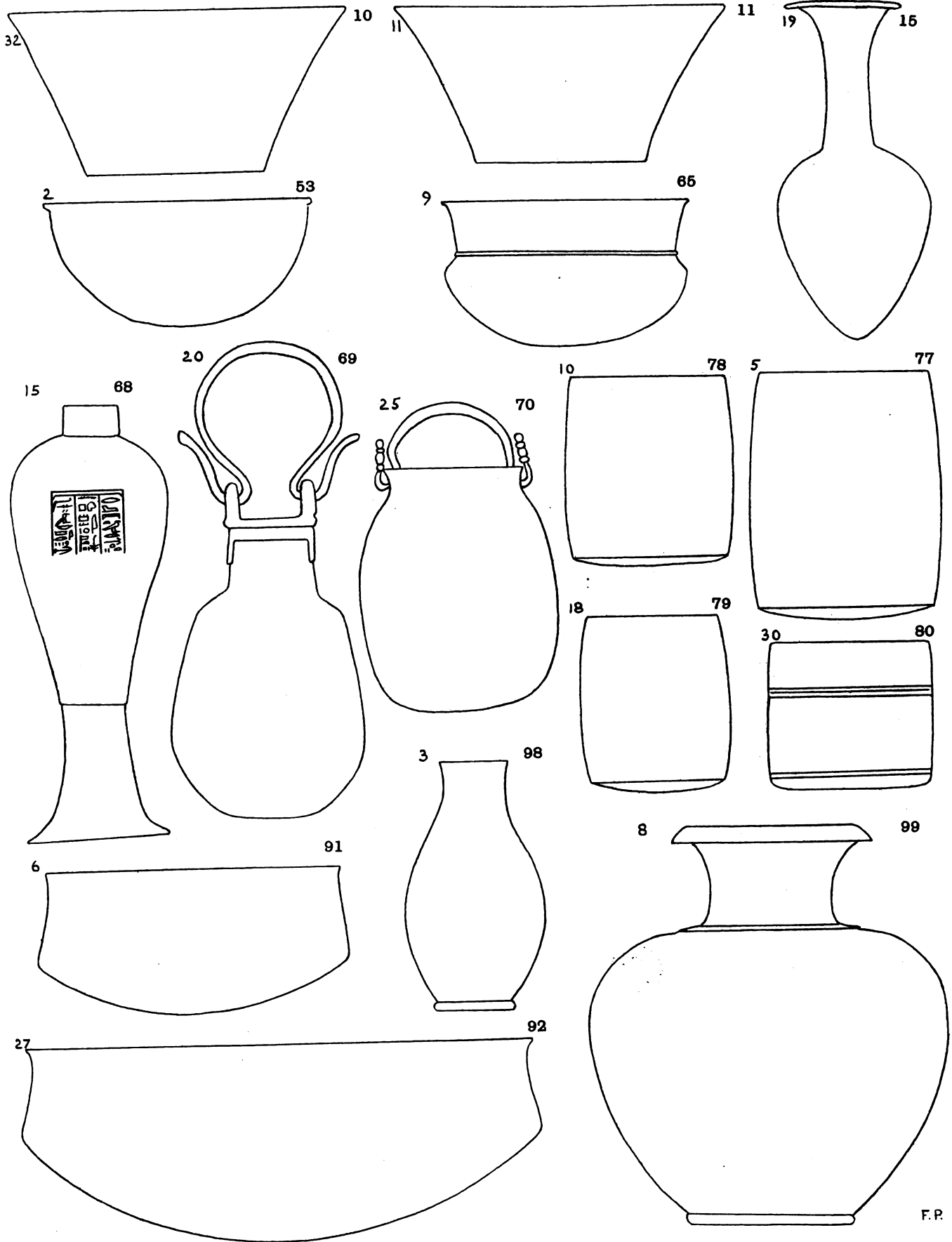
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 THE RIGHT NUMBER IS OF THE VASE CATALOGUE.



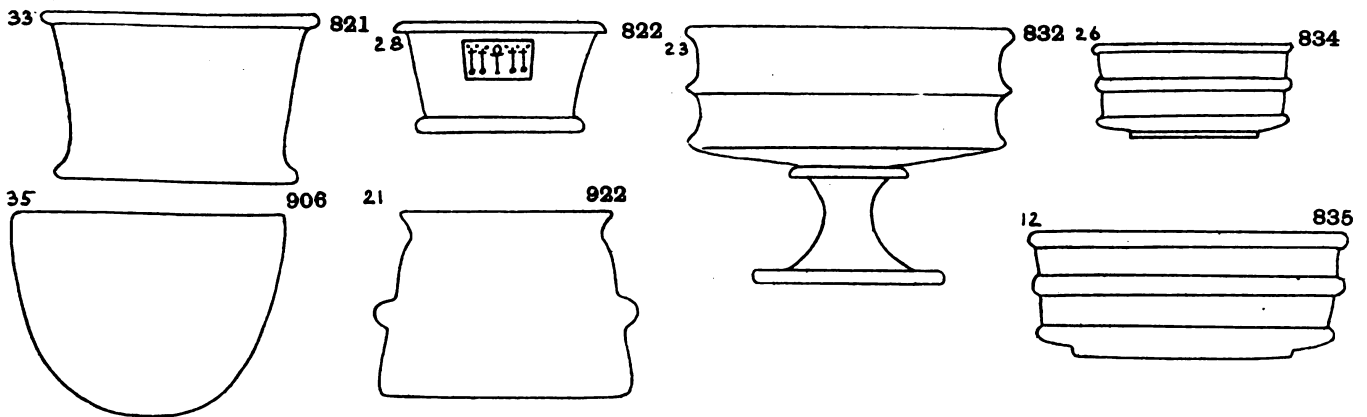
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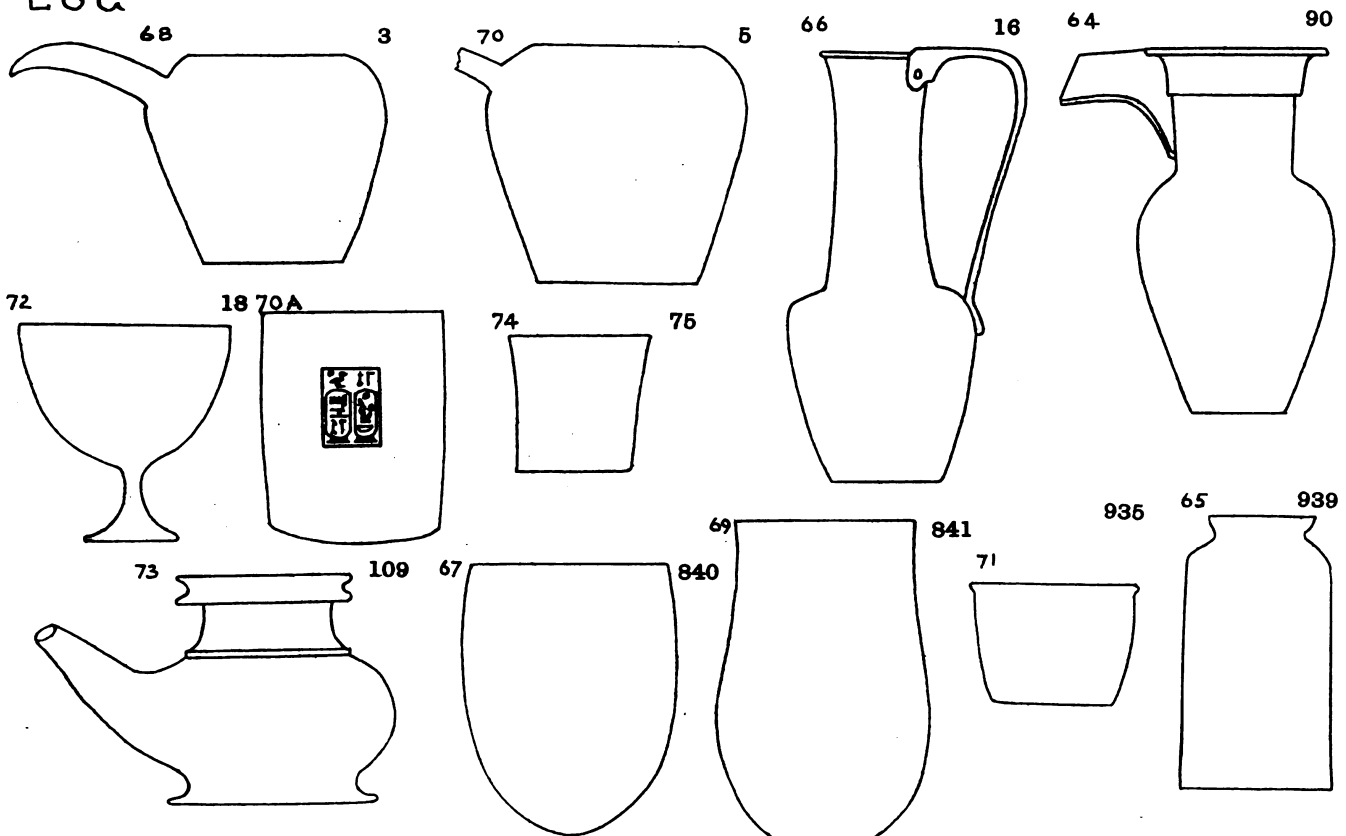
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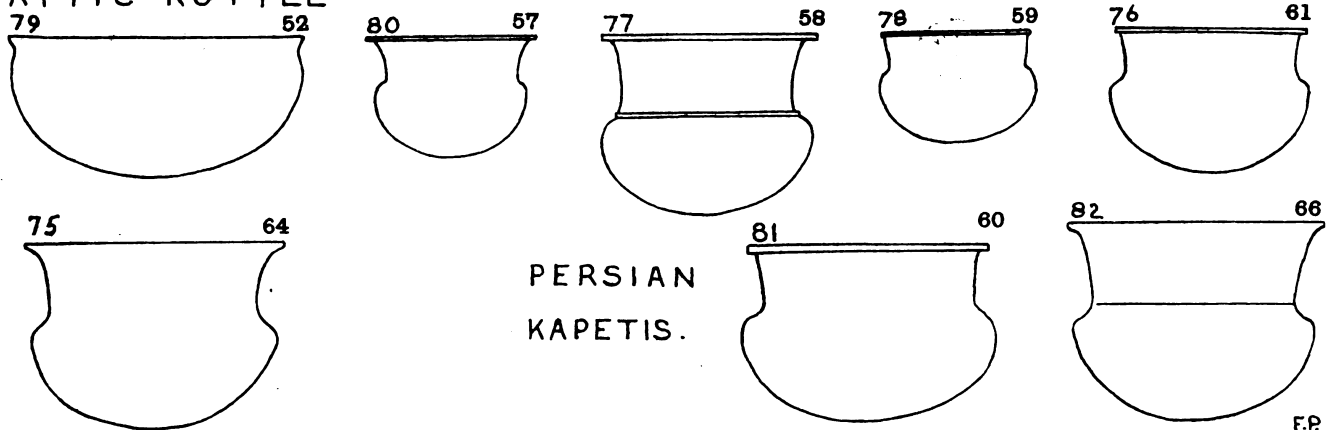
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LOG

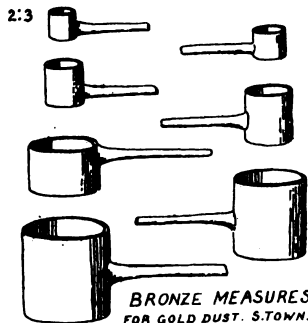
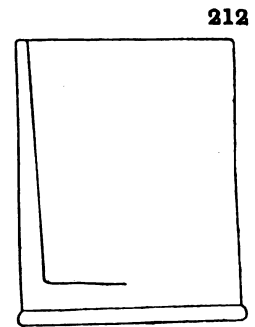
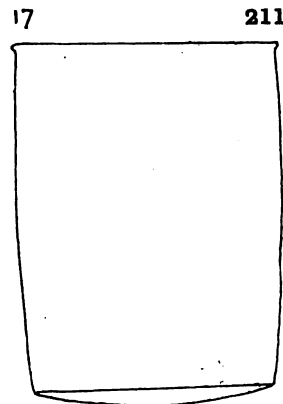
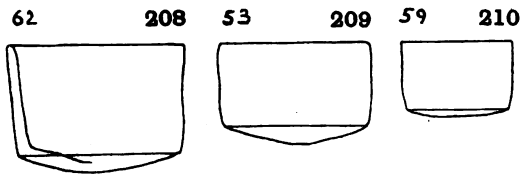
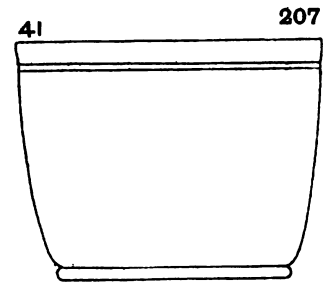
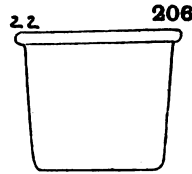
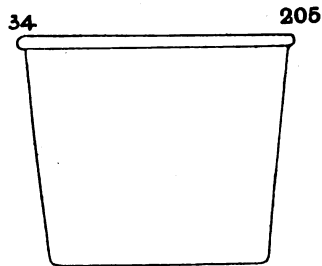
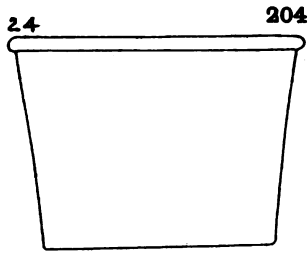
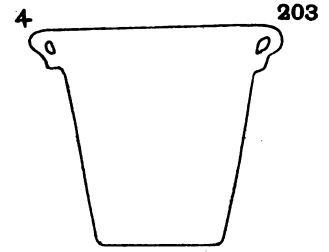
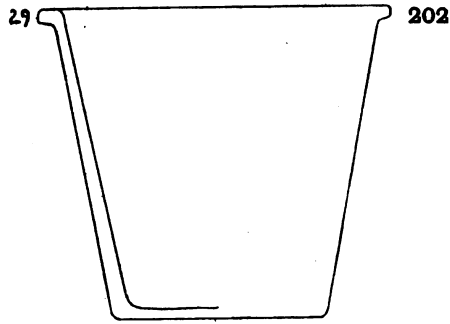
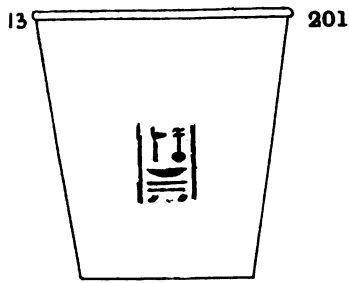


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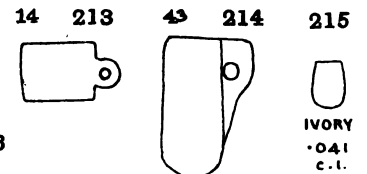


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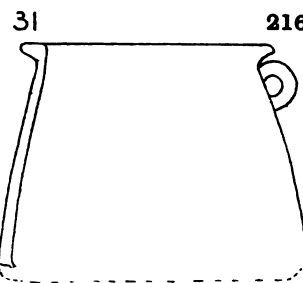
F.P.



BRONZE MEASURES
FOR GOLD DUST. STOWN.
SEE SECT. 86.



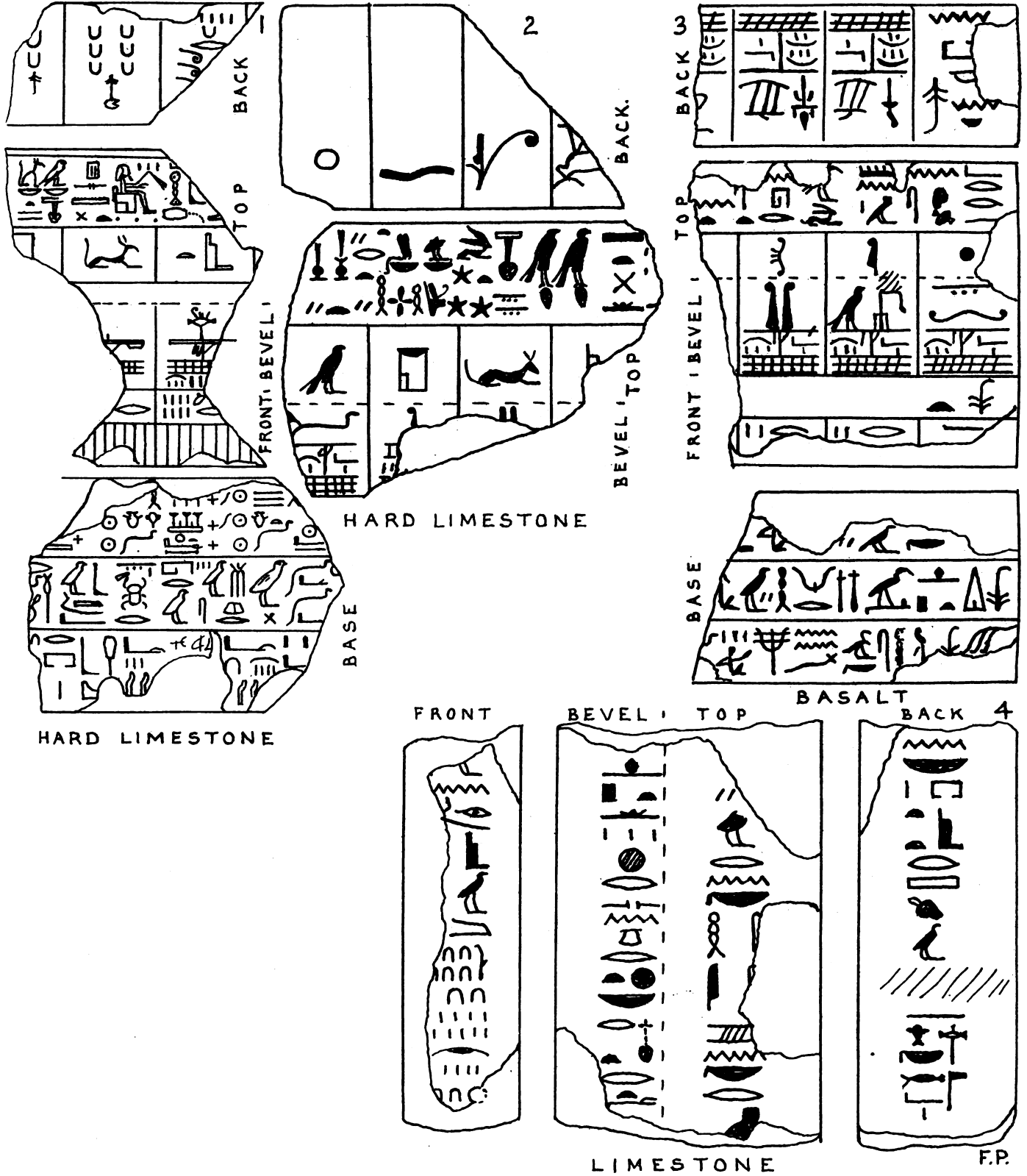
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F.P.



PEYEM ¼NECEF KHOIRINE BEQA
NAMES ON WEIGHTS, SEE SECT. 3.



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PEYEM 112-125 GRs.										No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL			
2001	CARNEL.	23	28-0	1/4	112-0	PIERCED				1	GY.SY.	921	1164-0	100	4	KAHUN	2122	BAS.	38	1197-9	10	119-8				
	BK-QTZOSE	9	56865	50	113-7					2	Y.LIM.	656	466-1	4	5	IV	3	HAEM.	436	119-9	1	-9				
	BK-JASR	314	285	1/4	114-0	PIERCED				3	BAS.	802	1164-8	10	-5	MEM. XVIII	4	GYP SUM	535	239-6	20	-9			-10	
	BK-QTZOSE	659	1369-3	12	-1					4	LIM. ABYD.	63	140-0	12	-7	III -15	5	BK-QTZOSE	8	599-4	50	-9				
	GY.SY.	238	11416	100	-2	SEE K.				5	LIM.	267	116-8	1	-8		6	ALAB.	63	300	1/2	120-0			0	
	BK-QTZOSE	2	4571-9	40	-3					6	DIORITE	65	1870-2	16	-9	IIII VI	7	LIM.	265	240-1	2	-0				0
	GY-QTZOSE	2	4572-2	40	-3					7	HAEM.	49	117-0	1	117-0	SYRIA XVIII	8	ALAB.	625	240-1	2	-0	MERENPTH			0
	BK.SY.	11	5715	50	-3					8	BAS.	653	2339-6	20	-0	MEM. V	9	BAS.	20	2400-3	20	-0	SEE Q			0
	BAS.	33	572	1/2	-4					9	GY.SY.	2	4685-4	40	-1		2130	HAEM.	491	240-2	2	-1			XVIII	
2010	BRECCIA	935	2288	2	-4					2070	GY-QTZOSE	8	4686-0	40	-1		1	ALAB.	496	600-4	5	-1	AMARNA "			
	GY-QTZOSE	392	2288-1	20	-4					1	Y.BK-SERP.	691	469-0	4	-2	ROUGH XII	2	"	63	481-0	4	-2	II XII			
	BK-QTZOSE	2	11445	100	-4					2	GY-QTZOSE	8	4690-3	40	-2		3	BK.SY.	125	481-2	4	-3				
	GY.SY.	9	4580-0	40	-5					3	BAS.	358	1172-1	100	-2		4	BK-QTZOSE	55	2405-8	20	-3				
	BAS.	23	5724-5	50	-5					4	BAS.	358	928-3	8	-3	MEM.GLASS	5	BAS.	314	30-1	1/4	-4				
	LIM.	497	573	1/2	-6					5	BK-QTZ.	10	5863-0	50	-3		6	ALAB.	264	602	1/2	-4				
	ALAB.	15	573-1	5	-6	MEM.GLASS				6	GY.SY.	346	4695-0	40	-4		7	BK-QTZOSE	558	6019	50	-4	SEE Q			
	BAS.	64	21834	16	-6	III, -10 XII				7	GY-QTZOSE	54	4694-4	40	-4		8	HAEM.	874	120-5	1	-5	ROUGH			
	RED GRAN	238	22930	200	-6	III, -10 XII				8	"	54	4696-9	40	-4		9	ALAB.	203	120-6	1	-6				
	FOS.WOOD	9	4580-4	40	-7					9	BK."	105	23480	200	-4	-4	*2140	BAS.	237	4825-5	40	-6				
2020	BAS.	133	287	1/4	-8					1	GY.SY.	12	1175-0	10	-5		1	BK-QTZOSE	54	2413-2	20	-7				
	BAS.	264	574	1/2	-8					2	HAEM.	492	117-7	1	-7	XVIII	2	GY.SY.	54	4829-0	40	-7				
	DURITE	22	2295-8	20	-8					3	BAS.	313	117-7	1	-7		*3	LIM.	63	2417-0	20	-8	SEE Q			
	SERP.	558	2296-4	20	-8	Λ QU. XII				4	GY-QTZOSE	10	4709-4	40	-7		4	GY.MARB.	32	6043	5	-9	RETABEN			
	BAS.	258	11485	100	-8					5	BAS.	11	5384	50	-7		5	BR-QTZITE	26	2419-0	200	-9	-4			
	BAS.	656	13793	12	-9	0 IIIII V				6	CHLORITE	64	117-8	1	-8	=	6	BAS.	31	1209-6	10	-10	MERENPTH.			
	BK-QTZOSE	923	2298-4	20	-9					7	GY-QTZOSE	558	5890	50	-8	GHURUB	7	BAS.	351	1210-2	10	-0				
	"	105	5745-6	50	-9					8	LIM.	442	235-9	2	-9		8	CHLORITE	646	2420	20	-0	-20 XII.			
	BAS.	65	230-4	2	115-0	0 I'				9	BAS.	437	1179-1	10	-9		9	ALAB.	654	2420	20	-0	-2 VI			
	HAEM.	497	459-9	4	-0	XVIII				1	GY.SY.	31	1179-2	10	-9		2150	LIM.	442	2422-3	20	-1				
2030	ALAB.	26	575	5	-0	-15				2	HAEM.	49	236-1	2	118-0	-20? XVIII	1	BK-QTZOSE	54	2422-4	20	-1				
	LIM. QU.	646	6900	60	-0	III -450 XII				2	GY-QTZOSE	54	2360-4	20	-0	MERENPTH.	2	BK.SY.	27	4847-6	400	-2	RAONKH IV			
	HAEM.	499	2303	2	-1					3	BK."	10	5898	50	-0		3	Y.LIM.	498	242-6	2	-3	GEBLEYN XVIII			
	GY.SY.	10	4606-0	40	-1					4	QTZITE	19	1180-4	10	-0		4	BK-QTZOSE	11	4855-3	40	-3				
	BK-QTZITE	313	4605-4	400	-1					5	BAS.	442	2364-5	20	-3		5	BAS.	328	242-60	200	-3				
	LIM.	38	115-2	1	-2					6	BAS.	254	29-6	1/4	-4	MERENPTH.	6	BAS.	327	243-0	2	-5				
	BAS.	372	1152-3	10	-2					7	BAS.	BALL 1184-0	10	-4		7	LIM.	16	4860	4	-5	QUFT				
	LIM. QU	64	1382-2	12	-2	III XII				8	BK-QTZOS	53	1184-8	10	-5		8	BRECCIA	80	1215-1	10	-5	XVIII			
	BK-QTZOSE	53	1383-0	12	-2					9	ALAB.	439	4738-5	40	-5		9	ALAB.	313	2430-3	20	-5				
	QTZ.	81	230-6	2	-3	MEM.GLASS				2100	BAS.	419	592-6	50	-5		2160	BR-QTZITE	14	24300	200	-5	-40			
	BAS.	254	11533	100	-3	SEE Q				1	OBSID.	928	59-3	1/2	-6		1	BONE	46	152	1/8	-6				
	RED SY.	345	5768-2	50	-4					2	BAS.	353	2372-4	20	-6	SEE Q	2	ALAB.	483	1215-8	10	-6	AMARNA XVIII			
	DURITE	618	231-1	2	-5	0 I VI				3	BAS.	452	5932	50	-6		3	BK-QTZOSE	56	1216-0	10	-6				
	LIM.	916	462-0	4	-5	KOM SULT. VI				4	BAS.	367	1187-6	10	-8	SEE Q	4	LIM.	56	12160	100	-6	-9			VI
	BAS.	125	1155-0	10	-5					5	BAS.	22	119-0	1	119-0		5	BAS.	652	608-7	5	-7				
	LIM.	26	28-9	1/4	-6					6	BAS.	424	1190-2	10	-0		6	BK.SY.	12	4872-7	40	-8				
	LIM.	422	925-0	8	-6	MEM.GLASS				7	BK-QTZOSE	54	594-6	50	-0		7	BK-QTZOSE	10	6092-9	50	-8				
	LIM.	BALL 1387-0	12	-6	0 IIIII -10					8	BAS.	313	23800	200	-0	-180	8	BAS.	102	61-0	1/2	122-0				
	GRAN.	11	4630-2	40	-7					9	BAS.	326	4763-0	40	-1		9	BAS.	436	244-0	2	-0				
	BK-QTZOSE	877	463-4	4	-8					2110	QTZITE	9	4765-8	40	-4		2170	HAEM.	425	122-1	1	-1	MARATHUS			
	GY.SY.	20	1157-7	10	-8					1	RED GRAN.	63	4770-0	400	-2	-270 KAH	1	GY-PORPHY.	8	4805-4	40	-1				
2040	QTZITE	54	4630-5	40	-8					2	BK-QTZOSE	9	5967	50	-3	SEE Q	2	BK-SERP.	261	61-1	1/2	-2				
	LIM.	653	6950	60	-8	III -500				3	HAEM.	399	59-7	1/2	-4		3	BAS.	256	122-2	1	-2				
	Y.LIM.	495	29-0	1/4	116-0	XVIII				4	GY.SY.	9	4775-9	40	-4		4	BR-QTZITE	435	244-50	200	-2	-30			
	BK-WT-QTZ	10	4630-0	40	-0					5	BAS.	65	119-5	1	-5		5	BR-LIM.	358	489-4	4	-3				
	BR-QTZITE	347	4642-0	400	-0					6	"	482	477-9	4	-5		6	BAS.	348	1222-8	100	-3				
	ALAB.	656	1392-8	12	-1	SEE Q				7	BK-QTZOSE	9	597-7	5	-5	SEE Q	7	BK-QTZOSE	31	153	1/8	-4				
	BAS.	11	2322-3	20	-1	QUFT IV				8	GY-GRAN.	439	4784-4	400	-6	SEE Q	8	Y.LIM.	38	122-5	1	-5	TARTUS			
	BAS	11	2325-0	20	-2					9	LIM.	141	1197-3	10	-7	SEE Q	9	GN-PORPHY	311	612-4	5	-5	-35			
	RED GRAN.	311	4647-0	400	-3	-2				2120	BK-SY.	352	4788-0	40	-7		2180	BAS.	64	49						

DARIC 124-133 GRS M=MINA													
No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL
2185	RED QTZITE	559	1227.3	10	12.2	AMARNA XVIII	2248	BAS.	446	746.5	M	12.4	-5
6	BAS.	32.5	6133	50	7		9	SERP.	26	41.5	1/3	5	
7	GY.SY.	237	12268	100	7	MERNPTAH	2250	ALAB.	805	3112.0	25	5	-4 XVIII
8	BAS.	254	1228	1	8		1	SARD.	628	10.4	1/2	8	
9	GY.SY.	367	6143	50	9		2	HAEM.	493	41.6	1/3	8	XVIII
2190	BK-STEAL	232	1230	1	12.3		3	BAS.	803	3745.0	30	8	XVIII
1	BK PORPHY	11	6150	50	0		4	GY.SY.	8	624.2	50	8	KAHUN; XVIII
2	BK-QTZITE	367	24600	200	0	-20	5	HAEM.	2	624.6	5	9	MERNPTAH
2A	GY.LIM.	497	1231.0	10	0	24V-21	6	GN.SERP.	33	62.5	1/2	12.50	
			6153	50	1	SEE B	7	LIM.	364	62.5	1/2	0	
3	BAS.	262	154	1/8	2		8	HAEM.	107	62.5	1/2	0	GHUROB
4	BAS.	203	61.6	1/2	2		9	"	482	125.0	1	0	XVIII
5	BAS.	261	61.6	1/2	2		2260	BAS.	426	1250.0	10	0	
6	BAS.	131	123.2	1	2		*1	LIM.	192	1250.2	10	0	
7	LIM.	920	4930	4	2		2	BAS.	331	3751.4	30	0	
8	ALAB.	12	1232.1	10	2		3	BK-QTZOSE	63	2501.8	20	1	XXIII
9	GY.SY.	9	6158	50	2	KAHUN XII	4	GY.SY.	54	3128.1	2.5	1	XXIII
2200	GY.SY.	9	6167	50	3	" XII	5	ALAB.	802	31.3	1/4	2	MERNPTAH
1	HAEM.	452	61.7	1/2	4	MARATHUS	6	HAEM.	895	125.2	1	2	TARTUS, XVIII
2	LIM.	916	61.7	5	4	-2	7	ALAB.	795	626.4	5	3	QUFT, XVIII
3	BK-QTZOSE	11	6168	50	4		8	CHLORITE	649	3133.9	25	3	SEE B
4	BAS.	367	2447.4	20	4		9	LIM.	263	20.9	1/6	4	
5	BAS.	54	2469.7	20	5		2270	ALAB.	244	125.4	1	4	QUFT
6	BK-QTZOSE	10	4941.3	40	5		1	LIM.	16	250.8	20	4	MEM-GLASS-15
7	HAEM.	484	123.6	1	6	XVIII	2	PINK LIM.	436	1253.9	10	4	QUFT
8	BR.SY.	10	4946.0	40	6		3	BA.SERP.	922	502.0	4	5	
9	ALAB.	801	123.7	1	7	XVIII	4	BK-QTZOSE	54	627.9	50	6	XXIII
2210	DIORITE	64	123.7	1	7	XII	5	BK.SY.	5	6280	50	6	XXIII
1	BK-QTZOSE	14	618.8	5	7		6	BK-QTZOSE	653	12560	100	6	-140 XXIII
2	BAS.	40	1236.7	10	7	MERNPTAH	7	CHLORITE	165	41.9	1/3	7	SEE K
3	GY-QTZITE	384	123700	1000	7	-800	8	BAS.	54	1256.8	10	7	
4	CHLORITE	652	4954	4	8	00 XII	9	BAS.	54	2550.3	20	7	SEE B
5	HAEM.	399	619.0	5	8	MARATHUS	2280	GN.SERP.	891	629.1	5	8	
6	" RED	493	619	5	8	-7	1	ALAB.	192	629.3	5	8	
7	BAS.	372	619.2	5	8		2	BAS.	422	1258.5	10	8	-20
8	BAS.	392	1237.6	10	8		3	BAS.	358	6290	50	8	XVIII
9	WT-QTZITE	364	24760	200	8		4	BRECCIA	79	629.8	5	9	XVIII
2220	BAS.	358	2479.0	20	9		5	HARD LIM.	797	2518.8	20	9	QUFT XVIII
1	CHLORITE	805	310	1/4	12.4		6	BK.SY.	9	3146.6	2.5	9	XXIII
2	BAS.	33	15.5	1/8	0		7	"	54	3776.3	30	9	SEE K
3	LIM.	482	620.2	5	0	KARNAK XVIII	8	LIM.	26	21.0	1/6	12.60	
3A	GY.LIM.	797	372.2	3	1	24V-21	9	DURITE	65	21.0	1/6	0	XII
4	BAS.	336	1241.5	10	1		9	BAS.	356	42.0	1/3	0	
5	ALAB.	894	2483.0	20	1		2290	BAS.	265	420	1/3	0	
6	BK-QTZOSE	10	4962.5	40	1		1	HAEM.	402	63.0	1/2	0	
7	"	54	4964.4	40	1		1A	ALAB.	494	126	1	0	MEM-15
8	BAS.	352	6206	50	1		1B	"	433	126	1	0	MEM-2
9	GY.GRAN.	422	4966.0	400	1	-20	2	BAS.	356	629.9	5	0	
2230	LIM.	65	620.8	5	2	QUFT VI	3	ALAB.	937	2519.2	20	0	
0A	BK-GY-LIM.	498	621.0	5	2	24V-21	4	LIM.	436	126.1	1	1	
1	LIM.	40	621.3	5	2		5	ALAB.	352	252.2	2	1	
2	HARD LIM.	652	1242.5	10	2	ABYD. VI	6	BAS.	38	2521.8	20	1	
3	BK-QTZOSE	54	4947.1	40	2								
4	BAS.	358	12420	100	2	-700							
5	BAS.	656	2487	2	3	I IV							
6	BAS.	653	2486.8	20	3	GHUROB IV							
*7	LIM.	254	124.4	1	4								
8	ALAB.	38	248.9	2	4								
9	BAS.	265	1243.7	10	4								
2240	BAS.	33	2488	20	4	-2							
1	LIM.	881	2488.0	20	4	MERNPTAH							
2	BAS.	18	2488.5	20	4								
3	BR.SY.	313	4974.7	40	4								
4	BAS.	367	1246.2	10	6								
5	LIM.	913	498.7	4	7								
6	GY.SY.	10	4996.8	40	9								
7	ALAB.	802	31.3	1/4	12.5	MERNPTAH							

MERNPTH. XIX NAQada PEBBLE QUFT SCHST. schist STEA EIR VM. veined GRS. original
 dyn palace Mem. NUM mulitic PORPH y-y RO man SERPentine syenite VOLcanic ash weight of stone
 METAMorphic OBSIDIAN QTZ quartz SANDST one SILICate VARiegated white -n loss of stone
 m 2308 &c, phi X = photograph in pl. IX (frontispiece), and similarly phi XVI and XXVI.

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REGISTER OF STONE WEIGHTS. 2358-2532. DARIC.

XXIX

No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL
2358	BRECCIA	802	2550	2	12.5	XVIII	2417	BKQTZOSE	54	6434	50	12.8	6	2472	BR-QTZITE	452	77800	10M	129.6	MEM. -800
9	ALAB.	496	637.5	5	-5	AMARN-7	8	Y.BK.SERP	149	429	1/3	-7		3	BK-WT-PORR	65	259.5	2	7	XII
2360	LIM.	63	637.6	5	-5	MEM. VI	9	BAS.	269	429	1/3	-7		4	BAS.	38	1297.3	10	7	DELTA
1	BAS.	422	2550.0	20	-5		2420	GY.SIL.	63	257.4	2	-7		5	BAS.	351	3892.0	30	7	
2	BAS.	54	2550.3	20	-5	XXIII	1	BAS.	355	257.5	2	-7		6	RED GRAN	328	64830	500	7	
3	BKQTZOSE	54	3187.1	25	-5	XXIII	2	LIM.	393	643.4	5	-7	SAIS	7	BR-QTZITE	452	77800	10M	7	-800
4	BAS.	439	6374.	50	-5		3	ALAB.	14	643.7	5	-7		8	BAS.	265	64.9	1/2	-8	
5	GY.SY.	357	6376.	50	-5							SEE B	9	GN.SILIC.	795	64.9	1/2	-8	XVIII	
6	LIM.	649	15300.	2M	-5	-320	4	BKQTZOSE	10	6434.	50	-7	XXIII	2480	BAS.	33	129.8	1	-8	
7	GY.SILIC.	415	127.6	1	-6							SEE B	1	LIM.	356	259.6	2	-8		
8	ALAB.	426	637.8	5	-6	KARNAK	5	BK-Y.SERP.	252	644	1/2	-8		2	Y.LIM.	79	649.3	5	-8	GEBELYN XVIII
9	BAS.	378	1275.8	10	-6		6	BAS.	20	644.1	5	-8		3	GY.SILIC.	10	3245.8	25	-8	
			3828.	30	-6	SEE B	7	BAS.	20	1287.8	10	-8				7788	M	-8	SEE B	
2370	QTZITE	14	6380.	50	-6	MERNPT. -50	8	BKQTZOSE	55	1288.0	10	-8	XXIII	4	BK.BAS.	12	64904	500	-8	
1	LIM.	38	6380.	50	-6	-12	9	BAS.	427	1288.1	10	-8		5	HAEM.	899	259.9	2	-9	SYRIA, XVIII
			31900	250	-6	SEE N						SEE B	6	RED LIM.	427	389.7	3	-9	KARNAK XVIII	
2	HAEM.	52	127.7	1	-7	XVIII	2430	BKQTZOSE	436	6438.	50	-8	XXIII	7	BAS. poor	26	1299.0	10	-9	
3	HAEM.	48	255.5	2	-7	XVIII	1	BAS.	254	257.8	2	-9		8	BAS.	372	1299.5	10	-9	
4	BAS.	656	1277.0	10	-7	IV	2	SERP.	428	644.6	5	-9		9	BAS.	356	2597.4	20	-9	
5	LIM.	314	21.3	1/6	-8		3	BAS.	33	644.7	5	-9		2490	BAS.	20	2598.7	20	-9	
6	ALAB.	38	639.1	5	-8	MERNPTH	4	BKQTZOSE	55	1288.8	10	-9		1	BAS.	254	260.0	2	130.0	
7	BAS.	368	1278.5	10	-8		4A	LIM.	646	3223.7	25	-9	ZET, ABYD, 601	2	HAEM.	483	390.1	3	-0	TARTUS XVIII
8	BAS.	448	639.0	50	-8		5	BAS.	38	644.8	50	-9		3	BAS.	428	1299.7	10	-0	
9	HAEM.	493	853	4/6	-9	IIII	6	PINK GRAN	20	1546.7	2M	-9		4	GY.SY.	165	6500.	50	-0	
2380	ALAB.	426	127.9	1	-9	MERNPTH	7	LIM.	328	645.	1/2	129.0	-2	5	BAS.	436	6501.	50	-0	
1	BAS.	14	639.7	5	-9		8	ALAB.	425	129.0	1	-0		6	GY.LIM.	427	390.4	3	-1	
2	QTZITE	9	3196.8	25	-9	XXIII	9	GYQTZOSE	429	258.0	2	-0		7	BAS.	215	650.5	5	-1	
3	BKQTZOSE	9	3198.4	25	-9	XXIII	2440	ALAB.	339	258.1	2	-0		8	BAS.	428	1301.0	10	-1	
4	"	54	3836.5	30	-9	XXIII	1	BAS.	352	645.0	5	-0		9	BAS.	19	2603.2	20	-1	
4A	" SKEW	63	4604.0	36	-9	Z ABYD, 510	2	BAS.	802	1290.	10	-0	-1.4	2500	BKQTZOSE	103	3253.1	25	-1	XXIII
5	HAEM.	526	128.0	1	128.0	XV III	3	PINK LIM.	436	1290.5	10	-0	XXIII	1	GY.SY.	10	3902.5	30	-1	XXIII
5A	"	49	256.	2	-0	-20						SEE N	2	BK-WT-SY.	10	3903.5	30	-1	XXIII	
6	BAS.	427	1280.3	10	-0		4	BKQTZOSE	11	2579.8	20	-0	XXIII			7807.	M	-1	SEE N	
7	LIM.	916	1279.8	10	-0	KAHUN XII	5	ALAB.	12	2580.1	20	-0		3	HAEM.	505	21.7	1/6	-2	MEM.
8	BAS.	238	2559.6	20	-0		6	QTZITE	9	3224.8	25	-0	XXIII	4	SARD	839	21.7	1/6	-2	XVIII
9	BKQTZOSE	16	3839.0	30	-0	XXIII	7	BAS.	356	12900.	100	-0	-40	5	GY.SERP.	424	65.1	1/2	-2	
2390	HAEM.	499	128.1	1	-1	XVIII	8	ALAB.	22	3227.0	25	-1		6	BAS.	415	65.1	1/2	-2	
1	BAS.	33	256.2	2	-1							SEE B	7	HAEM.	328	130.2	1	-2		
2	BAS.	352	2560.8	20	-1		8A	PORPHY	653	9685.	7M	-1	ZET, ABYD, 510	8	ALAB.	23	390.7	3	-2	
3	BKQTZOSE	54	3542.1	30	-1	RIQQEH XXIII	9	PINK LIM.	797	644.0	5	-2	XVIII	9	BAS.	382	1302.0	10	-2	
4	"	54	6407.	50	-1	XXIII	2450	BKQTZOSE	54	3229.2	25	-2	XXIII	2510	BKQTZOSE	11	6508.	50	-2	XXIII
5	ALAB.	358	128.2	1	-2	MEM.	1	QTZITE	54	3876.1	30	-2	XXIII	1	NUM.LIM.	314	7810.	M	-2	
6	BAS.	237	640.8	5	-2		2	BAS.	237	6459.	50	-2		2	LIM.	38	260.7	2	-3	MEM.
7	ALAB.	790	641.1	5	-2	XVIII	3	BAS.	238	6460.	50	-2	-55	3	GY.QTZOSE	406	651.6	5	-3	
8	BK.SERP.	64	1282.	10	-2	TAHARQA -10	4	GY.VOLC.	265	431	1/3	-3		4	LIM.	426	1303.3	10	-3	
9	LIM.	925	3846.	30	-2	MALTA	5	BAS.	368	129.3	1	-3		5	LIM.	79	1303.3	10	-3	MERNPTH
2400	BK.BAS.	314	256.50	200	-2	-150	6	BAS.	38	646.4	5	-3		6	BKQTZOSE	10	3257.9	25	-3	XXIII
1	HAEM.	439	513.2	4	-3	MARATHUS	7	HAEM.	498	1293.0	10	-3	XVIII			7821.	M	-3	SEE B	
2	BAS.	426	641.4	5	-3	MEM.	8	BAS.	367	2587.1	20	-3		7	ALAB.	339	652	1/2	-4	
3	LIM. rough	922	1283.0	10	-3							SEE N	8	HAEM.	49	86.9	2/3	-4	XVIII	
4	BKQTZOSE	875	6418.	50	-3	ZET ABYD, 121	9	GY.SY.	10	6466.	25	-3	XXIII	9	BAS.	38	260.8	2	-4	
5	ALAB.	30	64.2	1/2	-4		2460	RED GRAN	367	25870.	200	-3	-50	2520	BAS.	261	260.9	2	-4	
6	BAS.	396	128.4	1	-4		1	WT.QTZITE	5	93100.	12M	-3	-300	1	BAS. porous	879	521.6	4	-4	ABYD. 1ST
* 7	ALAB.	802	128.4	1	-4	QUFT XVIII	2	BR.SERP.	20	3882	3	-4		2	LIM.	426	652.1	5	-4	
8	"	426	642.2	5	-4		3	BAS.	12	1293.8	10	-4	QUFT	3	BAS.	20	3260.0	25	-4	
9	BAS.	365	1284.1	10	-4		4	BRECCIA	795	1294.2	10	-4	KARN. XVIII	4	GY.SY.	314	651.9	50	-4	
2410	BAS.	364	12840.	100	-4	-40						SEE N	5	BKQTZOSE	238	652.1	50	-4		
1	BK-STEAL.	898	128.5	1	-5	TYRE XVIII	5	GY.SERP.	494	647.4	5	-5	XVIII	6	HAEM.	896	130.5	1	-5	TARTUS, XVIII
2	HAEM.	498	128.5	1	-5	MEM. XVIII	6	"	494	647.5	5	-5	XVIII	7	BKQTZOSE	21	130.5	1	-5	
3	LIM.	931	514.2	4	-5		7	Y.SANDST.	339	129.50	100	-5	-90	8	ALAB.	38	261.0	2	-5	
4	LIM.	5	25700.	200	-5	-40	8	QTZ	duck	162	1/8	-6	XVIII	9	BAS.	352	261.0	2	-5	
5	HAEM.	DUCK	2571.2	20	-6	SPARTA XVIII	9	Y.BK.SERP.	263	432	1/3	-6		2530	BAS.	372	2609.7	20	-5	
6	BAS.	14	2572.7	20	-6	MERNPTH	2470	BK.PORPHY	26	432	1/3	-6		1	BKQTZOSE	60	2610.	20	-5	-10 XXIII
7	CLDRITE	65	2571.7	20	-6	S	1	BK.SERP.	887	259.1	2	-6		2	"	9	3261.8	25	-5	XXIII

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No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL
2533	Y.LIM.	65	6525	50	1305	-50 V	2587	BAS.	426	1314.8	10	1315		2639	BAS.	392	264.4	2	1322	
4	ALAB.	238	39150	5M	-5		8	BAS.	347	1315.3	10	-5		9A	GY.LIM.	797	661.3	5	-2	24-V-21
5	ALAB.	238	1306	1	-6		9	BAS.	238	2629.2	20	-5		2640	BK-SY.	325	1321.9	10	-2	III III III
6	LIM.	498	391.8	3	-6	XVIII	2590	BKQTZOSE	11	2629.5	20	-5	XXIII	1	LIM.	38	1322.0	10	-2	
7	ALAB.	801	6532	5	-6	XVIII	1	BAS.	429	3945.5	30	-5		2	BKQTZOSE	372	2643.6	20	-2	
8	PINK LM.	483	1306	10	-6	KARN-4, XVIII	2	GYQTZOSE	54	3945.9	30	-5	XXIII	3	ALAB.	16	3306.1	2.5	-2	
9	BAS.	318	2613.1	20	-6		3	BAS.	333	13150	100	-5	-7	4	BUFF.LIM.	368	3967.8	30	-2	XVIII?
2540	DORPHY	313	261.4	2	-7		4	LIM.	422	26300	200	-5	-40	5	BAS.	422	6610	50	-2	
*1	LIM.	931	522.8	4	-7		5	Y.LIM.	802	131.6	1	-6	XVIII	6	ALAB.	26	264.6	2	-3	
2	HAEM.	50	43.6	1/3	-8	XVIII	6	BAS.	384	1314	1	-6		7	BAS.	428	661.3	5	-3	
3	BAS.	125	65.4	1/2	-8		7	BAS.	33	6578	5	-6		8	BR.SERP.	496	661.5	5	-3	
4	BAS.	37	1308.2	10	-8	MEM.							9	BAS.	373	1322.8	10	-3		
5	BAS.	6	2616.7	20	-8	MERNPTH	8	ALAB.	80	658	5	-6	-38 XVIII	2650	GY.SY.	11	2645.7	20	-3	XXIII
6	BAS.	351	6540	50	-8	-75	9	BAS.	427	2631.3	20	-6	XXIII	1	BAS.	238	2647.0	20	-3	
7	BAS.	351	13082	100	-8	-20	2600	LIM.	351	2631.5	20	-6		2	GY.SY.	422	2649.0	20	-3	
8	RED GRAN.	333	157000	20M	-8	-300	1	BAS.	235	2633.2	20	-6		3	BAS.	235	3300.1	2.5	-3	
9	ALAB.	484	873	2/3	-9	XVIII							4	BAS.	314	264.9	2	-4		
9A	LIM.	915	3273	2.5	-9	KOM SULTAN VI	2	Y.BK.SERP.	33	43.9	1/3	-7		5	BAS.	378	662.1	5	-4	
2550	BAS.	442	1309.5	10	-9		3	BAS.	33	2634	2	-7		6	GY.SY.	442	2649.0	20	-4	
0A	ALAB.	437	65.5	1/2	1310	-4	4	BAS.	192	6584	5	-7		7	BK.SY.	54	3971.2	30	-4	XXIII
1	BRECCIA	79	131	1	-0	-2	5	BAS.	38	658.5	5	-7		8	BAS.	313	662.1	50	-4	
2	BAS.	254	1310	1	-0	MEM.	6	BK-SY.	315	658.6	5	-7		9	BAS.	368	7945	M	-4	-40
3	BAS.	827	1310.2	10	-0		7	ALAB.	23	1317	10	-7	-8	2660	BAS.	364	132.5	1	-5	
4	BAS.	235	2619.8	20	-0		8	GY.SY.	373	6584	50	-7	SEE B	1	GY.SY.	378	132.5	1	-5	
5	BAS.	352	2620.7	20	-0		9	LIM.	31	131.8	1	-8		2	LIM.	495	132.5	1	-5	MERNPTH
6	BAS.	238	3929.2	30	-0		2610	BAS.	339	131.8	1	-8		3	MALACHITE	495	132.5	1	-5	ZER-25 I
7	GY.GRAN.	351	26200	200	-0	-45	1	ALAB.	364	263.6	2	-8		4	BK-SY.	64	662.6	1	-5	XII
8	"	3	39300	5M	-0	-250	2	LIM. Tough	91	263.7	2	-8		5	BRECCIA	498	2650.8	20	-5	XVIII
9	"	23	78602	10M	-0	AMARN, XVIII	3	QTZITE	54	2635.8	20	-8	GHUROB XXIII	6	BAS.	33	22.1	1/6	-6	
2560	HAEM.	498	437	1/3	-1	XVIII	4	BAS.	64	2636.0	20	-8	VI	7	BAS.	429	1325.6	10	-6	
1	BAS.	397	131.1	1	-1		5	BAS.	356	2636.8	20	-8		8	ALAB.	21	1325.9	10	-6	
2	LIM.	931	262.2	2	-1		6	BAS.	333	6591.2	50	-8		9	BK-SY.	11	1325.9	10	-6	
3	BAS.	435	3932.9	30	-1		6A	LIM.	452	1055.5	8	-9	KOM SULTAN VI	2670	QTZITE	38	2653.0	20	-6	
4	GY.SY.	9	3934.2	30	-1	XXIII	7	LIM.	456	1319.3	10	-9	PREHIST.?							
5	BK-SY.	140	6553	50	-1		8	HARD LIM.	498	1319.5	10	-9	XVIII	1	LIM.	406	265.5	2	-7	SEE S
6	BAS.	166	6556	50	-1		*9	BAS. Tough	356	2637.7	20	-9		2	ALAB.	484	398.0	3	-7	AMARN XVIII
7	BAS.	367	6557	50	-1		2620	BAS.	38	2638.1	20	-9		3	BAS.	398.2	3	-7	SEE S	
8	BAS.	33	262.4	2	-2		1	BAS.	235	2638.3	20	-9		4	BAS.	352	663.6	5	-7	
9	BAS.	313	2624	2	-2		2	BAS.	33	6592	50	-9	SAIS	5	GY.SERP.	265	1327	10	-7	-10
2570	BAS.	33	6560	5	-2		3	ALAB.	25	440	1/3	1320	VI	6	BAS.	436	2654.8	20	-7	
1	GY.LIM.	801	1311.6	10	-2	XVIII	4	DURITE	65	44.0	1/3	-8		7	GY.SY.	442	6635	50	-7	
2	ALAB.	83	1311.9	10	-2		5	BAS.	202	1320	1	-0		8	BKQTZOSE	9	26542	200	-7	
3	BKQTZOSE	558	2623.3	20	-2	XXIII	6	BK-STEAL	62	2640	2	-0	XII	9	BAS.	33	66.4	1/2	-8	
4	GY "	54	2626.2	20	-3	XXIII	7	LIM.	916	660	5	-0	-4	2680	BAS.	232	66.4	1/2	-8	
5	BK "	10	3282.8	25	-3	XXIII	8	BAS.	23	660.1	5	-0		1	BAS.	63	663.8	5	-8	VI
6	BR-QTZITE	422	6568	50	-3		9	BAS.	315	660.1	5	-0		2	BAS.	238	1327.7	10	-8	
7	GY.SERP.	265	43.8	1/3	-4		2630	BAS.	38	1319.8	10	-0		3	BR-SY.	356	664.0	50	-8	
8	BAS.	33	43.8	1/3	-4	MEM.	1	BAS.	358	1319.8	10	-0		4	BUFF.LIM.	33	44.3	1/3	-9	
9	BAS.	33	262.9	2	-4		2	GN.SY.	59	2639.7	20	-0	XXIII	5	HAEM.	507	88.8	2/3	1332	
2580	LIM.	11	657.2	5	-4		3	BK.PORPHY	9	3961.1	30	-0	XXIII	6	LIM.	918	133.3	1	-3	SEE N
1	BAS.	498	1313.8	10	-4	XVIII	4	GY.SY.	7	6598	50	-0	XXIII	7	LIM.	931	564.1	4	1410	SEE B
2	BAS.	65	2627.8	20	-4	VI	5	GY.GRAN.	254	66000	500	-0	-400							
			7886	M	-4	SEE N	6	BAS.	265	264.2	2	-1								
3	ALAB.	192	263.1	2	-5		7	BKQTZOSE	10	6605	50	-1								
4	LIM.	931	394.4	3	-5		8	BAS.	BUCK	31700	4M	-1	-1400 XVIII							
5	Y.LIM.	498	657.5	5	-5															
6	PINK LIM.	494	657.6	5	-5	XVIII														

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STATER 132-138 GRs.						No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL
2688	BK-STEAL	144	22.0	1/6	132.0	2749	BAS.	313	667.8	5	133.6		2815	FLINT PEB.		2690	2.0	134.5	-10
8A	HARD LIM.	497	132.0	10	0	2750	BAS.	358	2671.7	20	0.6		6	BK-BAS.	339	1345.00	20M	0.5	-2000
9	BK-BAS.	351	264.00	4M	0	1	BAS.	115	3340.0	25	0.6	XXIII	7	BAS.	267	134.6	1	0.6	
2690	PINK GRAN.	351	132.020	20M	0	2	LIM.	60	3340	25	0.6	KAHUN-24,XII	8	ALAB.	226	134.6	1	0.6	
1	BK-BAS.	25	132330	20M	0	3	BAS.	264	6679.	M	0.6		9	GY-SERP	364	134.6	1	0.6	
2	ALAB.	885	66.3	1/2	0.6	4	BK-QTZOSE	11	6681	M	0.6	XXIII	2820	BAS.	338	673.0	5	0.6	
3	GY-SY.	38	662.9	M	0.6	5	WT. LIM.	436	1337.1	1	0.7		1	BAS.	367	673.1	5	0.6	
4	LIM.	79	398.2	3	0.7	6	BAS.	254	534.8	4	0.7		2	BKQTZOSE	2	1345.6	10	0.6	MERN PTH
5	GY. GRAN	40	132700	20M	7	7	DIORITE	64	534.9	4	0.7	V	3	BAS.	311	1345.8	10	0.6	
6	BL-GESCHST	406	132.9	1	0.9	8	BAS.	435	668.5	5	0.7	MERN PTH	4	HAEM.	WOLF HEAD	1345.8	10	0.6	=4938
7	BAS.	352	2658.0	20	0.9	9	DIORITE	46	1332.9	10	0.7	VI or XXIII	5	BAS.	392	44.9	1/3	0.7	
8	BAS.	313	66.5	1/2	133.0	2760	Y. LIM.	794	1337.0	10	0.7	GEBELEN, XVIII	6	BR-SERP.	254	134.7	1	0.7	
9	HAEM.	498	133.0	1	0	1	BAS.	368	1337.0	10	0.7		7	BAS.	254	673.7	5	0.7	
2700	WT. LIM.	406	133.0	1	0	2	BAS.	802	1337.5	10	0.7	XVIII	8	BAS.	384	1347.4	10	0.7	
1	ALAB.	256	133.0	1	0	3	WT. LIM.	46	1337.4	2M	0.7	RETABEH	9	BAS.	482	67.4	1/2	0.8	XVIII
2	BAS.	254	133.0	1	0	4	BUFF LIM.	265	66.9	1/2	0.8		2830	BAS.	256	134.8	1	0.8	
3	LIM.	31	133.0	1	0	5	BAS.	265	133.8	1	0.8		1	BAS.	237	134.8	1	0.8	
4	Y. LIM.	498	399.1	3	0	6	BAS.	333	133.8	1	0.8		2	BRECCIA	496	1347.6	10	0.8	XVIII
* 5	ALAB.	79	665.0	5	0	7	BAS.	256	669.2	5	0.8		3	BAS.	333	674.0	M	0.8	
6	BAS.	372	2660.0	20	0	8	BAS.	271	1338.3	10	0.8		4	ALAB.	254	269.8	2	0.9	
7	BAS.	26	2661.0	20	0	9	Y. BK-SERP	31	267.8	2	0.9		5	ALAB.	436	269.9	2	0.9	
8	BAS.	314	2660.0	4M	0	2770	GY-SY.	256	669.4	5	0.9		6	BAS.	237	269.9	2	0.9	
9	HAEM.	499	133.1	1	0	1	BAS.	354	1338.8	10	0.9		7	BAS.	79	674.6	5	0.9	XVIII
2710	BAS.	254	133.1	1	0	2	BAS.	356	2677.4	20	0.9		8	BAS.	358	134.8	10	0.9	
1	BR-HAEM.	45	2663	2	0	3	BAS.	236	1338.8	2M	0.9		9	BAS.	352	1349.3	10	0.9	
2	BAS.	458	665.6	5	0	4	GY-QTZOSE	16	67.0	1/2	134.0		2840	HAEM.	DUCK	2698.4	20	0.9	XVIII
3	BAS.	439	2661.4	20	0	5	BAS.	364	67.0	1/2	0		1	BAS.	368	2698.9	20	0.9	
4	BAS.	358	2662.4	20	0	6	BAS.	406	670.1	5	0	MERNPTH	2	ALAB.	494	22.5	1/6	135.0	rough XVIII
5	GY-SY.	54	665.5	M	0	7	LIM.	382	1339.7	10	0		3	BAS.	25	45.0	1/3	0	
6	BK-SY.	429	665.5	M	0	7A	HAEM.	4953	1340.0	10	0	END GROOVE (24-V-21)	4	BAS.	33	67.5	1/2	0	
7	GY-VOLC.	165	665.7	M	0	8	BAS.	312	2679.8	20	0		5	BAS.	256	270.0	2	0	
8	ALAB.	252	333	1/4	2	9	BAS.	352	2680.6	20	0		6	BAS.	256	270.0	2	0	
9	BAS.	110	444	1/3	2	2780	LIM.	436	2681.0	20	0		7	BAS.	313	270.0	2	0	
9A	SY.	4952	133.2	1	2	1	BAS.	352	2681.0	20	0		8	HAEM.	DUCK	270.1	2	0	TARTUS XVIII
2720	BAS.	355	666.2	5	2	2	RED GRAN	11	20100	3M	0	-60	9	BAS.	435	674.8	5	0	7P IX
1	LIM.	452	1331.9	10	2	3	BAS.	829	670.5	5	0		2850	WT. LIM.	40	675.0	5	0	
2	BAS.	358	2663.6	20	2	4	BAS.	401	1340.7	10	0	MEM. XVIII	1	BAS.	448	675.1	5	0	
3	BAS.	238	2664.0	20	2	5	GY-SERR	725	1341.0	10	0		2	BRECCIA	797	1350.	10	0	-15, XVIII
4	BAS.	238	666.1	M	2	6	BAS.	238	2683.0	20	0		3	BAS.	444	1350.0	10	0	
5	BAS.	267	133.3	1	3	7	BAS.	2	671.2	5	0.2		4	WT. LIM.	406	1350.4	10	0	
6	BAS.	265	133.3	1	3	8	BAS.	312	1342.4	10	0.2		5	BAS.	268	2699.2	20	0	
7	BAS.	352	133.3	1	3	9	BAS.	352	2684.6	20	0.2		6	BKQTZOSE	10	3374.3	25	0	XXIII
8	ALAB.	27	266.7	2	3	2790	BAS.	235	670.8	M	2		7	HAEM.	496	1350.7	10	0.1	XV III
9	Y. LIM.	38	666.5	5	3	1	GY-SY.	26	670.9	M	2		8	RED LIM.	79	1350.8	10	0.1	XV III
2730	BAS.	356	2666.3	20	3	2	GY-SY.	33	134.3	1	3		9	BKQTZOSE	10	3378.6	25	0.1	XXIII
1	BAS.	149	3331.6	25	3	3	BAS.	365	671.7	5	3		2860	RED HAEM.	802	67.6	1/2	2	XVIII
2	BK-SY.	11	666.5	M	3	4	ALAB.	9206	1075.0	8	3		1	BAS.	382	67.6	1/2	2	
3	BAS.	26	66.7	1/2	4	5	BAS.	368	1343.5	10	3		2	BAS.	27	270.4	2	2	
4	LT. BL. GLASS	12	66.7	1/2	4	6	BAS.	33	268.8	2	4		3	BAS.	33	270.4	2	2	
5	ALAB.	256	266.9	2	4	7	BAS.	254	268.9	2	4		4	BR-SERP.	452	676.0	5	2	
6	WT. LIM.	498	400.2	3	4	8	BAS.	498	671.8	5	4	XVIII	5	ALAB.	256	676.0	5	2	
7	BK-SY.	643	533.7	4	4	9	ALAB.	267	672.0	5	4		6	BAS.	33	1351.8	10	2	
8	BAS.	367	666.9	5	4	2800	BAS.	33	672.0	5	4		7	BAS.	382	1352.2	10	2	
9	BAS.	494	1333.8	10	4	1	BAS.	347	672.0	5	4	MEM.	8	BAS.	438	676.0	M	2	-20
2740	BAS.	262	1334.3	10	4	2	ALAB.	79	672.2	5	4	LAHUN, XVIII	9	BAS.	237	45.1	1/3	3	
1	WT. LIM.	433	1334.4	10	4	3	GY-MARB	65	2687.4	5	4	IIII V	2870	BK-SY.	17	135.3	1	3	
2	BAS.	368	2667.7	20	4	4	GY-SY.	10	2688.2	20	4		1	BAS.	254	135.3	1	3	MEM.
3	ALAB.	265	44.5	1/3	5	5	ALAB.	9205	3226.6	24	4		2	ALAB.	256	135.3	1	3	MEM.
4	WT. LIM.	429	400.5	3	5	6	BAS.	352	3359.5	25	4		3	RED PORPH.	26	270.6	2	3	
5	Y. LIM.	435	667.5	5	5	7	HAEM.	493	134.5	1	5	MEM. XVIII	4	WT. LIM.	790	676.5	5	3	-10 XVIII
6	BAS.	25	1334.8	10	5	8	LIM.	802	134.5	1	5	XVIII	5	BAS.	256	676.5	5	3	
7	BAS.	354	1335.1	10	5	9	BAS.	415	134.5	1	5		6	BAS.	338	1353.0	10	3	
8	BAS.	235	2669.2	20	5	2810	GY-SERP.	498	403.5	3	5	XVIII	7	BAS.	312	2707.1	20	3	
						1	LIM.	429	672.4	5	5		8	GN-PORPH.	10	3382.1	25	3	SEE N
						2	BAS.	27	672.6	5	5		9	BK-QTZOSE	11	3383.0	25	3	
						3	BAS.	338	672.7	5	5		2880	BAS. rough	33	406.3	3	4	
						4	HAEM.	493	1344.7	10	5	TARTUS, XVIII							

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XXXII

No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	
2881	BAS.	429	676.8	5	135.4		6945	YBK.SERP.	26	45.4	1/3	136.2		3011	ALAB.	206	68.5	1/2	137.0		
2	BAS.	384	676.9	5	.4	"ATA"	6	BRECCIA	498	68.1	1/2	.2	XVIII	2	BAS.	406	137.0	1	.0	MERNPTH	
3	YBK.LIM.	367	677.1	5	.4		7	BAS.	446	272.5	2	.2		3	BK.SERP.	263	685.0	5	.0	--6	
4	LIM.	79	135.4	10	.4	-13 XVIII	8	GY.LIM.	498	408.6	3	.2	XVIII	4	BAS.	312	685.1	5	.0		
5	BAS.	33	135.4	10	.4		9	BAS.	368	680.8	5	.2		5	BAS.	352	1370.0	10	.0		
6	MALACHITE	422	2708.	20	.4	-10	2950	BAS.	395	680.9	5	.2		6	BAS.	795	1370.0	10	.0	XVIII	
7	FLINT PEB.		3385.8	25	.4	INSCRIBED	1	BAS.	454	681.1	5	.2		7	BAS.	12	1370.4	10	.0		
8	LIM.	452	6771.0	10	.4		2	BAS.	27	681.2	5	.2		8	BK.SY.	10	2739.7	20	.0		
9	BAS.	33	271.0	2	.5	RI&EH	3	BAS.	354	1361.8	10	.2		9	BK.BAS.	618	2740.	20	.0	-40 XII	
2890	ALAB.	498	406.5	3	.5	EHNASYA XVIII	4	HAEM. DUCK	1362.2	10	.2	XVIII	3020	GY.SY.	264	1370.8	2	M	.0		
1	BAS.	369	677.6	5	.5		5	BK.SY.	235	681.1	M	.2		1	BAS.	265	137.1	1	.1		
2	BAS.	352	1355.2	10	.5		6	GY.SERP.	498	136.3	1	.3	BORED, XVIII	2	BAS.	27	274.2	2	.1		
3	SY.	10	3388.0	25	.5	XXIII	7	BAS.	79	681.5	5	.3	XVIII	3	Y.LIM.	435	685.3	5	.1		
4	ALAB.	22	677.4	M	.5	MERNPTH	8	GY.SERP.	436	1363.3	10	.3		4	LIM.	311	1370.6	10	.1		
5	BKQTZITE	185	2703.4	4	M		9	HAEM.	499	682.	1/2	.4	XVIII	5	BAS.	352	1371.0	10	.1		
6	ALAB.	491	22.6	1/6	.6		2960	BAS.	392	682.	1/2	.4		6	BAS.	235	2743.1	20	.1		
7	BUFF LIM.	266	45.2	1/3	.6		1	BAS.	33	682.	1/2	.4		7	BAS.	33	68.6	1/2	.2		
8	BK.SY.	17	135.6	1	.6	OVAL	2	ALAB.	206	136.4	1	.4	DELTA	8	ALAB.	39	137.2	1	.2		
9	BRECCIA	802	406.8	3	.6	XVIII	3	BAS.	333	681.8	5	.4		9	BAS.	802	274.4	2	.2	XVIII	
2900	BAS.	254	678.2	5	.6		4	BAS.	331	681.8	5	.4		3030	BAS.	265	274.5	2	.2		
1	BAS.	452	1356.1	10	.6		5	BAS.	33	681.8	5	.4		1	BAS.	27	274.5	2	.2		
2	GY.SERP.	494	2712.0	20	.6	XVIII	6	BAS.	428	681.9	5	.4		2	BAS.	433	685.8	5	.2		
3	ALAB.	254	135.7	1	.7		7	BAS.	338	682.1	5	.4		3	BAS.	356	685.8	5	.2		
4	BAS.	33	271.4	2	.7		8	BAS.	165	682.2	5	.4		4	BAS.	238	1371.8	10	.2		
5	YBK.LIM.	27	271.4	2	.7		9	BAS.	331	1363.6	10	.4		5	BAS.	238	1372.2	10	.2		
6	BAS.	803	407.0	3	.7	XVIII	2970	BAS.	39	136.4	10	.4		6	FOS. WOOD	10	2745.1	20	.2	XXIII	
7	BAS.	313	678.5	5	.7		1	BK.LIM.	20	136.5	1	.5		7	BAS.	347	686.3	M	.2		
8	BAS.	352	1356.8	10	.7		2	BAS.	372	682.4	5	.5		8	GY.SERP.	406	274.7	2	.3	OVAL	
9	BKQTZOSE	55	2713.5	20	.7	XXIII	3	BAS.	26	273.0	2	.5	-1.5	9	BKQTZOSE	82	1372.9	10	.3		
2910	BAS.	358	2715.0	20	.7		4	ALAB. SLAB	272.2	20	.5	XII	3040	GY.SY.	406	137.4	1	.4			
1	Y.LIM.	63	1356.6	2	M	nnnnn QU. XII	5	QTZITE	369	1365.0	2	M	.5	1	BAS.	435	274.8	2	.4		
2	YBK.LIM.	206	67.9	1/2	.8		6	BAS.	331	68.3	1/2	.6		2	BAS.	265	274.8	2	.4	DELTA	
3	GN.SILIC.	26	67.9	1/2	.8		7	BAS.	33	136.6	1	.6		3	BK.SERP.	33	274.8	2	.4		
4	BAS.	448	135.8	1	.8		8	ALAB.	141	273.2	2	.6		4	BAS.	334	687.1	5	.4		
5	BAS.	44	135.8	1	.8		9	GY.SERP.	12	273.3	2	.6	MEM.	5	BAS.	448	687.2	5	.4		
6	LIM.	801	271.6	2	.8		2980	BAS.	436	409.8	3	.6		6	BAS.	40	1373.6	10	.4		
7	BAS.	27	271.7	2	.8		1	BAS.	428	682.9	5	.6		7	BAS.	428	1373.7	10	.4		
8	BAS.	235	1358.2	10	.8		2	ALAB.	338	683.2	5	.6		8	BAS.	428	2749.0	20	.4		
9	BKQTZOSE	55	3396.0	25	.8	XXIII	3	BAS.	336	2731.5	20	.6		9	BAS.	312	2749.0	20	.4		
2920	RED GRAN.	345	13581.1	2	M		4	BAS.	312	2732.2	20	.6		3050	BAS.	264	6870.1	M	.4	-66	
1	Y.SANDST.	368	13583.2	2	M		5	BAS.	352	2732.0	4	M	.6	-3	1	BAS.	364	6871.1	M	.4	
2	BAS.	33	135.9	1	.9		6	ALAB.	26	136.7	1	.7		2	BAS.	314	45.5	1/3	.5		
3	BAS.	436	271.8	2	.9		7	GY.SERP.	436	410.1	3	.7		3	BAS.	33	137.5	1	.5		
4	HAEM.	645	679.7	5	.9	VI	8	HAEM.	483	410.2	3	.7	XVIII	4	BAS.	12	137.5	1	.5		
5	BAS.	336	1359.0	10	.9		9	BAS.	38	683.6	5	.7		5	BRECCIA	795	412.4	3	.5	XVIII	
6	BAS.	352	1359.2	10	.9		2990	BAS.	429	1366.9	10	.7		6	BAS.	354	687.4	5	.5		
7	HAEM.	50	680	1/2	136.0	SEE N	1	BKQTZOSE	9	3417.6	25	.7	XXIII	7	BAS.	237	1375.1	10	.5		
8	BK.SERP.	908	68.0	1/2	.0	SYRIA XVIII	2	BAS.	206	68.4	1/2	.8		8	BAS.	40	1375.4	10	.5		
9	HAEM.	439	68.0	1/2	.0		3	BAS.	79	136.8	1	.8	MEM. XVIII	9	BK.SERP.	48	3438.7	25	.5	MERNPTH	
2930	BK.STEA.	323	68.0	1/2	.0		4	WT.LIM.	38	273.6	2	.8		3060	RED.LIM.	802	688	1/2	.6	XVIII	
1	BAS.	256	679.9	5	.0		5	BAS.	433	684.0	5	.8		1	ALAB.	484	412.7	3	.6	XVIII	
2	DIALLAG	435	680.0	5	.0	-2.0	6	BAS.	354	1368.4	10	.8		2	ALAB.	79	413.0	3	.7	XVIII	
3	BAS.	368	680.0	5	.0		7	BAS.	406	1368.5	10	.8		3	WT.LIM.	826	688.4	M	.7		
4	BAS.	313	1360.1	10	.0		8	BAS.	33	136.9	1	.9		4	BAS.	368	688.5	M	.7		
5	BKQTZOSE	39	2720.5	20	.0	XXIII	9	BAS.	44	136.9	1	.9		5	BAS.	452	45.6	1/3	.8		
6	BAS.	33	136.1	1	.1		3000	BAS.	269	273.8	2	.9		6	BK.STEA.	232	457	1/3	138.1		
7	BAS.	338	272.2	2	.1		1	BAS.	268	684.3	5	.9		7	BAS.	33	457	1/3	.1		
8	BAS.	795	272.3	2	.1	XVIII	2	BAS.	498	684.7	5	.9	XVIII	8	BAS.	263	457	1/3	.1		
9	HAEM.	803	680.7	5	.1	XVIII	3	BAS.	33	684.8	5	.9		9	BAS.	415	414.5	3	.2		
2940	BAS.	352	1360.8	10	.1		4	BAS.	352	1368.6	10	.9		3070	LIM.	38	46.1	1/3	.3		
1	BAS.	352	1361.4	10	.1		5	BAS.	422	1369.0	10	.9		1	BAS.	38	23.1	1/6	.6		
2	BAS.	352	2722.3	20	.1	MEM.	6	BAS.	352	1369.1	10	.9	-1.8	2	YBK.SERP.	14	23.1	1/6	.6		
3	BAS.	38	680.5	M	.1	SEE K	7	BAS.	262	1369.2	10	.9		3	BAS.	434	416.0	3	.7		
4	BAS.	339	680.6	M	.1		8	BK.SY.	268	2737.4	20	.9		4	WT.LIM.	427	416.7	3	.9		
							9	BAS.	436	684.7	M	.9		5	BAS.	79	420.9	3	140.3		
							3010	GY.SY.	32	68.5	1/2	137.0	DEFENNEH								

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No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL
3452	BAS.	373	288.1	2	144.0		3518	LIM.	57	58000	400	145.0	11, KAHUN XII	3582	ALAB.	335	731	1/2	146.2	
3	LIM.	63	576	4	0	III -18	9	GY. QTZOSE	264	145.1	1	0		3	BAS.	262	146.2	1	0	
4	HAEM.	397	719.9	5	0	GHUROB	3520	BAS.	346	145.1	1	0		4	BAS.	344	292.4	2	0	DEFENNEH
5	BAS.	272	719.9	5	0		1	ALAB.	338	290.3	2	0		5	BAS.	426	292.5	2	0	
6	BAS.	369	720.1	5	0		2	BK QTZ.	545	290.7	2.0	0		6	MALACHITE	352	585	4	0	-4.5
7	GY.SY.	33	720.2	5	0		3	BAS.	338	48.4	1/3	0		7	BAS.	422	730.9	5	0	
8	GY. PORPH	245	719.6	50	0		4	GY.SY.	33	48.4	1/3	0		8	BAS.	258	731.2	5	0	MEM. GLASS
9	QTZITE.	207	1440.2	100	0		5	BAS.	328	290.4	2	0		9	GY.SY.	426	731.1	5	0	
3460	BAS.	32	1441	1	0		6	BAS.	202	290.4	2	0		3590	LIM.	397	292.50	200	0	-70
1	BAS.	366	288.3	2	0		7	BK QTZ.	369	290.5	2.0	0		1	BAS.	254	146.3	1	0	
2	GY. QTZOSE	55	2882.3	20	0	MERNPTH	8	BAS.	348	72600	500	0		2	GY. STEA.	657	292.7	2	0	QUFT XII
3	QTZITE.	382	720.2	50	0		9	BRECCIA	801	1452.6	10	0	MERNPTH	3	GY.SY.	393	292.7	2	0	
4	LIM.	9	144.15	100	0		9A	HARD LIM.	598	1453.5	10	0	ZET, ABYD 329	4	BAS.	11	438.9	3	0	^
5	BAS.	336	72.1	1/2	0	-3	3530	BAS.	33	1453.5	10	0		5	BAS.	337	1463.3	10	0	
6	BK-STEAL	22	144.2	1	0					3632.7	2.5	0	SEE K	6	DURITE	425	292.54	20	0	
7	BAS.	338	288.4	2	0		1	GY.SY.	823	726.6	50	0		7	BAS.	393	73.2	1/2	0	
8	BAS.	314	576.7	4	0		2	"	386	145.4	1	0		8	GLZD QTZ.	384	73.2	1/2	0	
9	BAS.	83	721.2	5	0	MERNPTH	3	BAS.	337	726.8	5	0		9	BAS.	126	732.2	5	0	QUFT
3470	RED SY.	345	5768.4	40	0		4	GY.SY.	262	1453.6	10	0		3600	BAS.	338	292.2	20	0	
1	BAS.	254	48.1	1/3	0		5	"	33	1453.7	10	0		1	BK QTZ.	55	292.84	20	0	
2	BAS.	26	144.3	1	0		6	BK.SY.	333	1453.8	10	0		2	GY.SY.	642	731.9	50	0	XII
3	HAEM.	498	1442.8	10	0	XVIII	7	"	386	291.1	2	0		3	BK. LJM.	267	732.5	5	0	-5
4	BAS.	265	72.2	1/2	0		8	ALAB.	206	291.0	2	0	-1.6	4	BAS.	265	2930.1	20	0	
5	BAS.	202	72.2	1/2	0		9	LIM.	215	291.1	2	0	MEM.	5	GY.SY.	392	732.3	50	0	
6	GY.SY.	33	72.2	1/2	0		3540	GY. MARB.	314	582.1	4	0		6	GY. BAS.	328	29300	200	0	
7	BK QTZOSE	32	72.2	1/2	0		1	ALAB.	9154	872.8	6	0	TARKHAN I	7	GY.SY.	16	73.3	1/2	0	
8	SERP.	271	144.4	1	0		2	GY. GRAN.	264	29100	200	0	-8	8	BAS.	254	293.2	2	0	
9	BAS.	265	288.9	2	0		3	GY.SY.	33	72.8	1/2	0		9	GY.SY.	353	733.0	5	0	
3480	BAS.	44	288.9	2	0		4	BAS.	203	145.6	1	0		3610	BK QTZOSE	8	3665.6	25	0	XXIII
1	Y. SERP.	32	721.8	5	0		5	HAEM.	645	727.8	5	0	XVIII			5863	40	0	SEE P	
2	BAS.	446	722.1	5	0		6	BAS.	406	728.3	5	0		1	QTZITE	364	1465.6	100	0	
3	QTZITE	372	2888.4	20	0		7	BAS.	624	1165.0	8	0	III V	2	RED GRAN	256	73300	500	0	
4	BAS.	663	5775.4	40	0	QUFT V	8	DIO RJTE	727	2911.8	20	0		3	BR. HAEM.	494	146.7	1	0	SYRIA XVIII
5	GY.SY.	261	722.00	500	0	-20				3641.0	2.5	0	SEE K	4	BAS.	425	146.7	1	0	
6	BK QTZOSE	335	289.1	2	0		9	BAS.	263	7280.5	50	0		5	BAS.	334	293.5	2	0	THEBES
7	LIM.	452	722.7	5	0		3550	BAS.	316	72820	500	0	-50	6	GY.SY.	321	293.5	2	0	
8	RED GRAN	256	722.50	500	0		1	GY.SY.	331	145.7	1	0		7	"	333	733.6	5	0	
9	BK. SERP.	487	723	1/2	0		2	LIM.	915	583	4	0	KAHUN 1.5 XII	8	BAS.	329	733.7	5	0	
3490	BAS.	33	289.3	2	0		3	BK QTZOSE	351	29150	200	0	-5			3668.5	25	0	SEE K	
1	GY. QTZOSE	387	1446.2	10	0		4	BRTZITE	314	72860	500	0		9	HAEM.	57	73.4	1/2	0	XVIII
2	BAS.	37	1446.4	10	0		5	BAS.	328	291.6	2	0		3620	HAEM.	368	73.4	1/2	0	
3	BAS.	314	2892	20	0	-6	6	BAS.	206	291.7	2	0		1	BK JASP.	12	293.7	2	0	
4	GY.SY.	317	28930	200	0	-3	7	BAS.	422	728.8	5	0		2	BK.SY.	331	1468.1	10	0	
5	BAS.	262	289.4	2	0		8	BAS.	33	1457.8	10	0		3	BAS.	422	2935.7	20	0	
6	BAS.	393	289.4	2	0		9	BAS.	33	1458.5	10	0				3670.2	25	0	SEE K	
7	BAS.	33	1446.9	10	0		3560	HAEM.	493	291.8	2	0	XVIII	4	HAEM.	49	146.9	1	0	XVIII
8	BK QTZOSE	82	723.7	50	0		1	BAS.	324	291.8	2	0		5	BR. SERP.	338	146.9	1	0	QUFT
9	ALAB.	9156	144.8	1	0	TARKHAN I	2	BAS.	442	291.9	2	0		6	BAS.	313	293.9	2	0	
3500	BK QTZ.	496	144.8	1	0	DONED, XVIII	3	BAS.	429	1458.8	10	0		7	LIM.	369	1468.6	10	0	
1	GY.SY.	33	723.9	5	0		4	BAS.	333	73.0	1/2	146.0		8	LIM.	674	1469.0	10	0	
2	HAEM.	498	1447.7	10	0	PHX. XVIII	5	BAS.	323	73.0	1/2	0		9	BR.SY.	316	2939.0	20	0	
3	BAS.	245	2896.4	20	0		6	AMAZONITE	341	73.0	1/2	0	THEBES	3630	JADE	28	490	1/3	147.0	DEFENNEH
4	QTZITE.	315	144.84	100	0	SEE K	7	LIM.	497	73.0	1/2	0	KARNAK XVIII	*1	BAS.	262	73.5	1/2	0	
5	ALAB.	314	48.3	1/3	0		8	GY. STEA.	285	146.0	1	0		2	HAEM.	803	73.5	1/2	0	XVIII
6	SERP.	23	144.9	1	0		9	BAS.	393	146.0	1	0		3	BAS.	275	294.1	2	0	
7	BAS.	315	289.8	2	0		3570	BAS.	261	146.0	1	0		4	BAS.	373	294.1	2	0	
8	GY. QTZOSE	265	289.8	2	0		1	GY.SY.	287	146.0	1	0		5	BAS.	203	1470.4	10	0	
9	BAS.	324	289.9	2	0		2	BRECCIA	801	292.0	2	0	KARNAK, XVIII	6	GY. QTZOSE	372	2939.8	20	0	
3510	BK QTZ	879	724.8	5	0	XXIII V	3	BAS.	312	292.0	2	0		7	BAS.	329	735.1	50	0	
1	BK QTZOSE	702	1449.0	10	0		4	ALAB.	885	729.7	5	0	THEBES, XVIII	8	QTZITE	358	735.2	50	0	
2	QTZITE	82	144.89	100	0		5	LIM.	366	729.8	5	0		9	BAS.	333	734.9	50	0	
3	GY. QTZOSE	352	72450	500	0	-20	6	GY. VOLC.	33	730.2	5	0		3640	ALAB. TUDC	657	58800	400	0	-10
4	GN. LIM.	265	72.5	1/2	145.0		7	BAS.	265	146.0	10	0	?K -1.2	1	BAS.	315	735.20	500	0	-40
5	RED HAEM	81	290.0	2	0	XVIII	8	RED SY.	265	145.000	1000	0		2	HAEM.	12	147.1	1	0	
6	BAS.	397	290.1	2	0	MEM. GLASS	9	BAS.	271	146.1	1	0		3	BAS.	262	294.2	2	0	
7	BAS.	10	2899.6	20	0		3580	BAS.	446	7305.7	50	0		4	BAS.	336	294.2	2	0	
							1	RED SY.	32	146.10	100	0		5	BAS.	252	2941.4	20	0	

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XXXVI

No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL
3646	BAS.	33	2942.7	2.0	147-1		3704	BAS.	338	741.7	5	148-3		3765	BAS.	33	49.9	1/3	149-7	
7	BK-QTZOSE	333	2943.0	2.0	-1		5	GY.SY.	363	1483.0	10	-3		6	BAS.	33	299.4	2	7	
8	GY.SY.	331	73.6	1/2	-2		6	BAS.	446	296.8	2	-4		7	GY.SY.	373	748.5	5	7	
8A	GOLD	RING	147.2	1	-2		7	BAS.	331	296.9	2	-4		8	LIM.	428	1496.8	10	-7	
9	BAS.	261	147.2	1	-2		8	ALAB.	64	593.6	4	-4	XII	9	GY.SY.	60	599.0	4.0	-7	XXIII
3650	BAS.	275	735.9	5	-2	MEM.	9	QTZITE	356	593.9	4.0	-4		3770	GY-QTZOSE	315	748.3	5.0	-7	
1	BAS.	498	1471.6	10	-2	XVIII	3710	GY.SY.	262	49.5	1/3	-5		1	QTZITE	328	748.7	5.0	-7	rough.
2	BR-QTZITE	55	2944.3	10	-2		1	BAS.	264	49.5	1/3	-5		2	ALAB.	384	74.9	1/2	-8	
			589.0	4.0	-2	SEE P	2	BK-QTZOSE	611	297.0	2	-5	XII	3	GN.SERP.	2.03	149.8	1	-8	
3	LIM.	262	736.0	5.0	-2		3	GY.SY.	2.63	742.8	5	-5	-6	4	BR.MARB	32	149.8	1	-8	
4	BAS.	33	1473.4	10	-3		4	GY.SY.	33	297.2	2	-6		5	BAS.	429	1498.2	10	-8	
5	BR.SY.	429	2945.2	2.0	-3		5	BR.LIM.	373	2971.8	2.0	-6		6	ALAB.	386	149.9	1	-9	
6	ALAB.	256	73.7	1/2	-4		6	GY.SY.	315	148.7	1	-7	SEE P	7	BAS.	448	149.9	1	-9	
7	GY.SY.	331	147.4	1	-4		7	BAS.	328	74.4	1/2	-8		8	BAS.	446	299.8	2	-9	
8	HAEM.	493	294.9	2	-4	TARTUS, XVIII	8	BAS.	165	74.4	1/2	-8		9	BAS.	429	1499.5	10	-9	
9	GY.SY.	275	294.9	2	-4		9	BAS.	285	148.8	1	-8	MEM.			599.4	4.0	-9	SEE P	
3660	GY.SY.	369	1474.4	10	-4		3720	HAEM.	387	297.7	2	-8		3780	LIM.	342	599.7	4.0	-9	
1	BAS.	265	2948.3	2.0	-4		1	BAS.	325	1487.6	10	-8		1	ALAB.	436	50.0	1/3	150-0	
			589.8	4.0	-4	SEE P	2	PORPH.	MAE	2975.5	2.0	-8		2	BAS.	356	300.0	2	-0	
2	BK-QTZOSE	9	736.8	5.0	-4		3	HAEM.	493	297.8	2	-9	SEE K	3	GY.SERP.	11	600.1	4	-0	
3	BK-BAS.	256	2947.5	2.0	-4	-2	4	BAS.	11	1489.0	10	-9	XVIII	4	BAS.	428	750.1	5	-0	
4	BAS.	428	147.5	1	-5		5	QTZITE	33	1489.0	100	-9		5	BAS.	372	1500.2	10	-0	
5	BAS.	344	295.0	2	-5		6	BAS.	262	74.5	1/2	149.0		5A	GN.GLZ.	696	7500.0	50	-0	JH-230
6	GY.SY.	57	737.3	5	-5	QUFT XII	6A	SY.	9238	149.1	1	-0	-1.9	6	GY.SY.	692	15000.0	100	-0	-40
7	BAS.	387	1474.6	10	-5		7	BK-SY.	21	74.5	1	-0		7	BAS.	426	150.1	1	-1	
8	BK-QTZOSE	375	1475.3	100	-5		8	BAS.	148.8	10	-0		8	BAS.	12	150.1	1	-1	DEFENNEH	
9	BAS.	264	49.2	1/3	-6		9	ALAB.	2.56	14900.0	1000	-0	-1400	9	GY.SY.	33	300.2	2	-1	
3670	BAS.	328	147.6	1	-6		3730	BAS.	350	149.1	1	-1		3790	GY-QTZOSE	265	75.1	1/2	-2	DEFENNEH
1	GY.SY.	325	1476.0	10	-6		1	GY.SY.	262	149.1	1	-1		1	BK "	235	75.1	1/2	-2	
2	BAS.	27	1476.2	10	-6		2	BAS.	369	74.5	5	-1		1A	BAS.	31	150.2	1	-2	MEM.
2A	LIM.	645	2214.3	15	-6	ZET, ABYD, 309	3	BK-SY.	338	149.1	10	-1		2	BAS.	333	150.2	1	-2	
3	ALAB.	653	2952.4	2.0	-6	III KAHUN	4	BAS.	19	74.5	5.0	-1		3	ALAB.	627	150.3	1	-3	XVIII
4	ALAB.	33	295.4	2	-7		5	CHALCEDONY	DULK	74.6	1/2	-2	JERUSALEM	4	BAS.	424	150.3	1	-3	DEFENNEH
5	GY.BAS.	422	295.4	2	-7		6	BAS.	482	298.5	2	-2	MEM.	5	GY.SY.	MAE	1503.5	10	-3	MEROE
6	BK-JASP.	698	591.0	4	-7		7	GY.SY.	312	596.7	4	-2		6	BAS.	33	1503.5	10	-3	Φ XVI
7	HAEM.	885	738.6	5	-7	MARATHUS	8	BAS.	258	1491.7	10	-2		7	RED SY.	245	3006.2	2.0	-3	
8	BAS.	350	1477.1	10	-7		9	GY.SY.	18	2985.0	200	-2	-80	8	ALAB.	265	75.2	1/2	-4	
9	BAS.	368	2954.9	2.0	-7		3740	BK-BAS.	346	2984.0	200	-2		9	BAS.	33	300.8	2	-4	
			3691.4	2.5	-7	SEE K	1	FLINT	9	2986.8	20	-3		1	BAS.	338	75.8	5	-4	
3680	RED SY.	261	5910.0	400	-7		2	BAS.	392	298.8	2	-4		2	BAS.	372	75.2	5	-4	MERNPTH
1	BAS.	338	739.2	5	-8		3	GY.SY.	62	298.9	2	-4		3	BK-JASP.	57	1503.7	10	-4	XXIII
			3694.5	2.5	-8	SEE K	4	BR-ALAB.	392	597.7	4	-4	GEBELEYN, XII	4	GY.SY.	311	1504.4	10	-4	
2	HAEM.	499	295.8	2	-9	XVIII	5	LIM.	344	747.7	5	-4		5	GY.SY.	215	1504.0	100	-4	
3	BAS.	265	295.9	2	-9		6	LIM.	642	1494.7	10	-4	IIIIIIII -V	6	BAS.	238	1504.0	1000	-4	-10
4	BAS.	448	295.9	2	-9		7	BAS.	254	2988.5	20	-4		7	GY.SY.	262	150.5	1	-5	
5	BK-SY.	285	295.9	2	-9		8	BAS.	19	747.0	50	-4		8	BAS.	213	150.5	1	-5	
6	DIORITE	82	1479.6	10	-9	GIZEH V	9	RED SY.	32	5975.0	400	-4		9	ALAB.	262	150.5	1	-5	
7	BK-QTZOSE	63	5918.0	40	-9	XXIII	3750	BAS.	33	149.5	1	-5		3810	BAS.	344	301.0	2	-5	
7A	"	611	739.6	5.0	-9	ZET, ABYD, 461	1	BAS.	46	149.5	1	-5		1	BAS.	427	75.2	5	-5	
8	BAS.	331	74.0	1/2	148.0		2	BAS.	32	598.1	4	-5		2	ALAB.	155	3010.7	2.0	-5	
9	BAS.	314	296.0	2	-0		3	BAS.	337	747.3	5	-5		3	BAS.	351	6019.9	4.0	-5	XXIII
3690	BAS.	11	740.0	5	-0		4	GY-QTZOSE	422	2990.0	200	-5		4	Y-RED LIM.	498	301.2	2	-6	QUFT XVIII
1	BAS.	261	740.1	5	-0		5	BAS.	442	74.8	1/2	-6		5	QTZITE	356	1506.4	10	-6	
2	ALAB.	406	740.2	5	-0		6	BAS.	384	74.8	1/2	-6		6	SANDSTN	337	752.9	5.0	-6	
3	BAS.	285	1480.3	10	-0		7	BK-QTZOSE	125	149.6	1	-6		6A	GOLD S	HELL	150.7	1	-7	TA-AA
4	BAS.	802	2959.9	2.0	-0		8	HAEM.	496	299.3	2	-6	XVIII	7	BK-SY	197	753.7	5	-7	SCARABS XXIII
4A	WT.LIM.	692	296.0	2.0	-0	AMENEMHAT III -500	9	GY.SY.	295	747.8	5	-6		8	GY-QTZOSE	11	3015.0	200	-7	
5	GY-QTZOSE	11	148.1	1	-1		3760	GY-QTZOSE	55	2991.3	2.0	-6		9	BAS.	335	75.4	1/2	-8	
6	Y.BK-SERP.	263	1481.0	10	-1		1	BAS.	382	2991.7	20	-6		3820	BAS.	314	753.9	5	-8	
			5926.5	4.0	-1	SEE P	2	LIM.	7	747.9	50	-6		1	BAS.	497	754.0	5	-8	XVIII
7	GY.BAS.	314	2962.0	200	-1		3	BAS.	264	1495.8	100	-6		2	BAS.	654	754.0	5	-8	V
8	GY.BAS.	271	2961.5	200	-1	-3	4	BK-BAS.	326	2991.2	200	-6		3	LIM.	375	754.0	5	-8	
9	BAS.	252	74.1	1/2	-2							SEE K	4	QTZITE	27	754.2	5	-8		
3700	BK-PORPHY	8	148.2	1	-2								5	GY-SILIC.	262	50.3	1/3	-9		
1	BK-SY.	393	148.2	1	-2								6	BK-SY.	446	754.4	5	-9	MEM.	
2	GY.SY.	327	296.5	2	-2															
3	BAS.	202	593.2	4	-3															

NECEF 152-169 GRS.													
NO.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	NO.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL
3827	ALAB.	803	604.3	4	151.0	SEEP	3934	BAS.	314	153.8	1	153.8	
8	BAS.	427	302.3	2	-1	GEBELEYN	5	BAS.	454	307.6	2	-8	MERENPTH
			3776.3	2.5	-1	SEE K.	6	BAS.	365	1538.2	10	-8	
9	RED SY.	314	302.20	200	-1	rough.	7	BAS.	202	153.9	1	-9	
3830	BAS.	268	75.6	1/2	-2		8	BAS.	368	3079.0	2.0	-9	
1	QTZ. CRYST	33	75.6	1/2	-2		9	HAEM.	487	385	1/4	154.0	"1/4"
2	BK. QTZ.	373	1511.8	10	-2		3940	HAEM.	845	154.0	1	-0	
3	RED QTZITE	558	3023.6	2.0	-2		1	BAS.	27	154.0	1	-0	
4	GY. QTZOSE	437	3023.8	2.0	-2		2	BK. QTZOSE	81	308.0	2	-0	XVIII
5	ALAB.	483	302.6	2	-3	XVIII	3	BAS.	27	769.8	5	-0	
6	BAS.	165	756.3	5	-3		3A	BRECCIA	MADE	924.0	6	-0	MEROE
7	BK. QTZ.	DRILL CAP	3027.4	2.0	-3		4	BAS.	428	3079.2	2.0	-0	XXVI
8	Y. LIM.	653	22700	300	-3	SEE K	5	BAS.	27	308.2	2	-1	
9	BAS.	265	302.8	2	-4	KAHUN	6	BAS.	33	308.2	2	-1	
3840	BAS.	271	757.1	5	-4	KAHUN	7	BAS.	338	308.3	2	-1	
1	SY.	364	1514.2	10	-4		8	GY. SILIC.	384	770.4	5	-1	
2	GY. SY.	353	75720	500	-4		9	GY. SY.	144	154.2	1	-2	
3	HAEM.	1	151.5	1	-5		3950	BAS.	19	1541.9	10	-2	
4	"	493	151.5	1	-5	XVIII	1	GY. SY.	365	1543.3	10	-3	
5	FLINT	486	151.5	1	-5	XVIII	2	BAS.	338	1543.	10	-3	-6
6	RED SY.	258	6060	40	-5		3	BAS.	63	30867	2.0	-3	V
7	ALAB.	152	151.6	1	-6	KAHUN	4	BAS.	27	309.1	2	-5	
8	BAS.	265	151.7	1	-7		5	BAS.	262	1546	4.0	-6	HIERAKON P.
9	BAS.	425	758.6	5	-7		6	BAS.	344	154.6	1	-6	
3850	BK. STEA.	295	1517.0	10	-7		7	BK. QTZOSE	19	773.2	5	-6	KARNAK
1	LIM.	465	6068.0	400	-7	rough	8	BAS.	256	1545.7	10	-6	
2	BAS.	331	303.6	2	-8		9	GY. SERP.	31	387	1/4	-8	
3	ALAB.	258	303.6	2	-8		3960	RED SY.	8	30963	2.0	-8	XXIII
4	BR. MARB.	744	303.6	2	-8	A	1	BK. QTZOSE	12	30969	2.0	-8	XXIII
5	BAS.	337	151.9	1	-9		2	BK. STEAT.	64	1549	1	-9	XII
6	HAEM.	494	303.9	2	-9	TARTUS XVIII	3	LIM.	42	1549	1	-9	
7	BAS.	275	303.9	2	-9		4	BAS.	19	1548.8	10	-9	
8	GY. PORPH.	10	759.5	5	-9		5	BK. QTZOSE	141	3099.1	2.0	-9	XXIII
9	BAS.	426	3038.4	2.0	-9		6	BAS.	406	77.5	1/2	155.0	
3860	BAS.	263	3039.3	2.0	-9		7	ALAB.	657	310.	2	-0	-12
1	BAS.	238	6078.	40	-9		8	BAS.	202	155.1	1	-1	
2	BAS.	11	607.9	4	152.0		9	SARD.	728	9.7	1/16	-2	GHUROB, XVIII
3	RED SY.	33	30400	200	-0		3970	BAS.	33	310.4	2	-2	
4	GY. SY.	32.3	30402	200	-0		1	BAS.	315	3106.	2.0	-3	
5	ALAB.	313	3042	2	-1		2	GY. GRAN.	37	31065	200	-3	
6	GY. SY.	33	76.1	1/2	-2		3	GY. SY.	27	77.7	1/2	-4	
7	BAS.	331	152.2	1	-2		4	RED SHELL MARBLE	33	155.4	1	-4	-1.3
7A	ALAB.	4952	913.0	6	-2		5	BAS.	38	310.8	2	-4	
			608.7	4	-2	SEE P	6	BAS.	33	310.9	2	-4	
8	GY. ST. EA.	653	152.2	10	-2	-4 VI	7	BK. W. PORPH.	8	311.1	2	-5	
9	GY. SY.	33	76100	500	-2		8	BAS.	5	777.4	5	-5	irregular
3870	SERP.	65	1522.7	10	-3	-4.4 XII	9	BAS.	345	3109.6	2.0	-5	
1	GY. SY.	33	50.8	1/3	-4	SEE P	3980	BAS.	435	3110.2	2.0	-5	
2	GY. SY.	191	6097.	40	-4		1	BAS.	265	77.8	5	-6	
2A	SANDSTN	605	3050	2	-5	DEN, ABYD 248	2	BAS.	27	777.8	5	-6	
3	BAS.	395	3051	2	-5		3	BAS.	256	1555.6	10	-6	
4	GY. SY.	334	76272	500	-5				77800.	500	-6	SEE D	
5	RED SY.	12	6121.	40	153.0		4	BAS.	328	778.3	5	-7	
6	Y. LIM.	803	6140.	40	-5	HELIOPOLIS -140	5	BAS.	33	77.9	1/2	-8	
	LEAD PLUG						6	BAS.	352	778.8	5	-8	
							7	BAS.	338	779.4	5	-8	
							8	BAS.	45	155.9	1	-9	
							9	GY. LIM.	25	311.8	2	-9	
							3990	BAS.	338	779.5	5	-9	
							1	BAS.	33	78.0	1/2	156.0	
							2	BAS.	33	312.0	2	-0	

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No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL				
3993	BAS.	313	780.1	5	156.0		4044	BAS.	406	159.1	1	159.1		4094	RED GRAN	9	8136.5	50	162.7					
4	LIM.	352	780.6	5	1		5	ALAB.	922	398.1	5/2	2	AMARN, XVIII	5	BAS.	338	325.7	2	.8	V?				
5	BAS.	33	780.6	5	-1		6	BAS.	446	318.7	2	3		6	BAS.	197	1628.8	10	.9					
6	BAS.	265	780.7	5D	-1		7	LIM.	305	1592.8	10	3					3257.9	2.0	9	SEE D				
7	BAS.	33	78.1	1/2	-2					3187.1	2.0	3	SEE D	7	BAS.	312	81.5	1/2	163.0					
8	BAS.	364	78.1	1/2	-2		8	ALAB.	4954	79.7	1/2	-4	XVIII	8	ALAB.	625	326.0	2	.0	XII				
9	BAS.	33	781.2	5	-2		9	BAS.	429	159.4	1	4					3260.0	2.0	.0	SEE D				
4000	QTZITE	38	3124.5	2.0	-2		4050	ALAB.	9156	478.2	3	4	TARKHAN I	9	BAS.	314	163.1	1	1					
1	BAS.	33	781.6	5	-3		1	GY.SY.	23	797.2	5	4					3261.8	2.0	-1	SEE D				
2	BAS.	446	312.8	2	4		2	BAS.	494	159.5	1	5	XVIII	4100	GY.QTZOSE	11	8180.0	50	-6	GIZEH V?				
3	BAS.	446	312.9	2	4		3	GY.VOLC.	922	159.5	1	5					8198.0	50	-9	SEE B				
4	BRQTZITE	643	1564.2	10	-4	RETABEH	4	CHLORITE	265	159.5	1	5					1	RED MARB	15	164.0	1	164.0	XP mor og?	
			3128.1	2.0	4	SEE D	5	BR.BAS.	254	3190.0	2.00	-5	-7				2	BAS.	369	820.2	5	.0		
5	BAS.	33	313.0	2	-5		6	GY.SY.	185	79.8	1/2	-6							3282.8	2.0	-1	SEE D		
6	BAS.	875	1565.0	10	-5	XXIII	7	ALAB.	64	159.7	1	-7	KAHUN XII	3	DIORITE	658	3290.2	20	-5	IV				
7	HAEM.	15	78.3	2.0	-6		8	BAS.	265	798.4	5	-7					4	BAS.	33	1645.7	10	-6		
8	BUFF LIM.	14	19.6	1/8	-8		9	ALAB.	15	1597.2	10	-7					5	BAS.	331	82.4	1/2	-8		
9	BAS.	325	78.4	1/2	-8		4060	BKQTZOSE	555	1597.4	10	-7					6	ALAB.	80	329.8	2	-9	XVIII	
4010	BAS.	331	156.8	1	-8					3196.8	2.0	8	SEE D	7	ALAB.	165	329.8	2	-9					
1	BAS.	314	156.8	1	-8					3198.4	2.0	9	SEE D	8	QTZITE	368	3297.5	2.0	-9					
2	BAS.	27	784.4	5	-9		1	ALAB.	14	20.0	1/8	1600					9	GY.QTZOSE	311	16501.0	100	165.0	rough	
3	GY.QTZOSE	54	1568.6	10	9	XXIII	2	BAS.	27	80.0	1/2	.0					4110	GY.STEAT	625	165.2	1	-2	XII	
4	BAS.	38	3138.8	20	9		3	HAEM.	499	160.0	1	.0	SYRIA, XVIII						3306.1	2.0	-3	SEE D		
5	BAS.	26	78.5	1/2	157.0		4	BAS.	33	160.0	1	0					1	BAS.	331	82.68	50	-4	SEE D	
6	BAS.	254	78.5	1/2	.0		5	GY.SY.	392	1599.9	10	.0					2	BK.SY.	3	1653.6	100	-4	XXIII	
7	GY.MARB.	81	157.0	1	.0		6	BAS.	705	1599.8	100	.0	IV				3	BK.SY.	264	1653.8	100	-4		
8	RED FELSP.	63	157.0	1	.0	XII	7	HAEM.	49	80.1	1/2	-2	XVIII				4	BKQTZOSE	11	827.9	50	-6		
9	BAS.	384	785.1	5	.0		8	BAS.	331	800.4	5	-1					5	BAS.	235	331.5	2	-7		
			157000.0	1000	.0	SEE D	9	BK.JASP.	14	801.0	5	-2							829.4	5	8	SEE B		
4020	LIM.	32	785.8	5	-2		4070	BAS.	338	1602.9	10	-3						830.0	5	166.0	5	SEE B		
1	BAS.	33	1572.7	10	-3		1	GY.GRAN.	312	4010.0	5	4	π -8				6	BAS.	314	166.2	1	-2		
2	BAS.	331	315.2	2	-6		2	BAS.	27	321.3	2	6					7	GN.JASP.	5	332.6	2	-3		
3	BAS.	338	315.3	2	-6		3	BAS.	268	8030.8	50	-6					8	QTZITE	38	3329.0	2.0	-4		
4	BAS.	338	3153.0	20	6		4	QTZITE	313	8032.1	50	-6					9	ALAB.	483	832.4	5	-5		
5	QTZITE	313	7885.8	50	7		5	BKQTZOSE	876	3215.0	20	-7	-2-2 XXIII				4120	BAS.	33	1665.6	10	-6		
6	BAS.	256	78.9	1/2	-8		6	RED GLASS	47	40.2	1/4	-8					1	BKQTZOSE	14	3334.5	2.0	-7		
7	BAS.	429	315.8	2	-9		7	HAEM.	491	160.8	1	-8	XVIII				2	HAEM.	922	166.8	1	-8	TARTUS XVIII	
8	BAS.	15	789.3	5	-9	AMARNA	8	GY.SY.	38	805.6	5	-1					3	BAS.	37	834.0	5	-8		
9	BAS.	27	789.8	5	158.0		9	BK.WPORPH.	31	1611.0	10	-1					4	BAS.	27	1668.2	10	-8		
4030	BAS.	338	1579.8	10	.0		4080	RED HAEM.	406	40.3	1/4	-2					5	LIM.	496	334.6	2	167.3	XVIII	
1	BAS.	331	1580.3	10	.0					3224.8	2.0	-2	SEE D				6	BAS.	39	335.1	2	-5		
2	ALAB.	923	1580.0	10	.0	RUFT, -24, XVIII				322.7	3	-3	SEE B				7	BKQTZOSE	11	838.0	50	-6		
3	LIM.	452	3160.0	200	.0	-60				3227.0	2.0	-3	SEE D				8	BR.SERP.	144	838.7	50	-7		
4	GY.SERP.	235	158.1	1	-1		1	GY.QTZOSE	658	1612.9	100	-3	IV				9	ALAB.	483	335.7	1	-8		
5	ALAB.	886	1581.1	10	-1		2	BK.STEAT.	32	80.7	1/2	-4	OVAL				4130	GY.SY.	392	167.9	1	-9		
6	HAEM.	499	79.1	1/2	-2	SYRIA XVIII	3	BK.STEAT.	202	80.7	1/2	-4	RUFT				1	HAEM.	803	168.0	1	168.0	XVIII	
			3164.8	2.0	-2	SEE D				3229.2	2.0	-4	SEE D				2	BAS.	32.8	336.0	2	.0		
7	BAS	33	158.4	1	-4		4	GN.STEAT.	365	80.8	1/2	-6					3	BKQTZOSE	55	1680.0	10	.0	-64 XXIII	
8	LIM.	452	792.0	5	-4		5	BAS.	27	1616.7	10	7							3359.5	20	.0	SEE S		
9	GY.SY.	338	792.1	5	-4		6	BAS.	353	1617.2	10	7					4	BK.STEA.	64	505.3	3	-3	-5 XII	
9A	BKQTZOSE	144	1584.6	10	-5	ABYDOS	7	BKQTZOSE	9	3233.3	20	-7					5	BAS.	33	337.0	2	-5		
4040	BAS.	DUCK	3170.0	200	.5	-1400	8	ALAB.	331	81.1	1/2	162.2					6	ALAB	352	3382.8	20	169.1		
1	BAS.	33	158.4	1	-6		9	BKQTZOSE	14.9	810.8	50	-2	XXIII				7	BAS.	338	339.0	2	.5		
			3174.0	2.0	-7	SEE D	4090	LIM.	435	324.6	2	-3					8	BAS.	496	339.3	2	.6	XVIII	
2	BAS.	334	794.1	5	-8					811.6	5	-3	XXIII				9	GY.SERP.	496	339.5	2	.7	XVIII	
			3178.6	2.0	-9	SEE D				3245.8	2.0	-3	SEE D						3396.0	2.0	-8	SEE S		
			3178.8	2.0	-9	SEE D	2	BAS.	21	1625.7	10	-6	XXIII				4140	BAS.	40	3397.0	2.0	.8		
			7945.0	5.0	-9	SEE D				3253.1	2.0	-6	SEE D						8500.0	50	170.0	SEE B		
3	BAS.	392	1590.0	10	159.0		3	BAS.	338	162.7	1	-7												

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KHOIRINE

170-189 GRS						190-209 GRS						210-229 GRS						230-249 GRS									
NO	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	NO	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	NO	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	NO	MATERIAL	FORM	GRS.	X	UNIT	DETAIL
4141	AMAZONITE	20	32.7	1/5	163.5	THEBES	4190	BAS.	33	88.7	1/2	177.4		4237	HAEM.	51	364.0	2	182.0	XVIII	4286	HAEM.	436	95.0	1/2	190.0	XVIII
2	BL. GL. SCHST	499	33.1	1/5	165.5	XVIII	1	ALAB.	625	177.4	1	-4	XII	8	GY. QTZOSE	54	364.1	2.0	-0	XXIII	1	BK. SY.	54	354.9	2.0	-4	XXIII
3	BL. GLASS	929	33.5	1/5	167.5		2	GY. QTZOSE	142	354.8	2	-4		8A	ALAB.	806	913.0	5	-6	XXIII	4	GY. SY.	54	354.9	2.0	-4	XXIII
4	BR. SERP.	25	33.9	1/5	169.5		3	BK. "	54	354.9	2.0	-4		9	BK. SY.	54	365.8	2.0	-9	XXIII	5	HAEM.	491	183.1	1	-1	XVIII
5	BAS.	356	34.01	8	2.0	170.1	4	GY. SY.	54	354.9	2.0	-4		1	HAEM.	491	183.1	1	-1		2	BK. QTZOSE	55	365.6	10	-3	XXIII
5A	GLASS VAR	218	170.5	1	-5		5	HAEM.	491	35.5	1/5	-5		2	BK. QTZOSE	55	366.5	20	-3	SEE Q	3	" "	65	366.5	20	-4	XXIII
6	LIM.	924	85.4	1/2	-8		6	GY. SY.	53.3	177.69	100	-7		3	" "	65	366.5	20	-4	XXIII	4	ALAB.	62	367.0	2	-5	-8 XII
7	BAS.	801	341.8	2	-9	XVIII	7	BAS.	165	177.69	100	-7		4	ALAB.	62	367.0	2	-5	-8 XII	5	BK. QTZOSE	64	367.0	2.0	-5	XXIII
8	HAEM.	49	34.2	1/5	171.0	XVIII	8	BK. SERP.	498	355.6	2	-8	XVIII	5	BK. QTZOSE	64	367.0	2.0	-5	XXIII	6	BAS.	327	367.3	2	-6	
9	BR. LIM.	646	171.0	10	-0	VIII -8 VI	9	BK. SY.	16	177.83	100	-8	XXIII	6	BAS.	327	367.3	2	-6		6A	BK. LIM.	287	275.2	15	-7	IE ROMAN
4150	LIM.	202	171.200	1000	-2	-300	4200	HAEM.	485	177.9	1	-9	XVIII	7	GY. SY.	328	36.8	1/5	184.0	7	GY. SY.	328	36.8	1/5	184.0		
1	GY. SY.	11	85.65	5	-3		1	CHLORITE	31	35.6	1/5	178.0	8	" "	CONRY	368.0	2	-0	ΦIX	8	" "	CONRY	368.0	2	-0	ΦIX	
2	LIM.	914	171.32	10	-3	rough	2	YEL. PASTE	927	891	1/2	-2		9	BAS.	9	921.0	5	-2		9	BAS.	9	921.0	5	-2	
3	BR. SERP.	342	85.8	1/2	-6		3	BAS.	40	891.2	5	-2		4250	HAEM.	80	184.3	1	-3	XVIII	9	BAS.	9	921.0	5	-2	
4	BAS.	332	85.9	1/2	-8		4	FOS. WOOD	54	357.1	20	-3	SEE Q	1	BK. SY.	54	3691.4	20	-6	XXIII	4250	HAEM.	80	184.3	1	-3	XVIII
5	BAS.	165	171.86	10	-9		5	DR. QTZITE	27	893.30	500	-6	-6	2	GY. SERP.	311	3694.5	20	-7		1	BK. SY.	54	3691.4	20	-6	XXIII
6	ALAB.	238	172	1/10	172.0		5A	BK. WT. SY. COWRY	53.6	3/10	-7		3	BK. SY.	646	3697.6	200	-8	"IRON 10" XII	2	GY. SERP.	311	3694.5	20	-7		
7	GY. SY.	54	344.01	2.0	-0	XXIII	6	GY. SY.	58	178.74	10	-7	XXIII	4	RED JASP.	653	185.0	10	185.0	IRON-100 IX	3	BK. SY.	646	3697.6	200	-8	"IRON 10" XII
8	BAS.	27	861.4	.5	-3		7	GY. MARB.	147	357.6	2	-8		5	HAEM.	484	185.2	1	-1	RETABH. XVIII	4	RED JASP.	653	185.0	10	185.0	IRON-100 IX
9	BK. QTZOSE	54	344.54	2.0	-3	XXIII	8	BAS.	235	357.6	2.0	-9		6	ALAB.	493	92.8	1/2	-6	XVIII	5	HAEM.	484	185.2	1	-1	RETABH. XVIII
4160	GY. SY.	235	344.7	2.0	-3		9	ALAB.	625	178.9	1	-9	XII	7	GY. SERP.	902	92.8	0	-6		6	ALAB.	493	92.8	1/2	-6	XVIII
1	BAS.	202	172.4	1	-4		4210	BAS.	332	179.1	1	179.1		8	BAS.	646	464.0	25	-6	-25 VI	7	GY. SERP.	902	92.8	0	-6	
2	LIM.	50	86.3	1/2	-6	MEM.	1	HAEM.	175	358.6	2	-3		9	ALAB.	801	92.9	1/2	-8	XVIII	8	BAS.	646	464.0	25	-6	-25 VI
3	BAS.	37	172.6	1	-6		2	QTZITE	646	3590.6	20	-5	XVIII	4260	GY. MARB.	429	371.6	2	-8	-8	9	ALAB.	801	92.9	1/2	-8	XVIII
4	LIM.	805	172.66	10	-7	XVIII	3	BK. QTZOSE	7	179.5	100	-5	XXIII	1	BK. QTZOSE	54	371.9	2.0	186.0	XXIII	4260	GY. MARB.	429	371.6	2	-8	-8
4A	ALAB.	804	346.6	2	173.3		4	GY. SY. COWRY	89.8	1/2	-6	QUFT	2	BK. SY.	33	371.9	2.0	-0	MEM.	2	BK. SY.	33	371.9	2.0	-0	MEM.	
5	BAS.	27	347.2	2	-6		5	ALAB.	937	179.4	10	-9		3	QTZITE	5	931.0	500	-2	-300	3	QTZITE	5	931.0	500	-2	-300
6	BK. QTZOSE	165	347.7	2.0	-6	SEE Q	6	GLASS	21	18.0	1/10	180.0	4	BAS.	33	931.9	5	-4		4	BAS.	33	931.9	5	-4		
7	" "	52	347.82	2.0	-9	XXIII	7	GY. SERP.	873	36.0	1/5	-0	5	BK. QTZOSE	58	4.66	0	-4	-22	5	BK. QTZOSE	58	4.66	0	-4	-22	
8	BAS.	331	348.0	9	2.0	174.0	7A	BK. WT. SY.	798	45.0	1/4	-0	COWRY	6	BK. SERP.	397	93.4	1/2	-8	IIIIII SEE Q	6	BK. SERP.	397	93.4	1/2	-8	IIIIII SEE Q
9	GY. STEA.	838	174.1	1	-1	ROMAN	8	BK. QTZOSE	59	450.5	2.5	-0	XXIII	7	ALAB.	917	93.4	5	187.0	7	ALAB.	917	93.4	5	187.0		
4170	GY. SY.	148	348.75	2.0	-4		9	GY. GRAN.	311	901.22	500	-2		8	BAS.	235	374.0	2.0	-0		8	BAS.	235	374.0	2.0	-0	
1	HAEM.	691	349.1	2	-5		4220	OBSID.	2.0	361	1/5	-5		9	BK. QTZOSE	54	374.0	2.0	-0	XXIII	9	BK. QTZOSE	54	374.0	2.0	-0	XXIII
2	GY. QTZOSE	55	174.4	8	-5	XXIII	1	BAS.	792	90.3	1/2	-6	XVIII	4270	LIM.	795	374.5	2	-2		4270	LIM.	795	374.5	2	-2	
3	GY. SY.	54	349.15	2.0	-6	XXIII	2	GY. SERP.	497	90.3	1/2	-6	XVIII	1	BR. CHALCO	925	935.9	5	-2	XXVII?	1	BR. CHALCO	925	935.9	5	-2	XXVII?
4	ALAB.	918	349.4	2	-7		3	BK. W. PORPH	35	180.6	1	-6		2	LIM.	646	4685.8	2.5	-4	QUFT VI	2	LIM.	646	4685.8	2.5	-4	QUFT VI
5	LIM.	499	349.8	2	-9		4	BAS.	33	361.8	2	-9	-3	3	BAS.	313	37.5	1/5	5		3	BAS.	313	37.5	1/5	5	
6	BAS.	338	175.73	10	175.7	HIERAKON?	5	LIM.	65	181.0	1	181.0	XII	4	HAEM.	499	371.5	2.0	-6	SEE D	4	HAEM.	499	371.5	2.0	-6	SEE D
7	BAS.	332	87.9	1/2	-8		6	RED MARB.	436	362.0	2	-0		5	BAS.	33	23.5	1/8	188.0	5	BAS.	33	23.5	1/8	188.0		
8	HAEM.	452	175.8	1	-8	MARATHUS	7	RED SY.	347	90.50	50	-0		6	BR. LIM.	801	375.9	2	-0	XVIII	6	BR. LIM.	801	375.9	2	-0	XVIII
9	BK. JASP.	20	17.6	1/10	176.0	OVAL	8	HAEM.	882	362.2	2	-1	rough	7	BAS.	63	377	1/5	-5	XII	7	BAS.	63	377	1/5	-5	XII
4180	HAEM.	FACE	352.0	2	-0		9	BK. QTZOSE	54	362.1	2.0	-1	XXIII	8	GY. SY.	882	377.1	2	-5		8	GY. SY.	882	377.1	2	-5	
1	ALAB.	865	352.1	2	-0		4230	HAEM.	62	362.7	2	-3	XII XII	9	BR. SY.	439	1884.8	10	-5		9	BR. SY.	439	1884.8	10	-5	
2	BRECCIA	801	352.2	2	-1	XVIII	1	AMAZONITE	497	36.3	1/5	-5	THEBES, XVM	4280	CARNEL.	258	94.3	1/2	-6	PIERCED	4280	CARNEL.	258	94.3	1/2	-6	PIERCED
3	BK. QTZOSE	10	352.28	2.0	-1		2	BAS.	33	181.5	1	-5		1	BK. QTZOS	10	377.6	3	-8	XXIII	1	BK. QTZOS	10	377.6	3	-8	XXIII
4	BAS.	356	352.4	2	-3		3	BRECCIA	43	90.8	1/2	-6		2	BAS.	256	377.8	2	-9		2	BAS.	256	377.8	2	-9	
5	BAS.	333	88.2	5	-4	-7	4	BK. SY	54	363.7	2.0	-6	XXIII	3	BK. QTZOSE	54	3783.5	20	189.2	XXIII	3	BK. QTZOSE	54	3783.5	20	189.2	XXIII
6	LIM.	795	353.0	2	-5	MEM.	5	BK. MARB	790	90.9	1/2	-8	XVIII	4	LIM.	646	473.2	2.5	-3	QUFT VI	4	LIM.	646	473.2	2.5	-3	QUFT VI
7	BK. QTZOSE	44	176.50	100	-5	KAHUN	6	ALAB.	65	182.0	1	182.0	XII	5	PINK LIM	801	94.8	1/2	-6	XVIII	5	PINK LIM	801	94.8	1/2	-6	XVIII
8	HAEM.	43	353.2	2	-6	XVIII								6	HAEM.	436	95.0	1/2	190.0	XVIII	6	HAEM.	436	95.0	1/2	190.0	XVIII
9	BAS.	333	354.00	200	177.0																						

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No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	No.	MATERIAL	FORM	GRS.	X	UNIT	DETAIL	
4410	GY.SY.	618	201.0	1	2010	VI	4458	GY.SY.	12	5121.	25	2045	XXIII	4508	BAS.	142	261	1/8	2088		
1	LIM.	643	1005	5	0	III -20 VI	9	BK.SY.	347	8198.	40	9		9	LIM.	232	261	1/8	8		
2	BAS.	17	20095	10	0					820.2	4	2050	SEE N	4510	Y.BK.SERP.	33	52.2	1/4	8		
3	BK.QTZOSE	347	4020.2	20	0	XXIII	4460	BK.STEAT	725	16400	8	0	H=8 ROMAN	1	BK.JASP.	63	417.9	2	9	II VI	
4	RED GRAN.	11	20100	100	0	-60	1	BK.QTZOSE	65	6153.	30	1	XXIII	2	GY.QTZOSE	PES	2090.0	10	2090		
5	BAS.	62	8049	4	2	II VI	2	BAS.	38	257	1/8	6		3	LIM.	429	20900	100	0	-100	
6	BR.SERP.	692	2011.8	8	251.5	IIIIIIIIII N HU458 XII	3	BAS.	314	257	1/8	6		4	GN.STEAT	725	2091	1	1	BORED	
			8056	4	4	SEE N	4	BAS.	38	51.4	1/4	6		5	SANDST.	625	5229	25	1	XII	
7	ALAB.	63	3828	19	5	III-6	5	GY.SILIC.	15	1028	1/2	6		6	GY.STEAT.	63	2092	1	2	XII	
8	BK.W.PORPH	356	4030	20	5	-26	6	RED JASP.	653	1850	9	6	IIIIIIII-100 IX RETABEN	7	Y.QUARTZ	742	4187	2	3		
9	BAS.	33	254	1/8	6		7	BRECCIA	11	20556	10	6	XXIII	8	LIM.	917	837.8	4	4	KAHUN XII	
4420	ALAB.	64	2017	1	7	DEFNEH VI	8	BK.QTZOSE	8	2056.5	10	6	XXIII	9	ALAB.	265	41900	200	5	-50	
1	BAS.	16	80777	40	9	XXIII	9	" "	611	2057.4	10	7	XXIII	1	BAS.	33	131	1/16	6		
2	LIM.	232	50.5	1/4	2020		4470	BAS.	33	51.5	1/4	2060		1	BAS.	20	52.4	1/4	6		
3	GY.STEAT.	932	101.0	1/2	0	QUFT	1	ALAB.	165	5156	25	2		2	HAEM.	894	52.4	1/4	6	SYRIA	
3A	LIM.	653	24244	120	0	MEDIUM III	2	ALAB.	347	41265	20	3		3	BK.JASP.	748	2096	1	6		
4	GY.SY.	62	2021	1	1	XII	3	BL.GLASS	303	258	1/8	4		4	BK.QTZOSE	2	4192.1	20	6	XXIII	
4A	SANDSTN	54	8086	40	2	ZERAB 79.1	4	BAS.	33	51.6	1/4	4		5	" "	446	4192.1	20	6	XXIII	
5	BAS.	23	253	1/8	4		5	BAS.	33	103.2	1/2	4		6	" "	54	4192.4	20	6	XXIII	
6	BK.SY.	325	506	1/4	4		7	GY.SY.	16	20640	10	4		7	LIM.	816	839.0	4	7	SEE L	
7	ALAB.	25	1012	5	4	-4	8	VOLC.ASH	264	2064	10	4	-12	8	BK.QTZOSE	11	41936	20	7		
8	BAS.	339	2025	10	5	MERNPTH	9	BK.QTZOSE	2	10319	50	4	XXIII	9	Y.LIM.	646	837.4	4	9	II XII	
8A	LIM.	920	10134	5	7	END GROOVE 24.5.21	4480	GN.SY.	9	10326	50	5	KAHUN XII	11	BK.QTZOSE	11	41965	20	8	XXIII	
9	BAS.	347	40540	20	7	SEE N	1	BAS.	33	517	1/4	8	SEE N	9	LIM.	646	839.5	4	9	II XII	
			81080	40	7	SEE P	2	BK.STEAT.	871	517	1/4	8		11	BR.QTZITE	11	41990	200	9	-4	
			12160	60	7	SEE P	3	BK.QTZOSE	54	4137.5	20	9	MERNPTH	10A	LIM.	653	42004	200	2100	MEDIUM III	
4430	VIOLET GLS.	38	507	1/4	8		4	BK.QTZOSE	54	8279	40	2070	SEE N	1	GN.QTZOSE	11	5256	25	1	MERNPTH	
1	BAS.	425	507	1/4	8		3A	LIM.	653	24861	120	1	MEDIUM III	2	GY. "	7	10506	50	1	XXIII	
2	BK.QTZOSE	55	10142	5	8	XXIII	4	GY.GRAN.	26	41416	200	1		3	BK.BAS.	33	42022	200	1		
3	" "	10	4056	20	8	XXIII	5	GY.JASP.	33	259	1/8	2		4	BK.W.SY	311	263	1/8	4		
4	" "	63	60882	30	9	XXIII	6	ALAB.	4	829.1	4	3	HIERAKON P	5	QTZITE	64	6313	30	4	-7 VI	
4A	GLZ.SCHIST	691	400	2	2030	ORX -30 XIII	7	BK.QTZOSE	2	5186	25	4		6	DIORITE	652	10526	5	5	IIIIII IV	
5	BAS.	14	5073	25	1	XXIII	8	LIM.	36	830.0	4	5		7	LIM.	934	8425	4	6		
6	BK.SY.	54	40640	20	2	XXIII	9	BAS.	203	519	1/4	6		8	ALAB.	626	2109	1	9	XVIII	
7	BK.QTZOSE	63	40660	20	3	XXIII	9A	OBSID.	803	2079	1	6	CU.PIN	9	BK.QTZOSE	10	10543	50	9	XXIII	
8	" "	9	5085	25	4	XXIII	1	GY.SY.	165	20758	100	6	IIIIII	4540	BAS.	15	10546	50	9	NO HIERAKON P. SEE L	
9	BR.QTZ.	742	10178	5	5	SEE N	2	GN.QTZOSE	11	41571	20	8	XXIII	1	GLASS	395	264	1/8	2	DEFENNEH	
4440	BK.QTZOSE	54	40706	20	5	MERNPTH	3	BAS.	254	5197	25	9		2	ALAB. KA	648	3801	18	2	IIIIIIII-2, XII	
1	RED GRAN	422	10175	50	5	rough	4	BONE	74	52.0	1/4	2080		3	LIM.	883	4224	20	2	NAR. PRE	
2	BAS.	19	255	1/8	2040		5	BK.QTZOSE	10	4160.1	20	0	SEE Q1386	3A	HAEM.	823	1213	20	7	QUFT	
3	GN.JASP.	20	255	1/8	0	THEBES	6	LIM.	56	8320	40	0	MERNPTH	4	PINK QTZ.	742	12704	6	7	SEE L	
4	BAS.	33	51.0	1/4	0		7	LIM.	692	31200	150	0	SINAI -500	5	GY.SY.	26	265	1/8	2120		
5	BAS.	33	51.0	1/4	0		8	W.QTZITE	54	20814	10	1	SEE N	6	LIM.	625	8500	40	5	KAH-200, XII	
6	BAS.	26	51.0	1/4	0		9	GY.MARB.	126	2083	1	3	XXIII	7	BR.SERP.	691	12762	6	7	III QUFT XII	
7	BK.QTZOSE	881	5101	25	0	XXIII	4500	BK.QTZOSE	55	20835	10	3	XXIII	8	RED V. LIM.	649	6405	30	2135	NAR. " IV	
8	GY.SY.	265	1021	1/2	2		1	" "	38	41652	20	3	XXIII	9	PINK SY.	165	10686	50	7		
9	WT.GLASS	38	51.1	1/4	4		2	RED QTZ.	54	41668	20	3	XXIII	4550	LIM.	29	1070	5	2140	HIERAKON P. -60 N. P. III	
4450	BAS.	20	57.1	1/4	4		3	HAEM.	485	521	1/4	4	XVIII	1	CHLORITE	618	6447	30	9	III XII	
1	ALAB.	626	4088	2	4	XII	4	RED GLS.	15	1042	1/2	4		2	Y.STEAT.	64	3227	3/2	2153	III XII	
2	BK.QTZOSE	12	40908	20	5	XXIII	5	GY.QTZOSE	38	41686	20	4	XXIII	3	LIM.	458	21802	10	2180		
3	BAS.	352	5112	25	5	SEE N	6	GY.STEAT.	63	4170	2	5	II XII	3A	LIM.	653	43848	200	2192	MEDIUM III	
4	ALAB.	65	1023	1/2	6	II XII	7	RED VEINTE L.LIM.	649	10433	50	7	SEE N	4	WT.QTZ.	742	8853	4	2213		
5	RED VEINTE L.LIM.	649	10433	50	6	III QUFT IV				8340	4	5	SEE N	5	LIM.	456	1180	1/2	2308		
6	BK.QTZOSE	822	10242	5	8	-12 XII HARAGEH															

* A D D E N D A MARKED *

2139A	P. BR. LIM.	799	241.2	2	1204	P	2540A	PINK LIM.	803	392.0	3	1307	D.	3157A	HAEM.	442	69.5	1/2	1390	Q
2142A	P. GY. LIM.	797	1208.2	10	8	P	2618A	ALAB.	49	1319.5	10	1319	D. CHICKEN	3337B	HAEM.	446	142.0	1	1424	Q
2183A	P. PINK LIM.	702	2454	2	1227	P	2705A	HAEM. DOVE	808	1330.	10	1330	S.-20 HUMAN HEAD	3403A	BAS.	331	143.1	1	1431	Q
2187A	P. BR. LIM.	792	124.4	1	1244	P	2786A	GY. LIM.	435	4025	3	1342	S. IX	3630A	BAS. UN	22	49.0	1/3	1470	Q
2261A	D. PURR "	797	1250.3	10	1250	Q D	3073A	BR. LIM.	436	13873	10	1387	S. III	3991A	IVORY LOW	926	78.	1/2	156.	N -2
2407A	D. VAR. GLS.	711	1284	1	1284	D	3151A	BK.JASP.	817	694.3	5	1389	PEBBLE Q							

SELA 209-22765							No.	MATERIAL	FORM	G.R.S.	X	UNIT	DETAIL	No.	MATERIAL	FORM	G.R.S.	X	UNIT	DETAIL
4557A	BR.SERP.	740	209.2	2	209.1		4608	CHLORITE	33	27.0	1/8	216.0		4677	BAS.	331	44300	200	221.5	-1100
			418.2	1			9	WT.MARB.	14	432.0	2	0	CARTHAGE, RQ	8	GY-RTZOSE	54	4432.5	20	.6	XXIII
			209.2	2			4610	LIM.	33	2160.2	10	0		9	BK "	10	2217.3	10	.7	Irregular
								BK.BAS.		216100	1000	1	-400	4680	" "	10	5543.3	25	.7	XXIII
6	ALAB.	265	41900	200	.5	-50	2	ALAB.	64	432.4	2	.2	II ABYD. VI	1	RED LIM.	325	221.8	1	.8	
7	HAEM.	938	8398	4	7		3	BAS.	656	864.9	4	.2	IV	2	LIM.	645	1109.2	5	.8	AMARN, XVIII
			839.5	4	9	SEE B	4	GY.GRAN.	465	432.70	200	.3	tough	3	GY.SY.	348	5544.3	25	.8	
8	BR-RTZITE	11	41990	200	.9	-4	5	BK.JASP.	875	865.8	4	.4	XXIII	4	BK-RTZOSE	55	2212.2	10	222.1	XXIII
9	BAS.	392	525	1/2	2100		6	BK-RTZOSE	55	1083.3	5	.6	XXIII	5	GY. "	54	4443.9	20	.2	XXIII
4580	BK.BAS.	33	42022	200	.1		7	" "	4	4331.9	20	.6	XXIII	6	HAEM.	49	444.7	2	.3	TARTUS, XVIII
			6313	30	.4	SEE B	8	LIM.	12	1084 1/2	.8			7	SARD	505	556 1/4	.4		XXIII
			10526	5	.5	"	9	BK-W-PORPH	10	4336.6	20	.8	QUFT XXIII	8	LIM. KAN	64	8900	40	.5	PN-200 XII
			2109	1	.9	"	4620	LIM.	313	4336.8	20	.8	tough	9	BAS.	11	222.9	10	.6	
			10548	50	.9	"	1	BKJASP.	14	216.9	1	.9	ROMAN	4690	BK.SY.	10	5566	25	.6	XXIII
			10546	50	.9	"	2	GY.SYEN	54	4338.6	20	.9	XXIII	1	DURITE	31	27.6	1/8	.8	QUFT
1	BR-RTZITE	343	42180	200	.9	tough	3	RED GRAN	354	43380	200	.9	tough	2	BAS.	63	222.8	10	.8	-8 XII
2	HAEM.	11	2110	1	2110		4	BAS.	422	5428	25	217.1	XXIII	3	BAS.	14	8917	40	.9	
3	BK-RTZOSE	11	5276	25	.1	XXIII	5	BAS.	313	543 1/4	.4	.2		4	GY.SY.	345	11144	50	.9	
			3001	9	.2	SEE B	6	BAS. WOLF HEAD	1303	6	.4		↓=3 φ IX	5	W-RTZITE	18	44374	200	.9	
			4224	20	.2	SEE B	7	GY-RTZOSE	5	43480	200	.4	Irregular	6	BAS.	26	5575	25	2280	-26
4	BK-RTZOSE	378	4230	2	.5		8	BAS.	422	5442	25	.7	XXIII	7	MARB. MAN	64	44600	200	.0	LEBANON-170
5	LIM.	711	2114.9	100	.5		9	GN.SERP.	887	545 1/4	218.0			8	DIORITE	37	27.9	1/8	.2	φ XVI
6	BAS.	71	4234	2	.7		4630	BAS.	64	4360	2	0	I XII	9	BAS.	33	55.8	1/4	.2	
7	GY-RTZOSE	2	5293	25	.7	XXIII	1	ALAB.	406	1090.9	5	.2		4700	BK-RTZOSE	38	4465.2	20	.2	XXIII
8	BK-SERP.	744	847.5	4	.8	ROMAN	2	BK-RTZOSE	54	4367.3	20	.3		1	BR-RTZITE	27	89330	400	.3	-6
9	LIM.	15	53.0	1/4	2120	AMARNA	3	HAEM.	899	2184	1	.4	SMYRNA, XVIII	2	ORANG. GLS	43	1117	1/2	.4	
4570	HAEM.	506	53.0	1/4	.0	XVIII	4	ALAB.	722	1092.0	5	.4	QUFT	3	Y.LIM.	429	1117	5	.4	-4
1	HAEM	498	42406	20	.0	XVIII	5	BAS.	422	5459	25	.4	XXIII	4	BK-RTZOSE	8	5584	25	.4	XXIII
2	GY-RTZITE	256	42400	200	.0	-3000	6	W-RTZITE	11	43700	200	.5		5	" "	54	2011.8	9	.5	IIIIIIII SEE B
3	BAS.	33	42400	200	.0	-220	7	MARBLE	15	874.5	4	.6	IIII RO.	6	" "	10	5588	25	.5	XXIII
4	RED GRAN	32	106080	500	.2		8	LIM.	406	437.8	2	.9		7	BAS.	11	2236	10	.6	-7
5	GY.SY.	33	53.1	1/4	.4		9	ALAB.	368	1094.8	5	2190		8	BK.BAS. COWRID	111	9	1/2	.8	XVIII
6	BK-LLAY	88	53.1	1/4	.4		4640	BR.SY.	2	4380.2	20	.0	rough XXII	9	HAEM.	499	111.9	1/2	.8	XVIII
7	FELSPAR	824	425.1	2	.5	MEM.	1	BR.SY.	2	4380.3	20	.0	" "	4710	BK-JASP.	64	447.8	2	.9	VI
8	LIM.	267	42500	200	.5	-170	2	RED GRAN	352	21900	100	.0	-60	1	LIM.	526	448.5	2	224.2	
			12770	6	.8	SEE D	3	GY.GRAN	12	43800	200	.0		2	BK-RTZOSE	4	4483.3	20	.2	XXIII
				100	.8	MEM.	4	RTZITE	338	219000	1000	.0		3	GY.SY.	54	5809	25	.3	XXIII
4580	BK.SY.	14	5325	25	.9	XXIII	5	GY.BAS.	892	876.5	4	.1		4	LIM.	701	112.15	50	.3	HORA
1	BR.SY.	338	85.21	40	213.0		6	ALAB.	26	54.8	1/4	.2		5	BK-RTZOSE	4	4489.0	20	.4	KANUN XXIII
2	BAS.	392	53.3	1/4	.2		7	HAEM.	494	109.6	1/2	.2	XVIII	6	GN.JADE	874	449.0	2	.5	"PTAH" XII?
3	HAEM.	898	426.6	2	.3	XVIII	8	BAS.	428	2192.4	10	.2		7	GY-RTZOSE	54	6985	40	.6	XXIII
4	BK-RTZOSE	32	128000	200	.3		9	BAS.	65	438.9	2	.4	ABYD. MENA.	8	BAS.	26	56.2	1/4	.8	
5	BAS.	11	8535	40	.4		4650	BAS.	165	4391.0	20	.5	XXIII	9	SLATE	BUCK HEAD	56.2	1/4	.8	φ IX
6	BAS.	327	6405	30	.5	SEE B	1	BK.SY.	5	4394.9	20	.7	tough XXIII	4720	LIM. rough	916	899.4	4	.8	KANUN XII
			8547	40	.7		2	HAEM.	429	1099	1/2	.8	ANTIOCH XVIII	1	BK-RTZOSE	11	562.2	25	.9	XXIII
			10686	50	.7	SEE B	3	BAS.	254	879.6	4	.9		2	BAS.	313	45000	200	225.0	
7	BK-RTZOSE	7	4276.5	20	.8		4	BAS.	149	4397.2	20	.9	XXIII	3	GY-RTZOSE	38	2253.5	10	.3	
7A	BAS.	314	5348	2.5	.9	GHUROB	5	BAS.	33	27.5	1/8	220.0		4	GY.GRAN.	351	9012	400	.3	
8	HAEM.	494	107.0	1/2	2140	XVIII	6	BAS.	33	550	1/4	.0		5	HAEM.	893	112.7	1/2	.4	TYRE
8A	HAEM.	495	2141	10	.1	END CROOVE 24.1.21	7	ALAB.	795	110.0	1/2	.0	-1.4	6	HAEM.	2	1127.0	5	.4	HELIOPOLIS
9	BAS.	256	214.2	1	.2	tough	8	BK-RTZOSE	54	22025	10	.2	XXIII	7	Y.SERP.	13	225.5	1	.5	Λ RO.
4590	LIM. KAN	64	8570	40	.2	PN-34 XII	9	W-RTZITE	27	220310	1000	.3		8	BK.SY.	14	4509.5	20	.5	XXIII
1	SY.		134	1/16	.4		9A	Y.GLASS	926	110.2	1/2	.4	BEHNE SARO	9	BK-STEAT.	323	564	1/4	.6	
2	GY.GRAN	331	42900	200	.5	-130	4660	BK-RTZOSE	55	881.8	4	.4	XXIII	4730	HAEM.		225.6	1	.6	Irregular
3	BR.LIM.	64	4294	2	.7	II VI	1	LIM.	917	4410	2	.5		1	GY-RTZOSE	3	4513	20	.6	XXIII
4	GY-RTZOSE	10	5373	25	.9	XXIII	2	BK-RTZOSE	2	5512	25	.5	XXIII	2	BK "	54	4514.8	20	.7	XXIII
			6447	30	.9	SEE B	3	" "	12	5513	25	.5	XXIII	3	BAS.	237	11289	50	.8	
5	HAEM.	482	430.1	2	2150	MERNPTH	4	HAEM.	232	110.3	1/2	.6	XVIII	4	W.MARB.	14	4519.3	20	2260	ROM.
5A	BR.LIM.	495	4300	20	.0	G -270	5	BR.SERP.	13	882.4	4	.6	Δ=4 ROM.	5	BK-RTZOSE	54	4520.8	20	.0	XXIII
6	BK.BAS.	364	43000	200	.0	-50	6	GY.SY.	38	4411.2	20	.6	XXIII	6	" "	10	5655	25	.2	XXIII
7	BK-RTZOSE	3	43025	40	.1	XXIII	7	BAS.	314	883000	4000	.7		7	" "	10	4527.2	20	.3	XXIII
8	BRECCIA	498	26.9	1/8	.2	XVIII	8	BAS.	33	55.2	1/4	.8		8	GY. "	54	2267.2	10	.7	XXIII
9	HAEM.	897	107.6	1/2	.2	-6 XVIII	9	LIM.	5	3534.4	16	.9	H=8 ROM.	9	CHALCEDONY	925	226.9	1	.9	XXVI?
4600	GN.SY.	2	8608	40	.2	KANUN XII	9A	CLEAR GLS	215	110.5	1/2	221.0		4740	BAS.	656	454.0	2	227.0	QUFT IV NEFERMAST
1	GN.JASP.	126	2154	1	.4		4670	HAEM.	232	110.5	1/2	.0		1	BK-RTZOSE	313	2271	1	.4	
2	LIM.	702	21553	100	.5	BENIHASAN XII	1	NUM.LIM.	64	2210.2	10	.0	IIIIII VI	2	" "	10	4549.1	20	.4	XXIII
3	GY.GRAN.	102	43112	200	.6		2	GY.GRAN	326	44195	200	.0	MEM.	3	HAEM.	12	227.5	1	.5	
4	BAS.	143	21572	10	.7		3	W-RTZITE	27	44195	200	.0		4	GY.SERP.	64	227.6	1	.6	QUFT XII
5																				

METAL WEIGHTS.							LEAD STATERS								
AS ALL OF THESE HAVE ALTERED BY CORROSION THEY ARE LISTED SEPARATELY.							B=BRONZE								
BRONZE PEYEM. L=LEAD.							LEAD STATERS								
No.	FORM	NOW	CH	ORIGIN	X	UNIT	DETAIL	No.	FORM	NOW	CH	ORIGIN	X	UNIT	DETAIL
4746	262	115.5	17	114	1	114.0		4860	621	19.7	7	19.0	1/6	114	•• = 2 OBOLI
7	605	4576.3	32	4570	40	2	ANCHOR	1	60	21.5	21	19.4	1/6	116.4	••
8	254	115.8	1	115	1	115.0	DEFNEH	2	60	183.4	7	176	3/2	117.3	ALEX.
9	CALF	59.0	1	58	1/2	116.0	ALEX. ΦIX	3	621	178.1	1.6	176.5	3/2	6	Γ = 3 DR, 5 MYRN.
9A	505	228.4	4	232	2	0	BEYRUT	d	60	60.1	8	59.3	1/2	6	
4750	60	1169.8	36	1166	10	6		5	60	487.0	10	478	4	119.4	H = 8 DR
0A	895	232.5	2	233	2	5		6	58	245.5	5	240	2	120	
1	605	3533.0	30	3503	30	8	ANCHOR	7	623	484.8	9	480	4	120	H
2	206	118.8	14	117	1	117.0	DEFNEH	8	58	30.0	6	30.2	1/4	8	••• = 3 OBOLI
3	338	236.0	18	234	2	0	AMARNA	d	60	246.9	3.5	243	2	121.5	
4	742	469.4	0	469.4	4	4	B BK.MARB	9	58	67.4	6.7	61	1/2	122	B
5	628	2363.4	67	2356	20	8		4870	623	243.1	7	245	2	5	
6	256	60.7	13	59	1/2	118.0		1	58	12.5	2.3	12.3	1	123	
7	575	247.3	10	237	2	5		2	623	12.1	1.9	12.3	1		
8	265	596.8	32	594	5	8		3	60	248.5	2.1	246	2		
9	12	127.1	8	119	1	119.0		4	60	277.1	30	247	2		ALEX
4760	9196	240.0	17	238	2	0		5	58	64.4	2	62	1/2	124	
1	623	251.0	13	238	2	0	ALEX.	6	605	62.8	9	62	1		A = 1 SMYRNA
2	334	28.7	5	24	1/5	120.0		7	605	124.7	7	124	1		HIERAPOLIS
3	252	119.6	28	120	1	0		d	605	248.4	4	248	2		8 QUIT BK.MARB
4	353	1209.2	5	1208	10	8		8	71	248.0	0	248	2	0	8 QUIT BK.MARB
5	605	1764.0	65	1816	15	121.1	ANCHOR ΠΑΠΙΟΥ	9	60	256.7	8	250	2	125	
6	26	246.6	3	243	2	5		4880	60	252.2	18	250	2		Δ = 4 DR. ALEX
7	263	1221.9	8	1218	10	8		1	60	252.4	2.7	250	2		ALEX.
8	345	60.7	7	61	1/2	122.0		2	60	633.0	4	629	5	8	Γ = 10 DR.
9	26	123.5	2	122	1	0		3	60	21.5	6	21	1/6	126	ALEX.
4770	38	251.2	7	244	2	0		4	623	68.2	5	63	1/2		
1	267	659.4	45	610	5	0		5	623	63.0	1.2	63	1/2		
2	264	1235.6	13	1223	10	3		6	58	64.0	10	63	1/2		
2A	49	121.8	2	123.5	1	123.5		7	58	133.4	7.5	126	1		
3	DISC	497.5	5.5	495	4	7	TARTUSUYZ	8	58	131.5	4.5	127	1	127	ALEX.
4	338	62.1	14	62	1/2	124.0		9	605	316.5	2.2	317	5/2	6	Ε = 5 MACNESIA SIPYL.
5	FR06	123.9	1.1	124	1		ΦIX	4890	44	63.8	11	64	1/2	128	#
6	373	126.8	2.5	124	1			1	623	63.9	1.2	64	1/2		
7	369	125.4	1.5	124	1			2	58	128.3	1.7	128	1		ALEX.
8	152	250.3	2	248	2		SMYRNA	3	615	520.8	7	514	4	128.5	MAGNESIA SIP.
9	331	251.6	2.5	249	2	124.5		4	58	32.2	5	32.3	1/4	129.2	
4780	338	246.8	3.5	250	2	125		5	623	32.3	1	32.5	1/4	130	∇
1	252	252.2	2	250	2			6	60	65.3	7	65	1/2		ALEX.
								7	60	65.5	5	65	1/2		Λ = 1 DR.
								8	622	130.2	3	130	1		
								9	23	280.2	26	260	2		
								d	333	394.2	2	392	3	130.7	
								4900	58	130.3	19	131	1	131	ALEX.
								1	621	16.0	4	16.4	1/8	2	ALEX.
								2	621	32.8	3	32.8	1/4	2	
								3	60	33.3	7	33	1/4	132	
								4	58	34.2	11	33	1/4		ALEX.
								5	60	67.2	9	66	1/2		ALEX.
								6	623	71.1	5	66	1/2		
								7	623	530.6	3.8	528	4		H = 8 DR
								7A	623	128.3	4	132.5	1	132.5	B = 2
								8	336	268.7	4	265	2		
								9	623	275.7	11	265	2		
								4910		17.1	11	16.6	1/8	8	
								1	623	671.7	8	664	5		
								2	333	134.1	13	133	1	133.0	
								3	58	132.3	14	133	1		B = 2 ALEX.
								4	304	132.4	16	133.2	10		ΦIX.

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No.	FORM	NOW	CH.	ORIGIN	X	UNIT	DETAIL	BRONZE QEDET								No.	FORM	NOW	CH.	ORIGIN	X	UNIT	DETAIL
								No.	FORM	NOW	CH.	ORIGIN	X	UNIT	DETAIL								
4915	333	258.5	14	2.67	2	133.5		4978	324	141.5	4.8	137	1	137		5017	262	293.3	7	2.86	2	143	
6	336	270.0	2.8	2.67	2			d	337	690.3	10	686	5	2		8	33	145.5	2.4	143	1		
7	60	70.5	3.5	67	1/2	134	SLATE	d	926	69.6	7	69	1/2	138		9	344	713.6	4	716	5	2	
8	60	67.3	7	67	1/2		ALEX.	d	344	141.1	3	138	1			d	364	283.5	3.5	287	2	.5	
9	60	133.6	9	134	1			d	344	141.1	3	138	1			5020	312	287.0	6	287	2		
4920	60	134.6	1	134	1		ΦIX	d	335	684.2	10	690	5			1	338	287.7	2	287	2		1
1	256	134.9	2.9	134	1			d	336	696.8	9.7	694.3	50	.9		d	344	287.8	5	287	2		
2	58	133.0	2.5	134	1			1	33	66.6	4.3	69	1/2			d	335	721.2	3	718	5	.6	
3	333	132.9	3.5	134	1			d	32	148.5	9	139	1	139		2	23	72.2	.2	72	1/2	144	
4	301	136.5	2.5	134	1			d	3494	140.0	1	139	1			3	336	72.9	1	72	1/2		
5	BULL HEAD	134.6	.3	134.3	1		ΦIX	3	4235	136.0	2.8	139	1			d	338	138.5	8	144	1		
6	MAX HEAD	270.8	2.3	268.5	2		ΦIX	4	252	272.7	7.5	278	2			d	"	145.0	3.6	144	1		
7	53	271.0	2.8	268	2		RIGQEH	5	6FM6	277.2	2.3	278	2			d	"	146.7	4.6	144	1		
8	58	540.2	12	536	4		SMYRNA	6	7338	699.5	3	696	5	2		d	33	287.8	7	144	1		
9	26	674.8	4.6	670	5		MEM. B	7	d	265	692.4	8	696	5	2	d	338	287.4	5	288	2		
4930	265	668.0	2	670	5			d	8262	471.7	7	465	1/2	.5		d	338	723.0	1	722	5	.4	
1	74	268.5	0	268.5	2	134.2	Δ=4 OUFF. BY STAT.	8	926	281.5	12	279	2			5	344	283.2	6	289	2	.5	
2	52	415.0	12	403	3	.3		9	4990	338	280.8	2	279	2		d	338	288.0	5	289	2		
3	314	263.4	11.5	269	2	.5		1	LI0N	27866	30	27900	200			d	338	300.0	19	289	2		
4	58	277.1	8	269	2	.5	ALEX	2	339	1404	26	140	1	1400		d	265	293.8	9	289	2		
5	327	271.6	1.9	269	2			3	334	140.5	26	140	1			d	262	742.1	18	724	5	.8	
6	60	543.7	6	538	4			d	338	150.7	11	140	1			d	657	144.5	.5	145	1	145	LEAD, ALEX
7	338	669.7	5.6	673.5	5	.7		d	338	281.7	5	280	2			d	338	150.7	5.6	145	1		
8	WOLF HEAD	134.5	2	134.8	10		8 HAEMT ΦIX	d	33	299.7	20	280	2			d	763	144.3	1.9	145	1		
9	WOLF HEAD	134.5	6	134.8	10		8 AMARNA B ΦIX	d	33	299.7	20	280	2			d	312	290.2	4	290	2		
4940	321	44.5	12	45	1/3	135		d	4265	672.8	30	700	5			d	324	715.6	9	725	5		
1	326	45.1	13	45	1/3			d	324	692.4	12	700	5			d	8366	293.5	107	2907	2	.3	MEM. SET OF 4
2	623	135.3	.7	135	5			d	5334	702.8	3	700	5			d	324	730.6	3	727	5	.4	
3	927	270.4	4.5	270	2			d	324	708.0	18	702	5	140.4		d	333	292.5	2	291	2	.5	
4	325	679.3	9.5	675	5		GHUROB	6	333	281.7	5	281	2	.5		9	337	293.7	3	291	2		MEM. SET OF 4
5	265	667.8	2.7	675	5			7	331	468	12	47	1/2	141		5030	BULL HEAD	302.7	11	291	2		GHUROB
6	605	677.1	1	677	5	135.4	ASKLEPIOS B ΦIX	8	623	471.5	4	47	1/2			d	338	725.4	4.5	728	5	.6	
d	9156	270.4	2.4	271	2	.5		9	428	140.5	21	141	1			d	1265	731.6	3	729	5	.8	
7	64	17.0	0	17.0	1/8	136		d	324	143.5	36	141	1			d	335	73.1	3	73	1/2	146	
8	575	24.3	1.6	22.7	1/6		ALEX.	d	23	146.1	5.2	141	1			d	338	145.6	2	146	1		
9	60	34.0	.1	34	1/4			d	338	138.0	15	141	1			2	353	147.1	3	146	1		
4950	60	35.1	.7	34	1/4			d	33	149.6	8.7	141	1			3	36	292.5	14	292	2		
1	63	68.5	1.2	68	1/2			5000	23	280.2	2	282	2			d	364	298.8	7	292	2		
2	622	68.3	.4	68	1/2			1	366	282.0	6	282	2			4	306	1474.6	14	1460	10		ΦIX
3	622	135.6	3.0	136	1			2	884	711.4	5	706	5	141.2		5	338	725.4	5.5	730	5		
4	262	134.8	1.5	136	1		ALEX.	3	262	713.9	15	707	5	.4		6	337	729.6	4	730	5		
5	58	137.0	.7	136	1			4	643	284.5	1.2	283	2	.5		7	324	710.8	20	730	5		
6	58	274.3	2	272	2			d	356	704.5	9	708	5	.6		8	337	1475.8	12	1464	10	.4	
7	58	540.8	3.1	544	4		SMYRNA	5	33	73.0	3	71	1/2	142	X	d	364	288.8	4	293	2	.5	
8	60	2041.0	17	2040	15			d	338	73.7	3	71	1/2			9	33	292.6	2	293	2		
9	623	277.1	4.5	272.5	2			6	337	142.5	2.5	142	1			d	366	277.3	12	293	2		
4960	621	33.3	1.1	34.2	1/4	136.8		7	337	142.5	2.6	142	1			5040	339	304.3	2.3	293	2		
1	57	136.5	2.5	137	1	137	QUS	d	338	143.5	1.2	142	1			d	338	735.5	8	733	5	.6	
2	623	548.8	10	539	8	137.2	III H ALEX.	8	364	283.6	4	284	2			1	338	734.2	5	733	5		
3	623	23.5	.5	23	1/6	138		9	324	287.6	3	284	2			2	333	734.4	5	733	5		
4	254	45.6	1.2	46	1/3			d	366	288.0	10	284	2			d	33	147.4	.6	147	1	147.0	
5	58	67.4	3.3	69	1/2		ALEX.	5010	692.4	17	710	5			3	36	295.6	2	294	2			QUS
6	SEED	69.5	.1	69	1/2		SICILY B	1	324	699.7	10	710	5			7	304	693.5	4	735	5		A'ABYD, DEN
7	60	140.0	2.3	138	1			d	338	1430.1	9	142.1	10	.1		d	324	742.0	9	735	5		
8	58	138.3	.3	138	1		ALEX.	2	327	718.0	7	711	5	.2		5	338	1471.2	6	1470	10		
9	622	71.1	.5	71	1/2	142	A=1	d	337	720.3	8	712	5	.4		6	45	150.5	11	1474	1	.4	MEM. SET OF 4
4970	58	144.7	3	142	1			d	324	729.0	17	712	5	.4		d	333	293.5	14	295	2	.5	
1	14	11.9	0	11.9	1/2	142.8	SMYRNA	d	334	283.0	9	285	2	.5		7	354	590.4	0	590	4		
2	58	72.4	.7	72	1/2	144	ALEX.	d	366	288.0	5	285	2	.5		8	494	739.2	11	738	5	.6	SYRIA
3	60	289.0	4.5	289	2	144.5		3	333	710.2	6	714	5	.8		9	337	1495.2	24	1476	10		MEM. SET OF 4
d	625	74.7	3.2	71.5	1/2	143	ALEX	d	33	72.7	1.2	71.5	1/2	143.0		5050	DOVE	74.3	.6	74	1/2	148.0	ΦIX
4	62	24.0	9	24.1	1/6	144.6		d	338	145.6	2.												

BRONZE SELA												BRONZE UNGIA													
L-LEAD												MARK TO ORF													
NO. FORM		NOV	CH.	ORIGIN	X	UNIT	DETAIL						NO. FORM		NOV	CH.	ORIGIN	X	UNIT	DETAIL					
SET FROM AMARNA, MEAN 1137, ROMAN. L												SET FROM AMARNA, MEAN 1137, ROMAN. L													
5276 57 189.8 7 189.1 5/3 1135 MARK I/A												5276 57 189.8 7 189.1 5/3 1135 MARK I/A													
7 57 223.0 10 222.0 2 111.0												7 57 223.0 10 222.0 2 111.0													
8 57 345.8 70 339.0 3 113.0 ---												8 57 345.8 70 339.0 3 113.0 ---													
9 57 563.5 15 562.0 5 112.4												9 57 563.5 15 562.0 5 112.4													
5280 65 692.1 18 690.8 6 115.1												5280 65 692.1 18 690.8 6 115.1													
1 314 1373.5 41 1369.2 12 114.1												1 314 1373.5 41 1369.2 12 114.1													
BRONZE SELA												BRONZE UNGIA													
5220 623 53.0 17 51 1/4 204. L L L L L L L L L L L L												5282 621 52.6 58 50.4 1/6 302 NEMONISMA													
1 58 58.7 1 51 1/4 204. L L L L L L L L L L L L												3 595 52.6 30 52.0 1/6 312 N DEFENEH													
2 58 52.9 8 52 1/4 208. L L L L L L L L L L L L												4 621 54.1 15 54.5 1/6 327 N													
3 923 106.1 2 104 1/2 L L L L L L L L L L L L												5 61 59.3 5 59.6 1/6 357 N SMYRNA													
4 PAN 12810 252 12560 60 2093												6 61 59.8 2 59.6 1/6 N "													
5 LION 20968 2 20970 100 7												7 61 60.0 1 59.9 1/6 359 N													
6 657 105.3 3 105 1/2 210. L L L L L L L L L L L L												8 61 60.6 4 60.2 1/6 361 N													
7 60 113.7 9 105 1/2 L L L L L L L L L L L L												9 623 374.6 7 368.1 368 I L													
8 721 12568 80 12650 60 210.8 LIM-3 LAYER BK. STEAT. ALEX. L L L L L L L L L L L L												5290 602 313.8 2 312 5/6 374 NE=5 NOM													
9 60 213.2 18 211 1 211. L L L L L L L L L L L L												1 15 188.2 0 188. 1/2 376 NG=3													
5220 625 2189.5 80 2110 10												2 61 62.2 8 63. 1/6 378 N													
1 623 288 3 285 1/8 212. MEM. L L L L L L L L L L L L												3 58 126.8 8 126 1/3 SMYRNA													
2 165 580 3 53 1/4												4 615 379.8 2 378 1 A=1													
3 254 543 1.3 53 1/4												5 61 379.8 X ? 1 NS=6 N CLEAN													
4 25 52.5 7 53 1/4												6 BUST 63.3 1 64 1/6 384 KHT CONSTANTIN BRAC. TIB.													
5 57 105.7 3 106 1/2												7 BUST 56.4 1 ? DN HOMOPHUS EKAGIUM SQUID													
6 333 216.5 4 212 1												8 58 388.8 0 389 1 389 GA JERUSALEM													
7 14 99.7 6 106 5/8												9 152 389.6 7 389 1 N2 MAG. SIP. L													
8 612 42.7 3 42.5 2 212.5 H BEYRUT L L												5300 61 64.9 0 64.9 1/6 4 SET IN BOX													
9 575 225.8 13 213 1 213. @ L L												1 PAN 4697.0 20 4680 12 390 LIBRA BEYRUT													
5230 625 2127.7 80 21360 100 6 LIM. L L L L L L L L L L L L												2 602 389.7 7 391 1 391 ALEX L													
1 923 107.9 6 107 1/2 214. L L L L L L L L L L L L												3 61 197.5 18 196 1/2 392 H													
2 261 111.0 4 107 1/2												4 61 32.6 1 32.7 1/2 4 IB=12 SILIQUAE													
3 1045 209.7 5 214 1												5 60 471.9 5 471.0 12 392.5 KA 1 st SMYRNA													
4 573 210.4 4 214 1												6 60 233.2 2 235.6 6 7 GS=6 UM.													
5 66 214 3 215 1 215. X =SELA L L L L L L L L L L L L												7 745 393.7 14 393 1 393 GA ALEX.													
6 60 4290.5 40 4310 20 215.5												8 59 780.6 7.5 787.2 5 SMYRNA													
7 612 108.2 12 108 1/2 216. B BEYRUT L L												9 60 395.4 14 394 1 394 GA ALEX.													
8 338 109.4 1.5 108 1/2												5310 745 1182.0 0 1182. 3 GA ALEX.													
9 623 214.1 2.1 216 1												1 72 118.4 6 118.5 3 395 BK. STEAT.													
5240 368 434.6 3 432 2												2 61 22.7 7 22. 1/8 396 H=8 SILIQUAE													
1 LION 867.7 7.3 864 4												3 15 198.5 0 198.5 1/2 397 NG													
2 60 877.7 12 866 4 216.5												4 61 66.4 2 66.4 1/6 398 N SMYRNA													
3 621 440 6 434 1/5 217. @@												5 60 265.6 0 265.6 1/6 ND													
4 602 437.0 3 434 2												6 602 398.5 X ? 1 GA cleaned													
5 7045 655.0 9 654 3 218. Φ IX												7 723 241.45 6 242.0 6 409.5 IB, T ΠΑΛΛΑΔ ΑΛΕΞ.													
6 602 146.4 13 146.1 2 219.1 MN GL												8 605 1612.4 28 1614. 4 5 Δ ANTIQ. L													
7 52 435.6 9 439 2 5												9 746 807.3 X ? 2 GB cleaned													
8 313 55.4 3 55 1/4 220. L L L L L L L L L L L L												5320 61 67.3 0 67.3 1/6 8 ΔΙΚΕΟΝ ΤΩΤ													
9 623 57.4 1.2 55 1/4												1 723 804.4 5 809 2 404.5 BK. MARB.													
5250 338 111.4 1 110 1/2 DEFENEH												2 60 404.1 X ? 1 GA cleaned													
1 58 442.4 2 44.0 2												3 607 405.0 0 405 1 405 N+S													
2 57 447.4 5 44.2 2 221. CYPRUS JEWELER MOULD MAGNES. SIP. L												4 602 405.8 6 405. 1 N+S III													
3 CALF 2758.5 18 2765 5/8 221.2 Φ IX												5 60 202.5 4 203 1/2 406 N Γ													
4 SHELL 1779.9 9.5 1774 8 7												6 716 201.5 1.5 203 1/2 1 st B=12 SCRUP													
5 26 112.2 9 111 1/2 222. + DEFENEH												7 602 810.9 2.5 813 2 5 GB SMYRNA													
6 66 1381.0 16 1397 2 223. CYPRUSH ALIKE												8 711 406.8 0 407 1 407 BK. MARB.													
7 66 664.8 8 673 3 224.3 TORTOISE												9 HEAD 1640.1 11.5 1628. 4 Φ IX													
8 Φ IX 56.3 5 56 1/4 224. HEDGEHOG												5330 711 1221.4 1 1222. 3 3 BK. STEAT.													
9 113.5 1.2 112 1/2 Φ IX Φ IX												1 61 68.0 0 68.0 1/6 408 N													
5260 LION 225.4 1 224 1												2 622 68.3 4 68. 1/6													
1 572 453.8 6 450 2 225. L L L L L L L L L L L L												3 60 202.0 2 204 1/2													
2 58 112.5 2 112.6 1/2 2												4 61 82.7 5 81.6 2													
3 723 449.4 16 451.0 20 225.5 Φ IX												5 606 820.8 5 816 2													
4 7045 909.5 37 906 4 226.5												6 60 822.7 3 819 2 409.5 SMYRNA													
5 58 227.8 1.2 227 1 227. L L L L L L L L L L L L												7 15 200.7 5 205 1/2 410 NG "													
6 252 57.4 6 56.8 1/4 2												8 60 1231.0 0 1231. 6 410.3 ΓΤΓ													
7 504 527.6 8 51 113.7 1/2 227.4 AMARNA L												9 60 821.7 0 822. 2 411. ΓΒ SOLXII SMYRNA													
8 25 57.4 5 57 1/4 228. L L L L L L L L L L L L												5340 57 414.4 3 411 1													
9 60 114.3 4 114 1/2												1 61 68.6 0 68.6 1/6 411.6 2 HEADS STAMPED													
5270 144 226.6 2.4 228 1												2 152 550.8 5.5 549. 8/6 8 NH=8 NOM.													
1 40 229.0 1 228 1												3 60 415.4 3 412 1 412 ΓΒ													
2 58 28.7 6 28.9 1/8 231.2 L L L L L L L L L L L L												4 60 413.3 1.7 412 1 ΓΑ													
3 612 233.9 1.3 232 1 232. Δ BEYRUT L												5 602 410.8 1.2 412 1 2 SAINTS GA													
4 58 117.4 1 116 1/2												6 625 206.0 1.4 206 1/2 1B Φ IX													
5 612 238.7 1.5 239 1												Δ BEYRUT L													
5347 829.0 4 825. 2 412.5 MAGN. SIP. L												5347 829.0 4 825. 2 412.5 MAGN. SIP. L													
8 602 1247.3 9.5 1238. 3 7 NH=18 NOM.												8 602 1247.3 9.5 1238. 3 7 NH=18 NOM.													
9 15 346 2 34.4 1/2 8 IB=12 SILIQUAE												9 15 346 2 34.4 1/2 8 IB=12 SILIQUAE													
5350 716 825.9 0 826. 2 413. NIB 5/2 NOM. CYPRUS												5350 716 825.9 0 826. 2 413. NIB 5/2 NOM. CYPRUS													
1 60 827.1 1 826. 2 413. ΓΒ QUFT												1 60 827.1 1 826. 2 413. ΓΒ QUFT													
2 602 207.5 7 207. 1/2 414. NG												2 602 207.5 7 207. 1/2 414. NG													
3 152 414.4 5 414. 1 SMYRNA												3 152 414.4 5 414. 1 SMYRNA													
4 61 69.3 2 69.1 1/6 1 N ALEX												4 61 69.3 2 69.1 1/6 1 N ALEX													
5 60 414.3 X ? 1 CYPRUS cleaned.												5 60 414.3 X ? 1 CYPRUS cleaned.													
6 60 419.6 4.5 415. 1 415 SMYRNA L												6 60 419.6 4.5 415. 1 415 SMYRNA L													
7 60 1240.4 5.5 1246. 3 3 MN Γ in lead												7 60 1240.4 5.5 1246. 3 3 MN Γ in lead													
8 HEAD 835.5 5 831. 2 5 Φ IX L												8 HEAD 835.5 5 831. 2 5 Φ IX L													
9 60 208.5 6 208 1/2 416 N Γ GIZEH												9 60 208.5 6 208 1/2 416 N Γ GIZEH													
5360 14 208.0 0 208 1/2 N Γ												5360 14 208.0 0 208 1/2 N Γ													
1 602 414.9 1.9 416 1 ΓΑ MARATHUS												1 602 414.9 1.9 416 1 ΓΑ MARATHUS													
2 61 835.3 3.5 832 2 ΓΒ												2 61 835.3 3.5 832 2 ΓΒ													
3 63 252.3 22 2500 6 7 GHUROB L												3 63 252.3 22 2500 6 7 GHUROB L													
4 745 139.4 4 139 1/3 4170 NB												4 745 139.4 4 139 1/3 4170 NB													
5 605 1245.2 7 1252 3 3 ΓΤΓ												5 605 1245.2 7 1252 3 3 ΓΤΓ													
6 60 835.9 0 836 2 4180 ΓΑ Β												6 60 835.9 0 836 2 4180 ΓΑ Β													
7 740 418.2 0 418.2 1 2 A. BR. SERP.												7 740 418.2 0 418.2 1 2 A. BR. SERP.													
8 745 249.4 28 2510 6 3 ΓΤΣ												8 745 249.4 28 2510 6 3 ΓΤΣ													
9 61 69.8 0 69.8 1/6 8 N. SET IN BOX												9 61 69.8 0 69.8 1/6 8 N. SET IN BOX													
5370 60 2478.8 37 2513 3 ΓΣΤ												5370 60 2478.8 37 2513 3 ΓΣΤ													
1 61 70.0 0 70 1/6 420 N SET IN BOX												1 61 70.0 0 70 1/6 420 N SET IN BOX													
2 57 105.7 8 105 1/4												2 57 105.7 8 105 1/4													
3 15 209.6 5 210 1/2 N Γ SMYRNA												3 15 209.6 5 210 1/2 N Γ SMYRNA													
4 71 854.7 14 840 2												4 71 854.7 14 840 2													
5 605 5037.1 38 5047 12 6												5 605 5037.1 38 5047 12 6													
6 746 1275.2 12 1263 3 421. ΓΤ												6 746 1275.2 12 1263 3 421. ΓΤ													
7 71 71.5 4.2 70.9 1/4 422. N DEFENEH												7 71 71.5 4.2 70.9 1/4 422. N DEFENEH													
8 616 1261.4 15 1266 3 ΓΤΓ												8 616 1261.4 15 1266 3 ΓΤΓ													
9 61 70.5 1 70.4 1/6 4 N												9 61 70.5 1 70.4 1/6 4 N													
5380 60 845.3 0 845 2 5 ΓΤΒ												5380 60 845.3 0 845 2 5 ΓΤΒ													
1 15 138.8 2.3 141. 1/3 423. NB cleaned												1 15 138.8 2.3 141. 1/3 423. NB cleaned													
2 602 1274.6 2 1276 3 425.3 ΓΤΓ												2 602 1274.6 2 1276 3 425.3 ΓΤΓ													
3 60 212.0 7 213 1/2 426. N Γ												3 60 212.0 7 213 1/2 426. N Γ													
4 58 211.0 1.9 213 1/2 426. Δ												4 58 211.0 1.9 213 1/2 426. Δ													
5 71 255.0 11 254.4 6 424. BUSTS												5 71 255.0 11 254.4 6 424. BUSTS													
6 621 469.5 5 474 1/9 427. 3 BUSTS												6 621 469.5 5 474 1/9 427. 3 BUSTS													
7 71 71.5 2 71.3 1/6 428. N DEFENEH												7 71 71.5 2 71.3 1/6 428. N DEFENEH													
8 71 258.0 13 257.3 6 8 SC=6UM. M. MARB												8 71 258.0 13 257.3 6 8 SC=6UM. M. MARB													
9 711 107.9 0 107.9 1/4 431.6 RED PORPH.												9 711 107.9 0 107.9 1/4 431.6 RED PORPH.													
5390 71 874.0 18 864 2 432. ΓΒ												5390 71 874.0 18 864 2 432. ΓΒ													
1 61 144.6 6 144 1/3 1B ALEX.												1 61 144.6 6 144 1/3 1B ALEX.													
2 602 144.4 7 144 1/3 NB SMYRNA												2 602 144.4 7 144 1/3 NB SMYRNA													
3 71 216.5 0 217 1/2 434. B1=12 SCRUPOL.												3 71 216.5 0 217 1/2 434. B1=12 SCRUPOL.													
4 80.5 11 73 1/6 438. N DEFENEH												4 80.5 11 73 1/6 438. N DEFENEH													
5 PLUG AT THE 5288. 3 ? 12 440. LEAD PLUG. IRON RINGS												5 PLUG AT THE 5288. 3 ? 12 440. LEAD PLUG. IRON RINGS													
6 60 2674.2 13 2663 6 439. ΓΣ												6 60 2674.2 13 2663 6 439. ΓΣ													
7 623 816 1/4 81 2 DEFENEH												7 623 816 1/4 81 2 DEFENEH													
8 608 992.9 1 992 2 496. ΓΤΒ												8 608 992.9 1 992 2 496. ΓΤΒ													
SET IN SCALE BOX. 350 A.D. MEAN 427.2 ME.												SET IN SCALE BOX. 350 A.D. MEAN 427.2 ME.													
		DESIGN	GRS.	MEAN SCALE	ERROR ±	Φ XVI																			
5399		WREATH ΓΣ	2568.4	2563.2	5.2	SET IN																			
5400		" ΓΒ	1279.0	1281.6	2.6	LOWER																			
1		" ΓΒ	855.9	854.4	1.5	BOX.																			
2		" ΓΑ	424.8	427.2	2.4	PERFECT																			
3		" ΓΑ	141.2	142.4	1.2	STATE																			
				MEAN	2.4																				
4		"	30.1			LOOSE																			
5		"	427.0	427.2	.2	SET																			
6		"	205.7	213.6	7.9	IN																			
7		CONSTANTIVS	280	26.7	1.3	UPPER																			
8		CONSTANS I	256	26.7	1.1	TRAY																			
9		GLASS	7.7	6.7	1.0																				
5410		GLASS	60	6.7	.7																				
				MEAN	2.0																				
1		N	72.6	72.6	0																				
2		GLASS	35.7	36.3	.6																				
3		"	24.6	24.2	.4																				

PEYEM			No.	X	UNIT	No.	X	UNIT	No.	X	UNIT	No.	X	UNIT	No.	X	UNIT	No.	X	UNIT
			1246	1000	126.1	246	10	128.9	1212	1/2	132.4	337	20	135.4	*302	10	138.7	953	5	140.9
392	4	114.2	207	10	.1	247	1	.9	1213	2	.4	338	5	.4	*603	10	.7	543	5	141.0
393	2	.2	208	2	.2	1187	6	129.0	307	50	.5	890	50	.4	13	2	.8	954	1/2	.0
396	50	.4	209	1/2	.2	249	20	.1	*393	20	.6	*281	2	.5	924	1/2	.8	45	2	.1
400	1	115.6	665	4	.2	698	24	.1	*388	10	.7	*661	2	.5	925	1	.8	544	1	.2
816	10	.7	666	10	.3	250	240	.3	*502	20	.7	*657	2	.5	926	1	.8	545	50	.2
401	8	.8	667	20	.4	251	5	.3	310	10	.7	757	2	.5	14	1	.9	*375	5	.2
817	10	.8	668	6	.4	1189	20	.3	S T A T E R			1233	2	.5	15	1	.9	*447	1	.2
819	1	116.2	888	10	.4	696	30	.4	*278	5	132.9	*324	20	.6	16	1/2	.9	546	20	.3
404	2	.4	1167	1/2	.4	252	1	.5	312	20	133.0	*440	1	.8	*358	10	.9	957	1	.3
405	40	.9	210	2	.5	697	5	.5	*352	6	.0	*381	5	.8	526	10	.9	46	10	.4
409	5	117.1	1169	6	.5	253	10	.6	313	5	.0	*449	2	.8	927	10	.9	*426	1/2	.4
777	6	.4	*458	1/2	.5	255	120	.8	*626	1	.0	1235	5	.8	528	1	139.0	48	2	.5
768	20	.9	212	12	.6	256	10	.8	314	1	.0	343	50	.9	18	50	.1	547	10	.5
779	10	.9	214	2	.7	698	20	.8	1215	2	.1	344	5	136.0	19	1/2	.2	49	20	.6
821	1/2	118.0	1170	120	.7	699	1	.8	1217	1/2	.2	758	20	.0	20	50	.4	548	10	.6
163	1/2	.4	216	1	.8	257	1	.9	1218	1	.2	346	1	.1	21	40	.4	50	2	.7
627	1/2	.4	217	1	.8	279	1/2	130.0	739	10	.2	347	10	.2	22	1/2	.4	959	2	.7
*645	20	.6	*482	5	.8	704	60	.0	315	5	.3	348	20	.3	529	1/2	.4	549	2	.8
770	20	.6	*329	5	.8	280	50	.0	740	5	.4	349	5	.3	530	20	.4	960	1/2	.8
114.8	1/2	.6	671	30	.9	706	2	.2	741	5	.4	350	5	.4	*344	20	.4	*307	5	.8
*655	3	.7	672	12	.9	707	10	.3	743	5	.5	760	20	.4	*314	20	.4	550	2	.9
772	20	.8	673	6	.9	715	25	.4	317	5	.6	761	1	.4	23	200	.5	51	200	142.0
430	200	.8	1171	30	.9	281	50	.4	744	50	.6	1237	5	.4	876	2	.6	52	20	.0
773	20	119.2	218	6	127.0	261	2	.4	745	2	.6	1238	2	.4	523	1	.6	53	2	.0
774	20	.4	220	15	.1	282	20	.4	*271	1	.6	*350	10	.4	25	20	.7	963	10	.0
432	200	.4	676	5	.1	708	20	.5	318	20	.6	352	5	.5	*448	1	.7	*428	1/2	.0
822	10	.5	677	5	.2	716	10	.5	319	10	.7	762	10	.5	*437	1	.7	55	2	.1
166	5	.6	678	1	.2	283	50	.6	889	200	.7	1239	1	.6	*343	20	.7	56	10	.2
1150	1/2	.6	*397	50	.2	284	5	.6	748	1	.8	*456	1/2	.7	*368	2	.7	57	5	.2
167	5	.8	224	60	.3	*283	2	.6	320	50	.9	353	2	.7	*501	200	.7	551	1/2	.2
631	6	120.0	225	2	.3	710	2	.7	321	50	134.0	1	2	.7	936	1/2	.8	968	1	.2
886	4	.0	679	30	.3	717	100	.8	322	10	.0	891	20	.9	26	20	.9	969	1	.2
1275	20	.0	680	10	.4	718	1000	.9	1221	2	.0	355	50	137.0	27	20	.9	970	5	.2
168	1	121.4	226	2	.5	287	50	.9	1222	5	.0	2	5	.2	28	5	.9	58	5	.3
171	20	.5	1176	60	.5	712	6	131.0	324	20	.1	1241	10	.2	29	10	140.0	59	50	.3
174	20	.8	1177	10	.6	1196	120	.0	*349	10	.1	1242	50	.2	33	1	.0	971	10	.3
175	5	.9	*441	1	.6	1202	1	.0	*613	600	.1	763	1	.3	533	25	.0	*356	50	.4
180	2	122.6	227	2	.7	720	10	.1	325	1	.2	*357	60	.3	938	1/2	.0	553	10	.6
643	1	.6	228	5	.8	266	60	.2	326	1	.2	*500	200	.3	939	1/2	.0	975	1/2	.6
181	5	.7	229	5	.8	289	2	.2	749	1	.2	764	10	.4	943	10	.0	61	4	.7
644	1/2	.8	273	5	.8	1206	1/2	.4	1224	2	.2	1243	1/2	.4	944	10	.0	554	50	.7
648	20	123.0	681	5	.5	290	20	.4	1223	1/2	.2	765	50	.4	*427	1/2	.1	976	10	.7
649	10	.1	1179	24	.8	291	50	.6	*667	1	.3	Q E D E T			*665	1	.1	62	10	.8
183	1/2	.2	682	10	.9	722	2	.7	750	25	.3	909	2	137.5	*443	10	.1	63	5	.8
650	1	.2	683	6	.9	267	5	.7	327	50	.4	3	20	.6	*304	10	.1	555	100	.8
185	30	.4	231	1	128.0	723	1	.7	*322	25	.4	766	2	.6	36	2	.2	978	1/2	.8
186	30	.5	684	12	.0	292	50	.7	757	20	.4	*636	50	.6	534	50	.2	979	1	.8
187	1/2	.6	685	1	.0	293	5	.8	752	1	.4	4	10	.7	535	50	.2	980	1	.8
782	400	.7	686	20	.1	*496	500	.8	753	1/2	.4	*400	2	.7	536	5	.2	64	10	.9
189	2	124.0	*460	1/2	.1	294	5	.8	*333	12	.4	912	10	.8	948	5	.2	65	2	.9
652	10	.0	*445	1	.1	295	20	.8	754	10	.5	5	2	138.0	37	10	.3	557	10	.9
655	30	.3	234	10	.3	724	10	.9	1226	1	.6	578	1/2	.0	537	20	.3	558	2	.9
*499	100	.4	235	5	.3	301	1	132.0	755	100	.7	915	1	.0	538	10	.3	*318	5	.9
*444	5	.4	236	12	.4	725	100	.0	331	1	.7	916	1	.0	*421	100	.3	67	1	143.0
195	5	.6	238	10	.5	726	25	.0	328	50	.7	7	20	.1	539	2	.4	982	1/2	.0
656	30	.7	688	15	.5	1210	1	.0	330	10	.7	579	5	.1	950	1	.4	983	1/2	.0
*439	1	.8	689	10	.5	1211	20	.0	1227	1	.8	8	2	.2	.38	2	.5	68	10	.1
657	15	.9	*327	5	.6	*406	2	.0	*384	5	.9	9	10	.3	540	5	.5	69	5	.1
D A R I C			691	10	.6	728	25	.0	756	10	.9	*326	10	.3	951	1	.5	580	20	.1
200	12	125.6	1183	5	.6	304	40	.1	333	1500	.9	*459	1/2	.3	39	5	.6	985	10	.1
201	30	.8	1277	40	.6	729	25	.1	334	25	.9	10	2	.4	*429	1/2	.6	986	1	.2
661	30	.8	240	5	.7	305	50	.2	*404	2	135.0	521	10	.4	*344	50	.6	987	1	.2
*454	2	.9	242	2	.7	306	1500	.2	*311	5	.1	522	20	.4	521	20	.7	988	5	.2
203	20	126.0	243	1	.7	*346	10	.2	335	50	.1	919	1/2	.4	*453	2	.7	*432	1/2	.2
204	6	.0	692	20	.7	731	10	.2	*668	1	.2	920	10	.4	*403	2	.7	*365	2	.2
*419	1	.0	1185	10	.7	732	25	.3	336	25	.2	11	1	.5	542	20	.8	70	2	.3
1165	1	.0	*424	1/2	.7	733	10	.3	1231	5	.2	12	5	.7	952	50	.8	561	2	.3
664	30	.1	*386	10	.7	*438	1	.4	1232	10	.2	523	200	.7	42	500	.9	989	1	.3
			693	3	.8	734	5	.4	*639	20	.3	524	5	.7	45	500	.9	990	1	.3

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WEIGHTS FROM GEZER.

FROM TROY.

XLIX

PEYEM				QEDET				QEDET cont'd				KHOIRINE cont'd				No. D M. Z. TYPE GRAINS X UNIT						
P	GRNS	X	UNIT	P	GRNS	X	UNIT	P	GRNS	X	UNIT	P	GRNS	X	UNIT	PEYEM						
4	112.2	1	112.2	4	137.6	1	137.6	2	299.4	2	149.7	4	91.0	1/2	182.0	2352	B	45x25	491	114.1+	10	114.1+
2	456.0	4	114.0	4	1376.5	10	6	3	150.0	1	150.0	4	182.3	1	.3	2295	.	27 27	9?	581	5	116.2
3	114.2	1	114.2	4	138.1	1	138.1	1	150.1	1	.1	4	1459.9	8	.5	2340	B	37 19	498	582	5	116.4
2	460.8	4	115.2	1	1381.1	10	.1	1	150.5	1	.5	3	1825.6	10	.6	Scht	8.5	40 20	14?	586	5	117.2
1	468.6	4	117.1	4	3453.4	25	.1	2	76.1	1/2	152.2	3	365.6	2	.8	2322	.	30 25	8.05	591	5	118.2
4	468.9	4	.2	4	138.5	1	.5	3	152.3	1	.3	1	92.3	1/2	184.6	D A R I C.						
4	117.6	1	.6	4	692.6	5	.5	3	1523.1	10	.3	2	1847.2	10	.7	Scht	8.5	45x20	50	247	2	123.5
4	1176.8	10	.7	2	692.8	5	.5	N E C E F				4	92.4	1/2	.8	2345	.	28 15	495	250	2	125.
4	118.1	1	118.1	2	693.1	5	.6	1	1535.4	10	153.5	3	370.5	2	185.2	2349	8.5	60 25	491	126.4	10	126.4
3	473.0	4	.2	3	138.7	1	.7	1	309.1	2	154.5	4	92.6	1/2	.2	2348	10.	70 30	642?	256.5	20	128.2
4	2397.0	20	119.8	3	1386.8	10	.7	1	155.4	1	155.4	1	186.3	1	186.3	2291	.	22 22	9?	391	3	130.3
3	601.0	5	120.2	3	139.0	1	139.0	1	156.3	1	156.3	4	187.3	1	187.3	2358	8.5	31 13	496	262	2	131.
2	120.4	1	.4	4	139.0	1	.0	3	782.0	5	.4	4	187.6	1	.6	S T A T E R.						
1	966.1	8	.8	4	139.0	1	.0	1	1566.1	10	.6	4	94.1	1/2	188.2	2336	9.	54 22	496	136.5	10	136.5
4	241.9	2	.9	4	694.9	5	.0	2	157.1	1	157.1	B E Q A				2347	7.	80 30	491	273.8	20	.9
3	121.9	1	121.9	3	2779.4	20	.0	3	157.3	1	.3	4	94.3	1/2	188.6	2221	.	26 26	9?	687	5	137.4
3	975.6	8	122.0	4	2779.4	20	.0	1	157.5	1	.5	2	190.8	1	190.8	Q E D E T						
4	494.7	4	123.7	1	696.0	5	.2	1	157.5	1	.5	4	952.8	5	191.0	2330	9	55 14	50	280.	2	140
4	622.7	5	124.5	1	1397.7	10	.8	4	3152.0	20	.6	2	95.7	1/2	.4	Scht	8.5	50 10	14?	142	1	142
3	998.7	8	.8	2	699.4	50	.9	3	790.9	5	158.2	3	95.7	1/2	.4	2343	.	31 16	149?	355	2 1/2	142
3	624.9	5	125.0	3	2806.2	20	140.3	1	80.2	1/2	160.4	4	974.7	5	194.9	2357	.	33 13	496	285	2	142.5
D A R I C				4	140.6	1	.6	2	40.4	1/4	161.6	1	392.3	2	196.1	2359	8.	2 8	50	72	1/2	144
1	252.7	2	126.3	4	1406.2	10	.6	2	81.0	1/2	162.0	4	4923.	25	.9	2328	.	27 8	899	72	1/2	144
3	632.7	50	.5	1	1409.0	10	.9	4	162.0	1	.0	2	1976.2	10	197.6	2332	9.	62 32	810	2911	20	145.5
4	2537.0	20	.8	4	141.0	1	141.0	0	162.0	1	.0	4	98.9	1/2	.8	Scht	8.5	50 20	50	293	2	146.5
2	84.7	2/3	127.0	1	785.0	10	.0	3	1631.2	10	163.1	2	198.0	1	198.0	2335	9.	60 22	810	1477	10	147.7
1	85.2	2/3	.8	2	1410.3	10	.0	2	331.6	2	165.8	2	99.2	1/2	.4	Scht	8.5	36 15	50	301	2	150.5
3	258.5	2	128.2	2	2820.2	20	.0	4	1660.8	10	166.1	4	995.1	5	199.0	K H O I R I N E						
3	642.0	5	.4	4	141.1	1	.1	3	83.5	1/2	167.0	4	399.9	2	200.0	2360	.	26 9	899	86	1/2	172
4	128.7	1	.7	4	1410.9	10	.1	3	335.0	5	.5	4	801.0	4	.2	Scht	.			17450	100	174.5
1	644.1	5	.6	3	1410.9	10	.1	3	167.7	1	.7	1	1006.0	5	201.2	B E Q A						
1	2580.2	20	129.0	4	706.0	5	.2	2	1686.9	10	168.7	2	201.4	1	.4	2342	.	35 17	810	483	2 1/2	193.2
1	86.1	2/3	.2	4	141.2	1	.2	K H O I R I N E				3	101.6	1/2	203.2	2314	.	25 25	9?	497	2 1/2	198.8
4	258.8	2	.4	4	708.7	50	.7	3	85.6	1/2	171.2	4	4068.1	20	.4	2350	8.5	50 25	691	120.4	6	200.7
4	864	2/3	.6	4	141.8	1	.8	4	343.7	2	.8	3	1027.0	5	205.4	Scht	.	90 50	17?	8010+	40	200.2?
3	2622.5	20	131.1	3	1418.0	10	.8	1	1718.2	10	.8	4	1029.7	5	206.0	2327	.	30 8	50	103	1/2	206
4	393.5	3	.2	4	1418.0	10	.8	1	860.3	5	172.0	1	1030.2	5	.0	2354	.	47 16	505	208	1	208
1	656.3	5	.2	3	142.0	1	142.0	4	345.7	2	.8	4	2060.4	10	.0	Scht	8.5	32 12	14?	208	1	208
1	262.7	20	.4	4	142.5	1	.5	2	345.6	2	.8	3	103.5	1/2	207.0	S E L A						
3	65.9	1/2	.8	4	285.0	2	.5	3	345.9	2	.9	2	207.2	1	.2	2315		28 25	805	532	2 1/2	212.8
3	264.9	2	132.4	3	1426.0	10	.6	4	173.6	1	173.6	3	104.9	1/2	209.8	2331	9.	58 13	50	428	2	214.
S T A T E R				2	1429.8	10	143.0	4	347.2	2	.6	3	211.0	1	211.0	2344		28 17	144	536	2 1/2	214.4
3	1328.8	10	132.9	4	143.2	1	.2	3	347.3	2	.6	3	105.6	1/2	211.2	2353	8.	45 20	491	868	4	217
2	535.6	4	133.9	1	716.5	5	.3	3	173.9	1	.9	4	425.2	2	212.6	2319	.	20 20	10?	332	1 1/2	221.4
2	134.0	1	134.0	4	143.8	1	.8	4	174.2	1	174.2	1	857	40	214.4	2337	8.	45 19	899	561	2 1/2	224.4
4	535.9	4	.0	2	1442.3	10	144.2	4	174.4	1	.4	4	108.6	1/2	217.2	S E L A						
1	536.4	4	.1	2	144.4	1	.4	3	174.7	1	.7	3	108.6	1/2	.2	2315		28 25	805	532	2 1/2	212.8
1	674.0	5	.8	2	1446.0	10	.6	3	1752.7	10	175.5	4	108.6	1/2	.2	2331	9.	58 13	50	428	2	214.
2	675.1	5	135.8	1	2895.2	20	.8	4	175.6	1	.6	4	108.8	1/2	.6	2344		28 17	144	536	2 1/2	214.4
3	1352.3	10	.2	4	1459.9	10	146.0	4	175.9	1	.9	2	1089.2	5	.8	2353	8.	45 20	491	868	4	217
4	1358.4	10	.8	4	146.0	1	.0	2	176.8	1	176.8	2	2198.0	10	219.8	2319	.	20 20	10?	332	1 1/2	221.4
4	136.0	1	136.0	4	146.3	1	.3	3	355.3	2	177.6	1	1100.3	5	220.0	2337	8.	45 19	899	561	2 1/2	224.4
3	680.5	5	.1	4	731.5	5	.3	2	89.0	1/2	178.0	3	221.1	1	221.1	Number in Berlin or Schliemann private						
2	1362.5	10	.2	1	734.0	5	.8	1	89.2	1/2	178.4	4	888.4	40	222.1	Depth in metres						
4	137.0	1	137.0	2	1469.3	10	.9	2	89.2	1/2	.4	2	111.9	1/2	223.8	Size in millimetres						
				2	1470.1	10	147.0	3	178.6	1	.6	4	1123.0	5	224.6	Types, as these plates						
				2	295.6	2	.8	4	89.6	1/2	179.2	4	1128.8	5	225.7	Grains reduced from grams						
				1	7042.	50	148.4	2	896.7	5	1	3	113.4	1/2	226.8	Multiple						
				2	1495.8	10	149.6	2	358.7	2	.3	4	455.2	20	227.6	Unit in grains.						
				2	149.7	1	.7	2	359.4	2	.7											

REGISTER OF WEIGHTS, BRITISH MUSEUM. DARIC, STATER.

DARIC, BABYLONIAN, KYZIKENE, ANTIOCHIAN, OR ITALIC OF GALEN.

STATER, ATTIC.

REGISTER	M	GRS.	CH	ORIG	X	UNIT	MINA	PL.	DETAIL
67.8.14.1	P	684.9	15	692	6	1153	6920		TPIC KYZI
68.1.10.123	B	574.4	30	604	5	120.8	7248	C	TUNNY ?
68.1.10.70	P	1801.4	22	1813	15	120.9	7252	C	CLUB.TET.AA.
67.5.8.282	B	615.5	55	610	5	122	7320		
68.1.10.79	P	620.5	3.5	617	5	123.4	7404	C	CONVEX
66.5.4.16	P	630.7	108	620	5	124	7440	C	E=5 SNEKELS
68.1.10.76	B	1863.0	6	1866	15	124.4	7464	C	BULL'S HEAD
1872.P.511	P	1869.7	20	1872	15	124.8	7488	C	1/2 TORTOISE
66.5.4.3	P	3825.5	35	3790	30	126.3	7580	C	
83.3.1.1	P	7201	380	7580	60	126.3	7580		TUNNY, KYZI, MINA
68.1.10.96	P	252.0	6	256	2	128	7680	C	B=2 SNEKELS
o	P	15396.6	31	15365	120	1280	7682	Lk	
85.10.13.15	L	3846	0	3846	3	128.2	7692	Ky	---
68.1.10.81	P	1936.9	13	1924	15	128.3	7696	C	
66.5.4.26	B	3833.4	90	3850	30	128.3	7700	C	Σ Ω money?
T.B.363	P	3866.8	12	3865	30	128.8	7730	A	TORTOISE
63.8.9.1	P	3925.0	40	3885	30	129.5	7770	C	AMPHORA BULL HEAD MINA

MARBLE BLOCKS, 2 BREASTS ON TOP (BR), SOME + HANDLE. (h) THE MINA IS 50 DARICS.

59.12.26.457	M	563.4	50	610	5	122	6100	K	Bt. h.
59.12.26.458	"	12290	50	12340	2M	123.4	6170	K	Bt. h.
74.2.5.105	"	25800	5200	31000	5M	124.0	6200	E	Bt.
59.12.29.461	"	18544	80	18620	3M	124.1	6207	K	HEADS h.
87	"	37364	24	37340	6M	124.5	6223		Bt.
59.12.26.459	"	6042	210	6250	M	1250	6250	K	Bt. h.
59.12.7.567	"	26508	5000	31500	5M	1260	6300	K	Bt.
59.12.26.448	"	32036	600	32000	5M	1280	6400	K	Bt. h.
82.12.4.1	"	52461	420	52880	8M	132.2	6610		Bt. h.

MARBLE DISCS, ROUNDED EDGES PROBABLY ROMAN. CARTHAGE.

60.10.2.72	M	1458.2	14	1472	12	122.8			Cg
60.10.2.75	"	491.9	4	496	4	124.0			...
60.10.2.79	"	125.2	0	125.2	1	125.2			...
60.10.2.74	"	377.1	2	379	3	126.3			...
57.12.18.228	"	128.3	.5	128.8	1	128.8			
57.12.23.224	L	774.3	0	774.3	6	129.0			

LITRA OF CONFUSED ORIGINS, PEYEM, DARIC AND STATER.

65.5.8.337	S	40.4	0	40.4	25	121.2	5818		Σ = 2
	S	242.6	0	242.6	U $\frac{1}{2}$	121.3	5822		Σ = 5 SEMIS
65.5.8.344	M	60.7	0	60.7	35	121.4	5827		Σ = 3
	S	1460.2	.5	1460.7	3U	121.7	5843		
66.5.4.9	P	1330	240	1466	3U	122.2	5864		Γ = 3 UNCIAE
	B	41.3	.8	40.9	25	122.7	5878		= 2
67.5.8.250	P	2969.4	6	2963	6U	123.5	5926		
67.5.8.338	S	41.2	0	41.2	25	123.6	5933		..
	S	247.3	.5	247.8	U $\frac{1}{2}$	123.9	5947		Σ
67.5.8.313	S	1489.9	0	1489.9	3U	124.2	5960		...
68.1.10.75	B	2994.1	12	2990	6U	124.6	5980		ARRP AAPINUM
82.12.4.3	M	2399.5	30	2402.5	4L	125.1	6006		Δ
68.1.10.102	P	6022	24	6030	1	125.6	6030		Δ E I E T A
	B	3021.6	0	3021.6	6U	125.8	6043		S = 6 SEMIS
	B	127.6	.8	127.4	65	127.4	6103		...
67.5.8.307	S	510.6	6	511.2	1U	127.8	6134		...
T.B.	S	2075.5	6	2082	4U	130.1	6246		...
68.1.10.155	L	3133.9	1	3134	6U	130.6	6268		X
S.169	B	1546.0	90	1570	3U	130.8	6280		...
82.12.4.8	M	662	0	662	35	132.4	6355		...
68.1.10.107	P	3186.7	100	3200	6U	133.3	6400		...
67.5.8.324	S	6491	0	6491	1	135.2	6491		↑
67.5.8.343	L	68.6	0	68.6	35	137.2	6586		...
63.7.28.304	B	6600.5	6	6594	1	137.4	6594		...
81.7.9.7	P	6630.3	80	6605	1	137.6	6605		CAST OF BAG
60.10.2.77	S	275.2	0	275.2	U $\frac{1}{2}$	137.6	6605		GN. PORPH.
80.9.11.1	P	6742	80	6660	1	138.7	6660		AGITPA
	S	299.0	0	299.0	U $\frac{1}{2}$	142.5	7176		ΑΠΟΛΛΩΝΙΟΥ

The divisions may be noted between the PEYEM and DARIC at 125.8 and 127.4 and the DARIC and STATER at 130.8 and 132.4.

REGISTER	M	GRS.	CH	ORIG	X	UNIT	MINA	PL	DETAIL
68.1.10.98	P	229.2	3.5	230.1	2	1150	5752	C	
67.5.8.257	P	228.3	4.9	231.6	2	1158	5790		Δ. FEM. HEAD
67.5.8.252	P	175.9	50	176.2	3/2	117.5	5873		H = 3 DR.
67.5.8.268	P	10.2	.4	9.8	1/2	117.6	5880		□ = OBOLI
67.5.8.254	P	234.3	.5	237	2	118.5	5925		--- = 4 DR.
67.5.8.266	P	60.6	2	60.0	1/2	120.0	6000		---
67.5.8.250	P	244.9	3.5	245.8	2	122.9	6145		HALF CRESCENT
67.5.8.274	B	62.7	.6	62.1	1/2	124.2	6210		SILBANI
67.5.8.263	P	128.3	4	124.3	1	124.3	6215		---
67.5.8.246	P	309.1	3	311	5/2	124.4	6220		E = 5 DR.
T.B.380	P	1044.3	4	1040	M $\frac{1}{2}$	124.8	6240	A	ΔEWO CRESC.
68.1.10.91	P	781.3	7	785	M $\frac{1}{2}$	125.6	6280		1/2 CRESC. STAR
66.5.4.17	P	624.1	21	629	5	125.8	6290	C	PEGASUS, FORE
T.B.398	P	253.3	1.3	252	2	126.0	6300	A	---
	B	624.3	8	632	5	126.4	6320		I = 10 DR.
	P	126.5	1.9	126.6	1	126.6	6330		---
67.5.8.260	P	3216.3	55	3180	M $\frac{1}{2}$	127.2	6360	A	TAPT. TORTOISE
T.B.	B	1591.5	3	1590.5	25	127.2	6362		LEGLESS BULL
67.5.8.245	P	504.4	12	509	4	127.3	6367		H = 8 DR.
68.1.10.84	P	1280.4	6	1274	10	127.4	6370		III
65.7.20.117	P	1273.2	21	1275	10	127.5	6375		CRESCENT.
67.5.8.240	P	509.0	8	511	4	127.7	6387		ΠΗ = 5+3 DR.
67.5.8.239	P	638.2	14	639	5	127.8	6390		A
75.4.20.8	P	1070	11	1066	M $\frac{1}{2}$	127.9	6396	A	LADLE LUMP
61.1.10.88	P	1050.3	16	1070	M $\frac{1}{2}$	128.4	6420	C	ΔEWO CRESC.
58.8.26.262	B	1279.9	7	1287	10	128.7	6435	KL	ΔH.K = 20 DR.
T.B.379	P	1079.3	2.9	1076.4	M $\frac{1}{2}$	129.1	6456	A	1/2 TORTOISE
56.6.26.674	P	1295.6	4	1292	10	129.2	6460	KL	
67.5.8.236	P	1286.4	8	1293	10	129.3	6465		CRESCENT
54.5.19.154	P	322.5	4	323.6	5/2	129.4	6472	R	
67.5.8.279	B	21.6	.2	21.6	1/6	129.6	6480		--- = 2 OBOLI
68.1.10.95	P	665.4	15	650	5	130.0	6500	C	
68.1.10.112	P	647.1	6	651	5	130.2	6510	C	CYLINDER
T.B.394	P	524.8	3.6	521	4	130.2	6512	A	ΠΗ = 5+3
T.B.373	P	1643.1	22	1635	25	130.8	6540	A	H
66.5.4.14	P	816.6	14	818	M $\frac{1}{2}$	130.9	6543	C	1/2 CRESCENT
T.B.397	P	387.8	9	393	3	131.0	6550	A	
67.5.8.233	B	823.5	4	819	M $\frac{1}{2}$	131.0	6552		OMBA
67.5.8.242	P	807.4	13	820	M $\frac{1}{2}$	131.2	6560		1/2 CRESCENT
68.1.10.99	P	2197.5	25	2192	M $\frac{1}{2}$	131.5	6576	C	TORTOISE ?
T.B.362	P	4418.5	28	4390	25	131.7	6585	A	AMPHORA
T.B.369	P	2288.0	12	2196	M $\frac{1}{2}$	131.8	6588	A	1/2 AMPHORA
66.5.4.11	P	1103.6	12	1101	M $\frac{1}{2}$	132.1	6606	C	CRESCENT
67.5.8.244	P	522.2	8	529	4	132.2	6612		Γ 77 ? 5+3
69.1.10.1	P	6639	9	6630	50	132.6	6630		MNA DOLPHIN
67.5.8.258	P	189.0	16	199	3/2	132.7	6632		
85.10.10.1	P	6665	50	6640	50	132.8	6640	N	H
67.5.8.265	P	68.5	2	66.5	1/2	133.0	6650		---
76.8.10.5	P	831.0	9	832	M $\frac{1}{2}$	133.1	6655	AE	ΔH GOAT
67.5.8.221	P	4439.6	110	4445	2M $\frac{1}{2}$	133.3	6667		AMPHORA
66.5.4.10	P	1107.7	6	1112	M $\frac{1}{2}$	133.4	6672	C	CRESC. STAR
68.1.10.77	P	2213.8	10	2224	M $\frac{1}{2}$	133.4	6672	C	OMHA 1/2 AMPH.
T.B.400	B	177.5	2	178	4/3	133.5	6675	A	
35.7.6.58.4843	P	531.7	4	534	4	133.5	6675		
78.10.19.276	B	179.8	3	179.5	4/3	133.9	6694		H

REGISTER OF WEIGHTS, BRITISH MUSEUM. STATER—BEQA.

REGISTER	M	GRS.	CH.	ORIGIN ^x	X	UNIT	MINA	PL.	DETAIL
T.B.396	P	410.5	55	405	3	1350	6750	A	MIINI=6DR.
T.B.375	P	1347.5	9	1350	10	1350	6750	A	B
T.B.391	P	842.1	7	845	M/8	1352	6760	A	1/2 CRESCIT
T.B.372	P	1696.9	7	1690	25/2	1352	6760	A	CRESCENT
67.5.8.222	P	3399.6	60	3389	25	1356	6778	A	ΔHMO TORTOISE
67.5.8.223	P	1686.5	22	1695	25/2	1356	6780	A	OMHA 1/2 "
T.B.390	P	852.2	22	850	M/8	1360	6800	A	OMHA OWL
T.B.393	P	540.0	10	545	4	1362	6812	A	
67.5.8.231	P	1675.9	47	1705	25/2	1364	6820	A	1/2 AMPHORA
52.9.1.18	B	4576.8	19	4558	M/8	1367	6837	A	
NEIKO MOC MAP K OY AFO PA NOM WN ΛE BAAEYC									
67.5.8.227	P	1714.6	12	1712	25/2	1370	6848	A	1/2 TORTOISE
T.B.361	P	704.4	500	6860	50	1372	6860	A	MNA DOLPHIN
68.1.10.85	P	2219.3	23	2198	16	1372	6862	C	H
69.1.10.3	P	4590.5	40	4587	2M/3	1376	6880	A	TRITH AMPHORA
67.5.8.234	P	1139.6	13	1147	M/3	1376	6882	A	
53.6.16.1	B	41507.4	25	41300	6M	1377	6883	H	
ΘΕΟΙΣ ΕΒΑΣΤΟΙΣ ΚΑΙ ΤΑ ΔΑΜΟ ΛΓΟ ΡΑ ΝΟΜΟΥΝ ΤΑΝ Π									
ΚΑΝΔΑΙΟΥ ΡΟΥΦΟΥ ΚΑΙ ΤΕΡΤΙΟΥ ΒΕΚΙΛΙΟΥ.									
65.7.20.111	P	4599.8	50	4590	2M/3	1377	6885	A	AMPHORA
T.B.365	P	3458.6	35	3445	25	1378	6890	A	BUCKLER
W.T.1109	P	4596.5	12	4595	2M/3	1379	6893	C	AMPHORA
68.1.10.87	P	1386.8	7	1380	10	1380	6900	C	DOLPHIN
68.1.10.89	P	557.6	13	552	4	1380	6900	C	
T.B.364	P	3478.3	20	3450	25	1380	6900	A	OMHA TORTOISE
65.7.20.112	P	3453.8	50	3460	25	1384	6920	A	MNIMN, DOLPHN
T.B.389	P	865.5	6	869	M/8	1390	6952	A	ROSETTE
76.5.10.4	P	1697.6	50	1740	25/2	1392	6960	SY	ANTIKHEION TETART. ANCHOR
67.5.8.219	P	6958	75	6990	50	1398	6990	C	DOLPHIN
66.5.4.1	P	7010	5	7005	50	1400	7000	C	WITH BRONZIERING
66.5.4.12	P	897.9	22	876	M/8	1402	7008	C	MNA DOLPHIN
67.5.8.253	P	282.0	6	281	2	1405	7025	A	TT
T.B.371	P	1765.8	15	1759	25/2	1407	7036	A	III 3AE, III 4 ATT.
68.1.10.93	P	422.0	2.7	422	3	1410	7050	C	HMITEP, 1/2 TORT
T.B.388	P	881.3	4	882	M/8	1411	7050	A	DIOTA
83.10.1.1	B	707.1	1	708	5	1416	7080	Co	ΔΣ LION, FAUNG
66.5.4.4	P	3558.9	12	3545	25	1418	7090	C	Plugged.
T.B.387	P	880.0	7	887	M/8	1419	7096	A	ΔOMO CORNUCOR
T.B.	P	7161	26	7167	50	1433	7167	A	MNA DOLPHIN
67.5.8.225	P	1000.4	4.4	1796	25/2	1437	7184	A	HMITE 1/2 TORT.
T.B.386	P	898.7	5	898	M/8	1437	7184	A	1/4 AMPHORA
68.1.10.97	P	143.6	4.7	143.9	1	143.9	7195	C	
65.7.20.115	P	1807.5	15	1808	25/2	1446	7232	A	HMITE 1/2 TORT.
68.1.10.101	P	723.4	28	7250	50	1450	7250	C	
T.B.385	P	908.0	7	910	M/8	1456	7280	A	1/2 CRESCENT
T.B.384	P	914.1	33	911	"	1458	7288	A	
67.5.8.228	P	1835.4	10	1836	25/2	1469	7344	A	HMITE 1/2 TORT.
T.B.383	P	921.4	5	921	M/8	1474	7368	A	1/2 CRESC, STAR
T.B.382	P	925.0	2.5	922.5	M/8	1476	7380	A	OMHA OWL
67.5.8.226	P	1868.6	30	1848	25	1478	7392	A	
T.B.395	B	449.8	1.8	448	3	1493	7467	HT	

KHOIRINE, CHIAN, PERSIAN.

REGISTER	M	GRS.	CH.	ORIGIN ^x	X	UNIT	MINA	PL.	DETAIL
68.1.10.80	P	2127.2	22	2105	3U	168.4	8420	C	
67.5.8.336	S	29.3	0	29.3	1S	168.6	8430	C	
64.10.7.1997	M	8476	0	8476	M	169.5	8476	KM	DUCK
68.1.10.106	P	4243.2	50	4240	6U	169.6	8480	C	
	S	89.2	0	89.2	3S	171.3	8533		
68.1.10.134	B	175.7	3.5	172.2	2K	172.2	8610		
	S	358.8	0	358.8	U/2	172.2	8611		
	BR	179.5	0	179.5	U/4	172.3	8616		
	B.	86.9	1.4	86.3	K	172.6	8630		
68.1.10.72	P	2167.2	24	2159	3U	172.7	8636	C	Δ = QUARTER
	S	360.1	0	360.1	U/2	172.8	8642		Σ = SEMIS
67.5.8.347	S	181.1	0	181.1	U/4	173.8	8692		Σ = SICILICUS
	P	344.7	7	350	4K	175.0	8750		
	S	8756	0	8756	M	175.1	8753		
67.5.8.319	S	2208.8	3	2209	3U	176.7	8836		
	S	2342.6	1	2343.6	3U	187.5	9374		

TWO SYSTEMS ARE MIXED HERE. THE MINA ÷ 100 = KHOIRINE, K. " ÷ 12 UNCIAE, U; AND 288 SCRIPULAE, S.

BEQA, AEGINETAN.

REGISTER	M	GRS.	CH.	ORIGIN ^x	X	UNIT	MINA	PL.	DETAIL
	P	464	1.1	453	1/4	181.2	9060		∞ = 3 OBOLI
	B	99.0	11	92	1/2	184	9200		1 = 1 DR.
	B	369.7	1.4	370	2	185	9250		
68.1.10.103	P	9218	170	9300	50	186	9300		
67.5.8.232	P	1159.7	7	1164	M/8	186.2	9312		HMIS 1/4 AMPH.
T.B.378, 1809	P	1168.0	5	1168	M/8	186.9	9344	A	CRESCENT
T.B.377	P	1169.6	5	1170	M/8	187.2	9360	A	ΔHMO CRESCIT
67.5.8.253	P	282.0	6	281	3/2	187.4	9367		III AEG, III ATT.
68.1.10.122	B	373.9	3	375	2	187.5	9375	C	
T.B.392	P	752.3	2	750	4	187.5	9375	A	Δ = 4 STATERS BOARDS HEAD
R.P.K.	B	1166.6	7.4	1174	M/8	187.8	9392		ΔHMOION OTAZON
	B	473	8	471	1/4	188.4	9420		
66.5.4.19	P	477.8	3	475	5/2	190.0	9500	C	
68.7.20.118	P	955.5	5	954	5	190.8	9540	A	1/2 CRESCENT
67.5.8.249	B	2389.9	7	2388	25/2	191.0	9552	A	TOUYA OWL
70.11.5.1	P	2402.4	25	2390	25/2	191.2	9560	A	ΔHMO 1/2 AMPH.
68.1.10.94	P	482.7	9	479	5/2	191.6	9580		
67.5.8.241	P	957.3	19	959	5	191.8	9590		1/2 CRESC, STAR
67.5.8.246	P	480.9	1.2	479.7	5/2	191.9	9594	A	
	P	577.1	5	578	3	192.7	9633		
66.5.4.2	P	4823.3	7	4823	25	192.9	9646	C	MN RAMS HEAD
65.7.20.116	P	1204.6	8	1207	M/8	193.1	9656		1/2 TORTOISE
67.5.8.262	P	82.7	5.7	80.6	0.5	193.4	9667		MIINI = 5 OBOLI
67.5.8.220	P	2404.9	30	2420	25/2	193.6	9680		
66.5.4.18	P	583.9	1.4	582.5	3	194.2	9708	C	FULL FACE
65.7.20.113	P	2434.1	5	2429	25/2	194.3	9716	A	TORTOISE
67.5.8.224	P	2458.5	22	2436	25/2	194.9	9744		3/4 AMPHORA
67.5.8.243	P	973.0	6	975	5	195.0	9750		1/2 CRESC, STAR
68.1.10.90	P	489.1	1.4	487.7	5/2	195.1	9754	C	
T.B.399	B	294.2	1.2	293.0	3/2	195.3	9767	A	K
T.B.359	P	9782.8	60	9793	50	195.9	9793	A	DOLPHIN
T.B.376	P	1229.6	12	1227	M/8	196.3	9816	A	ΔHMO 1/4 AMPH
68.1.10.82	P	594.1	4	590	3	196.7	9833	C	DIOTA
T.B.381	P	985.6	5	985	5	197.0	9850	A	OMHA
	B	298.5	5	298	3/2	198.7	9933		H T = 3
T.B.358	P	9970.6	62	9942	50	198.8	9942	A	MNA ATOP DOLPHIN
67.5.8.229	P	1248.1	14	1244	M/8	199.0	9952	A	CRESC, STAR
T.B.570	P	301.8	4	299	3/2	199.3	9967		EUROPA ON BULL

BEQA AS UNCIA OF LIGHT LITRA OF HESYCHIOS AND POLLUX.

67.5.8.348	S	194.4	0	194.4	U	194.4	2333		S = SEMIS
4.8.3.15.2	B	2314	50	2350	1	195.8	2350		∞ = SEMIS OF HEAVY UNCL. PAVI PIG.
67.5.8.277	B	330	0	330	5	198.0	2376		∞ = 1 SEXTULA
67.5.8.248	P	404.2	3.6	405.6	2U	202.8	2434		∞ = 2 UNCLAE
	S	68.2	0	68.2	2.5	204.6	2455		∞ = 2 SEXT.
67.5.8.327	S	206.9	0	206.9	3U	206.9	2483		∞ = 1 UNCL.
67.5.8.305	S	593.3	50	640	3U	213.3	2560		∞ = 3 UNCL.

NECF, MINA OF AELIAN, ISLAND MINA.

67.5.8.251	P	228.5	7	234	3/2	156.0	7800		∞ = 1.1.1
68.1.10.100	P	7853	40	7810	50	156.2	7810	C	
68.1.10.104	P	7901	50	7915	50	158.3	7915	C	FULL FACE, OWL
	P	3949.2	10	3959	25	158.4	7918	A	1/2 AMPHORA
66.5.4.6	P	3978.6	6	3985	25	159.4	7970	C	ΔHMO, AMPH.
	B	162.7	1.3	162.9	1	162.9	8145		
	B	165.7	2.7	163	1	163.0	8150		
78.10.19.293	P	2036.7	36	2047	25/2	163.8	8188		1/2 AMPHORA
	Sy	2048.5	8	2049.3	25/2	164.0	8197		
82.12.4.7	M	166.2		166.2	1	166.2	8310		

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Table with columns: REGISTER, M, GRS., CH., ORIGIN, X, UNIT, MINA, PL, DETAIL. Contains two main sections of data, one on the left and one on the right, separated by a vertical line. Includes various alphanumeric codes and numerical values.

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Table with columns: REGISTER, M, GRS., CH., ORIGIN, X, UNIT, MINA, PL., DETAIL. Contains multiple rows of weight data and a section for 'SET OF LEAD SCRIPULA'.

SELA. 2 BREASTS (BR) WITH BAR HANDLE (H).

Table with columns: REGISTER, M, GRS., CH., ORIGIN, X, UNIT, MINA, PL., DETAIL. Contains rows of weight data for Selas with 2 breasts and bar handles.

SELA, HEAVY PHOENICIAN MINA.

Table with columns: REGISTER, M, GRS., CH., ORIGIN, X, UNIT, MINA, PL., DETAIL. Contains rows of weight data for heavy Selas.

SELA, LIGHT PHOENICIAN MINA, UNCEIA, M. MINA, DRACHM, SH SHEKEL.

Table with columns: REGISTER, M, GRS., CH., ORIGIN, X, UNIT, MINA, PL., DETAIL. Contains rows of weight data for light Selas and other units.

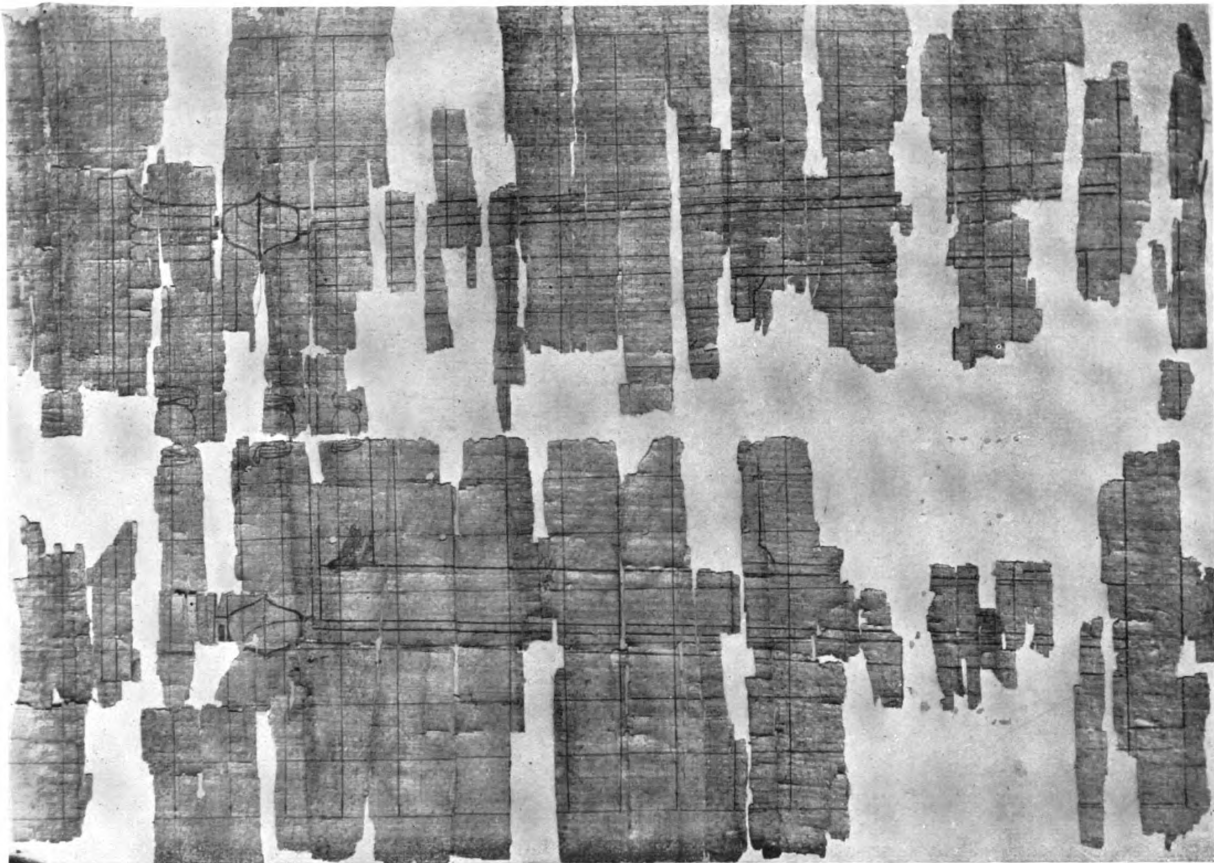
SELA. DISC WEIGHTS, CARTHAGE.

Table with columns: REGISTER, M, GRS., CH., ORIGIN, X, UNIT, MINA, PL., DETAIL. Contains rows of weight data for Selas disc weights from Carthage.

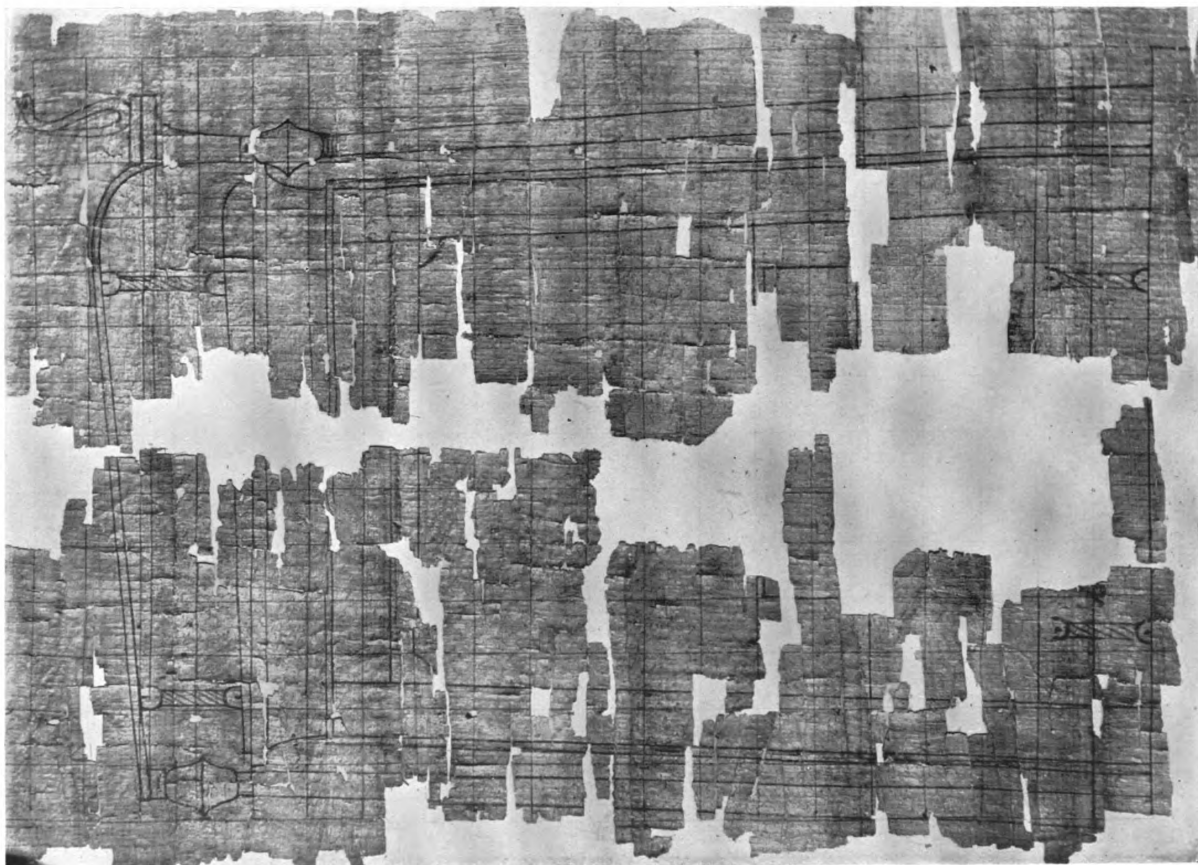
BRONZE SERIES.

Table with columns: MARK, GRS., CH., ORIGIN, X, UNIT, MINA, PL., DETAIL. Contains rows of weight data for the Bronze Series.

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FRONT VIEW



SIDE VIEW

DARIC, BABYLONIAN, KYZIKENE, ANTIOCHIAN, OR ITALIC OF GALEN.

STATER, ATTIC.

DARIC, BABYLONIAN, KYZIKENE, ANTIOCHIAN, OR ITALIC OF GALEN.								STATER, ATTIC.											
REGISTER	M	GRS.	CH.	ORIG	X	UNIT	MINA	PL.	DETAIL	REGISTER	M	GRS.	CH.	ORIG	X	UNIT	MINA	PL.	DETAIL
67.8.14.	P	684.9	15.	692	6	1153	6920		TPIC KYZI	68.1.10.98	P	229.2	3.5	230.1	2	1150	5752	C	
68.1.10.123	B	574.4	30.	604	5	1208	7248	C	TUNNY?	67.5.8.257	P	228.3	4.9	231.6	2	1158	5790		Δ. FEM. HEAD
68.1.10.70	P	1801.4	22.	1813	15	1209	7252	C	LWB. TET. AA.	67.5.8.252	P	175.9	5.0	176.2	3/2	117.5	5873		H = 3 DR.
67.5.8.282	B	615.5	5.5	610	5	122	7320			67.5.8.268	P	10.2	4	9.8	1/2	117.6	5880		Π = OBOLI
68.1.10.79	P	620.5	3.5	617	5	1234	7404	C	CONVEX	67.5.8.254	P	234.3	.5	237.	2	118.5	5925		ΠH = 4 DR.
66.5.4.16	P	630.7	108	620	5	124	7440	C	E = 5 SHEKELS	67.5.8.266	P	60.6	2.	60.0	1/2	120.0	6000		I
68.1.10.76	B	1863.0	6.	1866	15	1244	7464	C	BULL'S HEAD	67.5.8.250	P	244.9	3.5	245.8	2	122.9	6145		HALF CRESCENT
1872. P. 511	P	1869.7	20.	1872	15	1248	7488		1/2 TORTOISE	67.5.8.274	B	62.7	6	62.1	1/2	124.2	6210		SILBANI ∇ F
66.5.4.3	P	3825.5	35	3790	30	1263	7580	C		67.5.8.263	P	128.3	4.	124.3	1	124.3	6215		H = 2 DR.
83.3.1.1	P	7201.	380	7580	60	1263	7580		TUNNY, KYZI, MNA	67.5.8.246	P	309.1	3.	311.	5/8	124.8	6220		E = 5 DR.
68.1.10.96	P	252.0	6.	256	2	128.	7680	C	B = 2 SHEKELS	T. B. 380	P	1044.3	4.	1040.	3/8	124.8	6240		Δ EWQ CRESC.
o	P	15396.	31.	15365	120	1280	7682	LK		68.1.10.91	P	781.3	7.	785.	7/8	125.6	6280		1/2 CRESC. STAR
85.10.13.15	L	3846	o	3846	3	128.2	7692	Ky	ΠH	66.5.4.17	P	634.1	21.	629.	5	125.8	6290		C PEGASUS, FORE
68.1.10.81	P	1936.9	13.	1924.	15	128.3	7696	C		T. B. 398	P	253.3	1.3	252.	2	126.0	6300		A ΠH
66.5.4.26	B	3833.4	90.	3850.	30	128.3	7700	C	Σ Ω monog	B	624.3	8.	632.	5	126.4	6320		I = 10 DR.	
T. B. 363	P	3866.8	12.	3865.	30	128.8	7730	A	TORTOISE	P	126.5	1.9	126.6	1	126.6	6330		ΠH	
63.8.9.1	P	3925.0	40.	3865.	30	129.5	7770	C	AMPHORA BULL HEAD HMIM	67.5.8.260	P	3216.3	55.	3180	25/8	127.2	6360		A TETAPT. TORTOISE
MARBLE BLOCKS, 2 BREASTS ON TOP (BR), SOME + HANDLE (h) THE MINA IS 50 DARICS.										B	1591.5	3.	1590.5	25/8	127.2	6362		LEGLESS BULL	
59.12.26.457	M	563.4	50	610	5	122.	6100	K	B. r. h.	B	504.4	12.	509	4	127.3	6367		H. H. BULL.	
59.12.26.456	"	12290.	50	12340	2M	123.4	6170	K	B. r. h.	68.1.10.84	P	1280.4	6.	1274.	10	127.4	6370		IIII
74.2.5.105	"	25800	5000	31000	5M	124.0	6200	E	B. r. h.	65.7.20.117	P	1273.2	21.	127.5	10	127.5	6375		CRESCENT.
59.12.29.461	"	18544.	80	18620	3M	124.1	6207	K	HEADS h.	67.5.8.240	P	509.0	8.	511.	4	127.7	6387		ΠH = 5+3 DR.
87	"	3736.4	24	37340	6M	124.5	6228		B. r.	67.5.8.239	P	638.2	14.	639.	5	127.8	6390		A
59.12.26.459	"	6042	210	6250	M	1250	6250	K	B. r. h.	75.4.20.8	P	1070.	11.	1066.	3/8	127.9	6396		A LADLE LUMP
59.12.7.56?	"	26508	5000	31500	5M	1280	6300	K	B. r.	61.1.10.88	P	1050.3	16.	1070.	3/8	128.4	6420		A EWQ CRESC.
59.12.26.448	"	32036	600	32000	5M	1280	6400	K	B. r. h.	58.8.26.262	B	1279.9	7.	1287.	10	128.7	6435		KL Δ. H. K = 20 DR.
82.12.4.1	"	52461	420	52880	8M	132.2	6610		B. r. h.	T. B. 379	P	1079.3	2.9	1076.4	3/8	129.1	6456		A 1/2 TORTOISE
MARBLE DISCS, ROUNDED EDGES PROBABLY ROMAN. CARTHAGE.										B	1295.6	4.	1292.	10	129.2	6460		KL	
60.10.2.72	M	1458.2	14.	1472.	12	122.8		Cg		67.5.8.236	P	1286.4	8.	1293.	10	129.3	6465		CRESCENT
60.10.2.75	"	491.9	4.	496.	4	124.0				54.5.19.157	P	322.5	4.	323.6	5/8	129.4	6472		R
60.10.2.79	"	125.2	o	125.2	1	125.2			...	67.5.8.279	B	21.6	2.	21.6	1/6	129.6	6480		ΠH = 2 OBOLI
60.10.2.74	"	377.1	2.	379.	3	126.3			...	68.1.10.95	P	665.4	15.	650.	5	130.0	6500		C
57.12.18.228	"	128.3	.5	128.8	1	128.8				68.1.10.112	P	647.1	6.	657.	5	130.2	6510		C CYLINDER
57.12.23.224	L	774.3	6	774.3	6	129.0				T. B. 394	P	524.8	3.6	521.4	4	130.2	6512		A ΠH 5+3
LITRA OF CONFUSED ORIGINS, PEYEM, DARIC AND STATER.										T. B. 373	P	1643.1	22.	1635.	25/8	130.8	6540		A H
65.5.8.337	S	40.4	o	40.4	2.5	121.2	5818		Σ = 2	66.5.4.14	P	816.6	14.	818.	3/8	130.9	6543		C 1/2 CRESCENT
S	242.6	o	242.6	1/2	121.3	5822			Σ = SEMIS	T. B. 397	P	387.8	9.	393.	3	131.0	6550		A
65.5.8.344	M	60.7	o	60.7	3.5	121.4	5827		Σ = 3	67.5.8.233	B	823.5	4.	819.	3/8	131.0	6552		OMBA
P	1460.2	.5	1460.7	3U	121.7	5843			Γ = 3 UNCIAE	67.5.8.242	P	807.4	13.	820.	3/8	131.2	6560		1/2 CRESCENT
B	41.3	8.	40.9	2.5	122.7	5878			Π = 2	68.1.10.99	P	2197.5	25.	2192.	13/8	131.5	6576		C TORTOISE?
P	2969.4	6.	2963	6U	123.9	5926				T. B. 362	P	4418.5	28.	4390.	28	131.7	6585		A AMPHORA
S	41.2	o	41.2	2.5	123.6	5933				T. B. 369	P	2288.0	12.	2196.	3/8	131.8	6588		A 1/2 AMPHORA
S	247.3	.5	247.8	1/2	123.9	5947				66.5.4.11	P	1103.6	12.	1101.	3/8	132.1	6606		C CRESCENT
S	1489.9	o	1489.9	3U	124.2	5960				67.5.8.244	P	522.2	8.	529.	4	132.2	6612		Γ Γ Γ Γ ? 5+3
M	2994.1	12.	2990	6U	124.6	5980				69.1.10.1	P	663.9	9.	663.0	50	132.6	6630		MNA DOLPHIN
M	2399.5	30	2402.5	4L	125.1	6006				67.5.8.258	P	189.0	16.	199.	3/2	132.7	6632		
M	6022.	24	6030	1	125.6	6030				85.10.10.1	P	666.5	50.	664.0	50	132.8	6640		N H
M	3021.6	60	3021.6	6U	125.8	6043				67.5.8.265	P	68.5	2.	66.5	1/2	133.0	6650		I
B	127.6	.8	127.4	6.5	127.4	6103				76.8.10.5	P	831.0	9.	822.	3/8	133.1	6655		AE Δ H GOAT
S	510.6	6	511.2	11U	127.8	6134				67.5.8.221	P	4439.6	110.	4445.	25/8	133.3	6667.		C AMPHORA
S	2075.5	6.	2082.	4U	130.1	6246				66.5.4.10	P	1107.7	6.	1112.	3/8	133.4	6672.		C CRESC. STAR
L	3133.9	1	3134.	6U	130.6	6268				68.1.10.77	P	2213.8	10.	2224.	3/8	133.4	6672.		C OMHA 1/2 AMPH.
B	1546.0	90	1570	3U	130.8	6280				T. B. 400	B	177.5	2.	178.	4/3	133.5	6675.		A
M	662.	o	662.	3.5	132.4	6355				35.7.6.58.1843	P	531.7	4.	534.	4	133.5	6675.		
P	3186.7	100	3200	6U	133.3	6400				78.10.19.276	B	179.8	3.	179.5	4/3	133.9	6694		H
S	6491	o	6491	1	135.2	6491				54.5.22.53	P	665.2	7.	671.	5	134.2	6710		
L	68.6	o	68.6	3.5	137.2	6586				67.5.8.267	P	32.0	5.8	33.6	1/4	134.4	6720		III = 3 OBOLI
B	6600.5	6	6594.	1	137.4	6594				65.7.20.114	P	1699.0	18.	1681.	25/8	134.5	6724		A ΔHMO 1/2 TORT?
P	6630.3	80	6605	1	137.6	6605				67.5.8.238	P	1121.1	4.	1122.	3/8	134.6	6732		C CRESC. STAR
P	275.2	o	275.2	1/2	137.6	6605				68.1.10.71	P	1709.2	23.	1686.	25/8	134.9	6744		C DOLPHIN
P	6742.	80	6660	1	138.7	6660				67.5.8.259	P	137.7	5.5	135.	1	135.0	6750		ΠH = 2 DR.
S	299.0	o	299.0	1/2	149.5	7176				67.5.8.289	B	187.2	12.	180	4/3	135.0	6750		C
									CAST OF BAG GN. PORPH. ASIPA ATROMANIOY	66.5.4.21	P	340.5	3.	337.5	3/2	135.0	6750		C FEM. HEAD.

The divisions may be noted between the PEYEM and DARIC at 125.8 and 127.4 and the DARIC and STATER at 130.8 and 132.4.

REGISTER											KHOIRINE, CHIAN, PERSIAN.										
REGISTER	M	GRS.	CH.	ORIGIN	X	UNIT	MINA	PL.	DETAIL	REGISTER	M	GRS.	CH.	ORIGIN	X	UNIT	MINA	PL.	DETAIL		
T.B.396	P	410.5	5	405	3	135.0	6750	A	IIIH = 6 DR.	68.1.10.80	P	212.2	22	210.5	3U	168.4	8420	C			
T.B.375	P	1347.5	9	1350	10	135.0	6750	A	B	67.5.8.336	S	29.3	0	29.3	1S	168.6	8430				
T.B.391	P	842.1	7	845	M/8	135.2	6760	A	1/2 CRESCENT	68.1.10.106	M	8476	0	8476	M	169.5	8476	KM	DUCK		
T.B.372	P	1696.9	7	1690	25/2	135.2	6760	A	CRESCENT		S	89.2	0	89.2	3S	171.3	8573				
67.5.8.222	P	3399.6	60	3389	25	135.6	6778	A	ΔHMO TORTOISE	68.1.10.134	B	175.7	3.5	172.2	2K	172.2	8610				
67.5.8.223	P	1686.5	22	1695	25/2	135.6	6780	A	OMHA 1/2 "		S	358.8	0	358.8	U/2	172.2	8611				
T.B.390	P	852.2	2.2	850	M/8	136.0	6800	A	OMHA OWL		S	179.5	0	179.5	U/4	172.3	8616				
T.B.393	P	540.0	10	545	4	136.2	6812	A		68.1.10.72	P	2167.2	24	2159	3U	172.7	8636	C	Δ = QUARTER		
67.5.8.231	P	1675.9	47	1705	25/2	136.4	6820	A	1/2 AMPHORA		S	360.1	0	360.1	U/2	172.8	8642				
52.9.1.18	P	4576.8	19	4558	2M/8	136.7	6837	A		67.5.8.347	S	181.1	0	181.1	U/4	173.8	8692				
NEIKO	MOC	MA	PK	OM	AFODPA	NOM	WN	NE	BAAEYC		S	344.7	7	350	4K	175.0	8750				
67.5.8.227	P	1714.6	12	1712	25/2	137.0	6848	A	1/2 TORTOISE	67.5.8.319	S	2208.8	3	2209	3U	176.7	8836				
T.B.361	P	7044	11	685	5	137.0	6850	A	EX		S	2342.6	1	2343.6	3U	187.5	9374				
68.1.10.85	P	2219.3	23	2196	16	137.2	6862	C	H												
69.1.10.3	P	4590.5	40	4587	2M/8	137.6	6880	A	MNA DOLPHIN												
67.5.8.234	P	1139.6	13	1147	M/3	137.6	6882	A	TPITH AMPHORA												
53.6.16.1	B	41507	425	41300	6M	137.7	6883	H													
ΘΕΟΙΞ ΕΒΑ	ΕΑ	ΣΤΟΙΞ	ΚΑΙ	Τ	Α	ΜΟ	Α	ΡΑ	ΝΟΜΟΥΝ ΤΡΗΝ												
ΚΑΛΑΔΙ	ΟΥ	ΡΟΥΦΟΥ	ΚΑΙ	ΤΕΡ	ΤΙΟΥ	ΒΕ	ΚΙ	ΛΙΟΥ.													
65.7.20.111	P	4599.8	50	4590	2M/8	137.7	6885	A	AMPHORA												
T.B.365	P	3458.6	35	3445	25	137.8	6890	A	BUCKLER												
W.T.1109	P	4596.5	12	4595	2M/8	137.9	6893	A	AMPHORA												
68.1.10.87	P	1386.8	7	1380	10	138.0	6900	C	DOLPHIN												
68.1.10.89	P	557.6	13	552	4	138.0	6900	C													
T.B.364	P	3478.3	20	3450	2.5	138.0	6900	A	OMBA TORTOISE												
65.7.20.112	P	3453.8	50	3460	2.5	138.4	6920	A	MNIMA DOLPHIN												
T.B.389	P	865.5	6	869	M/8	139.0	6952	A	ROSETTE												
76.5.10.4	P	1697.6	50	1740	25/2	139.2	6960	SY	ANTIOKEION TETAPT. ANCHOR												
67.5.8.219	P	6958	75	6990	50	139.8	6990	A	DOLPHIN												
66.5.4.1	P	7910	5	7005	50	140.1	7005	C	WITH BRONZERING												
66.5.4.12	P	897.9	22	876	M/8	140.2	7008	C	MNA DOLPHIN												
67.5.8.253	P	282.0	6	281	2	140.5	7025	A	TT												
T.B.371	P	1765.8	15	1759	25/2	140.7	7036	A	III BAEG, III ATT.												
68.1.10.93	P	422.0	2.7	422	3	141.0	7050	C	HMITETAP, 1/2 TORT												
T.B.388	P	881.3	4	882	M/8	141.1	7056	A	DIOTA												
83.10.1.1	B	707.1	1	708	5	141.6	7080	Co	ΕΔΟΔΤΟ, 1/2 BAEM												
66.5.4.4	P	3556.9	12	3545	2.5	141.8	7090	C	ΔΣ LION, FAUNE												
T.B.387	P	880.0	7	887	M/8	141.9	7096	A	PLUGGED												
T.B.	P	7161	26	7167	50	143.3	7167	A	AOMO CORNUCOP.												
67.5.8.225	P	1800.4	4.4	1796	25/2	143.7	7184	A	MNA DOLPHIN												
T.B.386	P	898.7	5	898	M/8	143.7	7184	A	HMITE 1/2 TORT.												
68.1.10.97	P	143.6	4.7	143.9	1	143.9	7195	C	1/4 AMPHORA												
65.7.20.115	P	1807.5	15	1808	25/2	144.6	7232	A													
68.1.10.101	P	723.4	2.8	7250	50	145.0	7250	C	HMIT 1/2 TORT.												
T.B.385	P	908.0	7	910	M/8	145.6	7280	A	1/2 CRESCENT												
T.B.384	P	914.1	33	911	"	145.8	7288	A													
67.5.8.228	P	1835.4	10	1836	25/2	146.9	7344	A	HMIT 1/2 TORT.												
T.B.383	P	921.4	5	921	M/8	147.4	7368	A	1/2 CRESCENT STAR												
T.B.382	P	925.0	2.5	922.5	M/8	147.6	7380	A	OMBA OWL												
67.5.8.226	P	1868.6	30	1848	2.5	147.8	7392	A													
T.B.395	B	449.8	1.8	448	3	149.3	7467	H													

NECEF, MINA OF AELIAN, ISLAND MINA.																			
REGISTER	M	GRS.	CH.	ORIGIN	X	UNIT	MINA	PL.	DETAIL	REGISTER	M	GRS.	CH.	ORIGIN	X	UNIT	MINA	PL.	DETAIL
67.5.8.251	P	228.5	7	234	3/2	156.0	7800	C	*I-I-I	67.5.8.229	P	1248.1	14	1244	M/8	199.0	9952		
68.1.10.100	P	7853	40	7810	50	156.2	7810	C		T.B.570	P	301.8	4	299	3/2	199.3	9967		
68.1.10.104	P	7901	50	7915	50	158.3	7915	C	FULL FACE, OWL										
	P	3949.2	10	3959	2.5	158.4	7918	A	1/2 AMPHORA										
66.5.4.6	P	3978.6	6	3985	2.5	159.4	7970	C	ΔHMO, AMPH.										
	B	162.7	1.3	162.9	1	162.9	8145												
87	B	165.7	27	163	1	163.0	8150												
78.10.19.293	Sy	2036.7	36	2047	25/2	163.8	8188		1/2 AMPHORA										
	Sy	2048.5	8	2049.3	25/2	164.0	8197												
82.12.4.7	M	166.2	1	166.2	1	166.2	8310												

BEQA AS UNCIA OF LIGHT LITRA OF HESYCHIOS AND POLLUX.																				
REGISTER	M	GRS.	CH.	ORIGIN	X	UNIT	MINA	PL.	DETAIL	REGISTER	M	GRS.	CH.	ORIGIN	X	UNIT	MINA	PL.	DETAIL	
67.5.8.348	B	95.0	1.5	95.7	U/2	191.4	2297		S = SEMIS	67.5.8.327	S	206.9	0	206.9	U	206.9	2483			
4.8.3.15.2	B	2314	50	2350	1	195.8	2350		*S = SEMIS OF HEAVY UNC.	67.5.8.305	S	593.3	50	640	3U	213.3	2560			
67.5.8.277	B	33.0	2	33.0	5	198.0	2376		NAVI PIG.											
67.5.8.248	P	404.2	3.6	405.6	2U	202.8	2434		A = 1 SEXTULA											
	S	68.2	0	68.2	2.5	204.6	2455		B = 2 UNCIAE											
	S	206.9	0	206.9	U	206.9	2483		* = 2 SEXT.											
	S	640	0	640	3U	213.3	2560		* = 1 UNCI.											
									* = 3 UNCI.											

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REGISTER	M	G.R.S.	CH.	ORIGIN	X	UNIT	MINA	PL	DETAIL	REGISTER	M	G.R.S.	CH.	ORIGIN	X	UNIT	MINA	PL	DETAIL
BEQA 1/2 ROMAN UNGIA.										S. SCRIPULA UNGIA N. NOMISMA. L. LIBRA									
68-1-10-130	B	297-7	2	298	6N	298	3576	C	SOL.VI-6 SOLIDI	68-1-10-149	B	831-0	30	810	2U	4090	4860		SOL XII
67-5-8-339	S	52-2	2-7	50-1	N	3004	3607		Napocopa		S	810-2	-3	810-5	2U	4052	4863		
68-1-10-131	B	52-0	2	53-3	N	319-8	3838		N		S	405-5	0	405-5	U	4055	4866		
	B	352-7	1-0	352-8	U	352-8	4234		Γ+Α = Loup	68-1-10-147	B	201-6	2-0	202-8	3N	4058	4867	C	BI = 12 SCRIP.
67-5-8-340	B	60-3	-6	59-7	N	358-2	4298		N		S	2265-8	1698	2435-0	5L	4058	4870		
	S	46-0	0	46-0	3S	368-0	4416		• = 3 SCRIP.	68-1-10-148	B	206-2	3	203	3N	4060	4872		Σ A
	B	60-9	1-1	62-0	N	372-0	4464		SOL. II		B	404-2	1-8	406	U	4068	4872		Σ A
78-10-19-290	B	124-4	1-7	124-1	2N	372-3	4468			68-1-10-148	B	404-0	2	406	U	4060	4872		
67-5-8-285	B	186-5	-7	187-2	3N	374-4	4492		X = 10 SCRIP.		S	203-0	1-1	203-2	3N	4064	4877		
	B	375-2	1-8	377	U	377	4524		NS = 6 NOM.	73-7-9-1	S	406-6	0	406-6	U	4060	4879		
50-1-7-70	B	379-7	20	379	U	379	4548				S	969-8	60	976-0	2L	4067	4880		{ EXAVC. Q. IVNI. RUSTICI. PRAEF. VNB. X • = 12 NOM
68-1-10-82	P	379-2	-4	379	U	379	4548	C	A = 1 UNC.		B	813-2	-3	813-5	2U	4067	4881		+ AHDI
67-8-10-12	S	1148-2	-3	1148	3U	382-7	4592		0 R0	68-1-10-86	P	1626-5	12	1630	4U	407-5	4890	C	Δ = 4 UNC.
	S	1534-7	0	1534-7	4U	383-7	4604				S	244-64	20	244-84	5L	408-0	4897		• = 2 UNC.
	B	64-2	-4	64-2	N	385-2	4622			68-1-10-125	B	821-7	5	817	2U	4085	4902		N + 5
	S	2311-9	0	2311-9	6U	385-3	4624			67-5-8-281	B	408-0	-7	408-7	U	4087	4904	C	
50-1-7-71	B	379-7	20	386	U	386	4632				B	815-3	2-2	817-5	2U	4087	4905		
67-5-8-283	B	386-0	16	387	U	387	4644				S	1228-4	0	1228-4	3U	409-4	4914		Δ 1/4 LIB.
68-1-10-127	B	393-0	6	387	U	387	4644				S	1474-3	-1	1474-4	3L	409-6	4915		
68-1-10-121	B	206-3	12	194	3N	388	4656	C	TH	67-5-8-275	B	490-27	145	491-70	10L	409-7	4917		{ EXAVC. Q. IVNI. RUSTICI. PRAEF. VNB. Γ A 2 BUSTS V = 5 LIB.
78-10-19-287	B	392-2	-4	388	U	388	4656		• = 1 UNC.		B	410-1	-3	409-8	U	409-8	4918		
48-8-19-201	B	388-8	-7	389-5	U	389-5	4674		Σ A, OΥΥΥΙΑ I Γ A, " " "	67-5-8-323	S	2458-9	-2	2459-1	5L	409-8	4918		
67-5-8-273	B	391-6	1-0	391-5	U	391-5	4698		EΥT... AA = LIB.		S	491-0	10	492-0	L	410-0	4920		
67-5-8-297	B	464-5	55	470-0	L	391-7	4700				S	136-4	2-3	136-7	2N	410-1	4921		NB
	B	660	1-0	654	N	392-4	4709			67-5-8-230	P	410-8	0	410-8	U	410-8	4930		- = UNC.
	M	1181-4	0	1181-4	3U	393-8	4726				S	410-8	0	410-8	U	410-8	4930		-
	S	2362-9	1-5	2364-4	6U	394-1	4729		V	67-5-8-230	S	810-0	26	822	2U	410-0	4932		B = 2 UNC.
67-5-8-316	S	2353	12	2365	6U	394-1	4730		{ VIR. CL. EX. A. IVNI. R. PR. VR. IN = 10 NOM.		S	2459-9	6	2466	6U	411-0	4932		S = SEMIS
67-5-8-290	B	98-1	17	98-4	U/A	394-4	4732		I LIBRA	67-5-8-327	S	2469-5	0	2469-5	6U	411-6	4939		X
67-5-8-321	S	4731	3	4734	L	394-5	4734		- I SOL 9 = 6		S	1231-6	3-4	1235	3U	411-7	4940		• = 3 UNC.
61-5-20-1	S	394-6	-5	395	U	395	4740			67-5-8-314	S	1646-6	0	1646-6	4U	411-7	4940		• = 4 UNC.
67-5-8-321	S	4746	-1	474-7	L	395-6	4747			67-5-8-315	S	2471-3	-4	2471-7	6U	411-9	4943		S
68-1-10-128	B	92-4	6-6	99	U/A	396	4752			67-5-8-300	B	412-3	0	412-3	U	412-3	4947		•
68-1-10-151	P	802-2	9	793	2U	396-5	4758	C	BALL + LOOP		S	1965-7	130	1979-0	4L	412-3	4947		EYTYXID. L Δ
	B	66-7	-6	66-1	N	396-6	4759			67-5-8-353	S	1237-4	0	1237-4	4U	412-4	4950		
	B	198-0	-8	198-4	3N	396-8	4761			83-11-10-1	L	1485-0	0	1485-0	3L	412-4	4950		III
	S	1191-8	-2	1192	3U	397-3	4768			67-5-8-326	B	4948-7	2	4951	L	412-6	4951		Ro XI
68-1-10-124	B	395-8	6	397-4	U	397-4	4769	C	N Γ = 3 NOM.		B	990-3	0	990-3	2L	412-7	4951		
67-5-8-270	B	794-1	1	795	2U	397-5	4770		•		B	34-0	-4	34-4	2S	412-8	4954		IB = 12 SILIAYAE
	S	4783	6	4789	L	399-1	4789			67-5-8-326	B	1239-3	2	1239	3U	413-0	4956		Σ Γ
50-1-17-73	B	798-9	2-7	798-4	2U	399-2	4790		- II, SOL XII	67-5-8-326	S	1648-6	3-5	1650	4U	412-5	4950		•
67-5-8-318	S	2396-0	0	2396-0	6U	399-3	4792			68-1-10-150	B	124-0	0	124-0	3U	413-3	4960		•
	B	66-8	-2	66-6	N	399-6	4795				S	211-4	5	207	3N	414-0	4968		C
	B	199-7	1-2	199-9	3N	399-8	4798		S = SEMIS	67-5-8-320	S	2484-4	-3	2484-7	6U	414-1	4969		S II
	B	403-2	7	400	3N	400	4800		S = SOLIDVS	67-5-8-354	S	4969-1	-2	4969-3	10L	414-2	4969		X 10 LIB
T.B. 1093	S	4801	0	4801	L	400-1	4801	Ro			S	14911	0	14911	3L	414-2	4970		•
	B	133-2	1-2	133-4	2N	400-2	4802			82-12-4-2	S	4977-7	100	4971-0	10L	414-3	4971		X 10 LIB
78-10-19-271	B	1189-7	11	1201	3U	400-3	4804		SOL II	67-5-8-310	S	1243-2	0	1243-2	3U	414-4	4973		•
	B	800-5	-5	801	2U	400-5	4806		Σ Γ OΥΥΥΙΑ 3		B	51-7	-6	51-8	U/B	414-4	4973		{ TIBERIANI. PROC. MENATIS. PRAEF.
	S	1443-4	-2	1443-6	3L	401-0	4812		III = 3 LIB.	W.T. 1759	B	829-0	1	829	2U	414-5	4974		
	B	664-1	5	669	10N	401-4	4816				S	1492-4	-1	1492-5	3L	414-6	4975		III
50-1-17-69	B	803-0	0	803-0	2U	401-5	4818		N I = NOM. 10	67-5-8-276	B	138-4	-8	138-3	2N	414-9	4978		LYONS SET. FEB. END NB
50-1-17-74	B	399-1	2-6	401-7	U	401-7	4820		VSLDN. SOL XII		B	414-7	1-4	414-9	U	414-9	4979		
82-12-4-5	S	4822	0	4822	L	401-9	4822		• LSP...		S	2483-9	-5	2489-5	5L	414-9	4979		V
68-1-10-137	B	398-8	3	402	U	402	4824	C		67-5-8-299	B	5206	270	4980	L	4150	4980		ASTRAGALVS
	B	803-1	3	804-5	2U	402-2	4827		Σ A	67-5-8-357	S	14806	134	14940	3L	415-0	4980		EYT... A Γ
	B	804-5	-5	805	2U	402-5	4830		E S - CA		S	1994-0	0	1994-0	4L	415-4	4985		
66-5-4-13	B	806-1	-5	805-6	2U	402-8	4834			67-5-8-329	S	206-5	1-3	207-8	3N	415-6	4988		
67-5-8-349	S	201-5	0	201-5	3N	403-0	4836		Γ + B	67-5-8-312	S	1248-8	0	1248-8	3U	416-3	4995		
	B	201-8	1-4	201-5	3N	403-0	4836		S = SEMI-UNC.		S	4639	3-60	5000	L	416-7	5000		
	S	2419-6	0	2419-6	6U	403-3	4839		BI = 12 SCRIP.	67-5-8-355	S	2500-1	-2	2500-3	5L	416-7	5001		V
82-12-4-4	S	2353-4	670	2420-0	5L	403-3	4840		S = SEMIS	68-1-10-129	B	105-3	1-1	104-2	U/A	416-8	5002	C	
78-10-19-274	B	801-5	55	807	2U	403-5	4842			78-10-19-272	B	417-9	1-1	416-8	U	416-8	5002		Y A
	S	968-5	0	968-5	2L	403-5	4842		Σ B		L	1999-8	15	2001-3	4L	416-9	5003		IIII
	B	674	-7	673	N	403-8	4846			67-5-8-291	B	830-2	7	834	2U	417-0	5004		EYT IB NOM - 12
	B	84-0	1-5	84-7	0	404-0	4848		• = 4 SCRIP										

REGISTER OF WEIGHTS, BRITISH MUSEUM. UNGIA, SELA.

Table with columns: REGISTER, M, GRS., CH., ORIGIN, X, UNIT, MINA, PL., DETAIL. Contains weight records for various items with numerical and alphanumeric data.

SET OF LEAD SCRIPULA, LOYASSE, LYONS.

Table with columns: REGISTER, M, GRS., CH., ORIGIN, X, UNIT, MINA, PL., DETAIL. Lists lead scripula weights with specific measurements and stroke counts.

SELA, HEAVY PHOENICIAN MINA.

Table with columns: REGISTER, M, GRS., CH., ORIGIN, X, UNIT, MINA, PL., DETAIL. Records heavy Phoenician mina weights.

SELA, LIGHT PHOENICIAN MINA, UNGIA M. MINA

Table with columns: REGISTER, M, GRS., CH., ORIGIN, X, UNIT, MINA, PL., DETAIL. Records light Phoenician mina and Ungia m. mina weights.

SELA. 2 BREASTS (BR) WITH BAR HANDLE (H).

Table with columns: REGISTER, M, GRS., CH., ORIGIN, X, UNIT, MINA, PL., DETAIL. Lists Selma 2-breasted weights with bar handles.

SELA. DISC WEIGHTS, CARTHAGE.

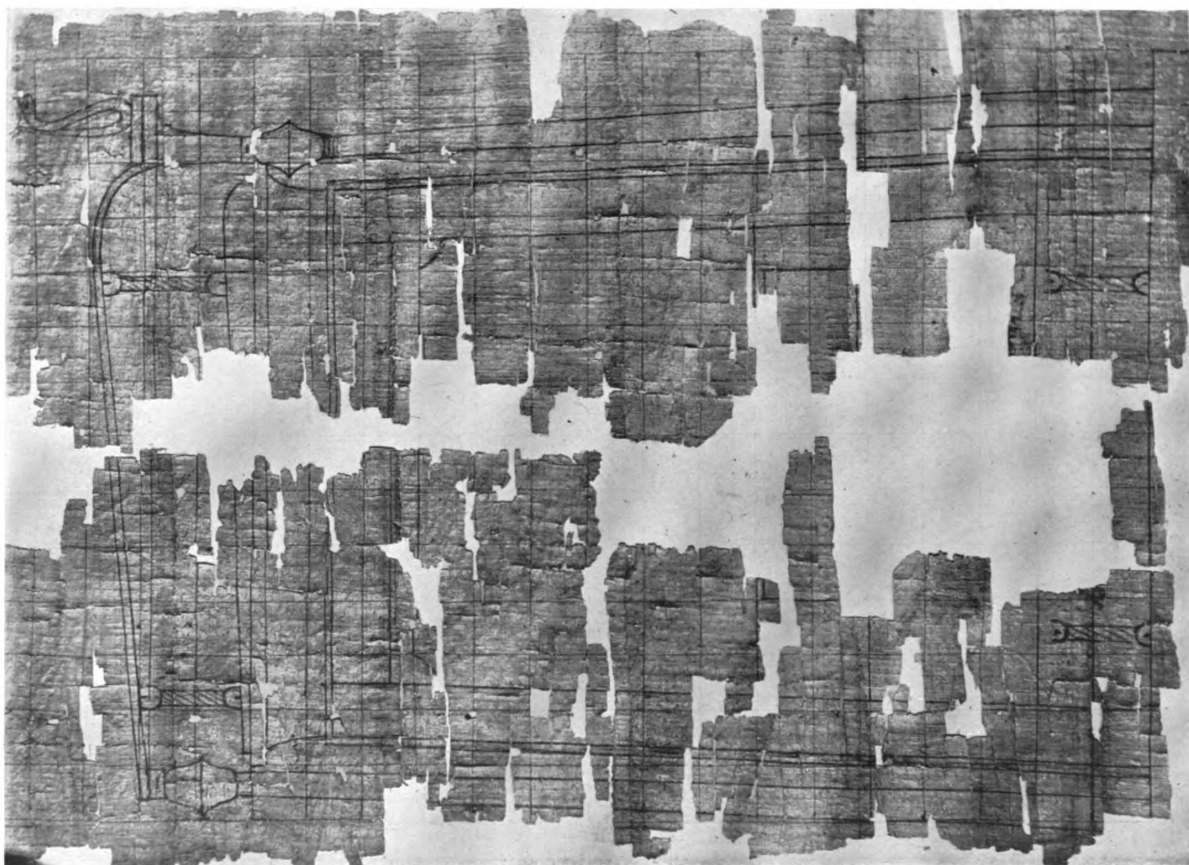
Table with columns: REGISTER, M, GRS., CH., ORIGIN, X, UNIT, MINA, PL., DETAIL. Records Selma disc weights from Carthage.

BRONZE SERIES.

Table with columns: MARK, REGISTER, M, GRS., CH., ORIGIN, X, UNIT, MINA, PL., DETAIL. Lists bronze series weights with various marks.



FRONT VIEW



SIDE VIEW

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