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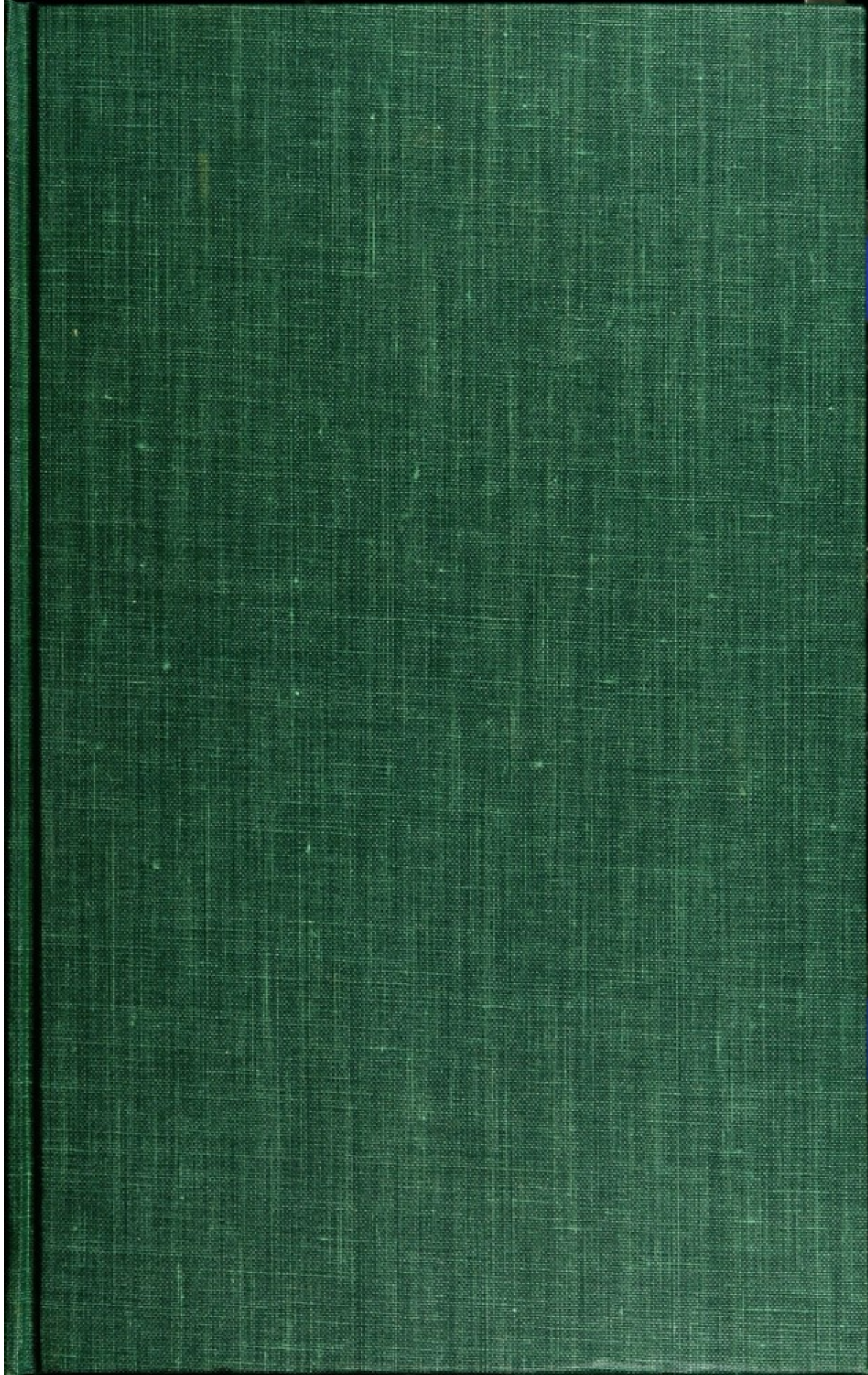https://wellcomecollection.org/works/xmqsccqn
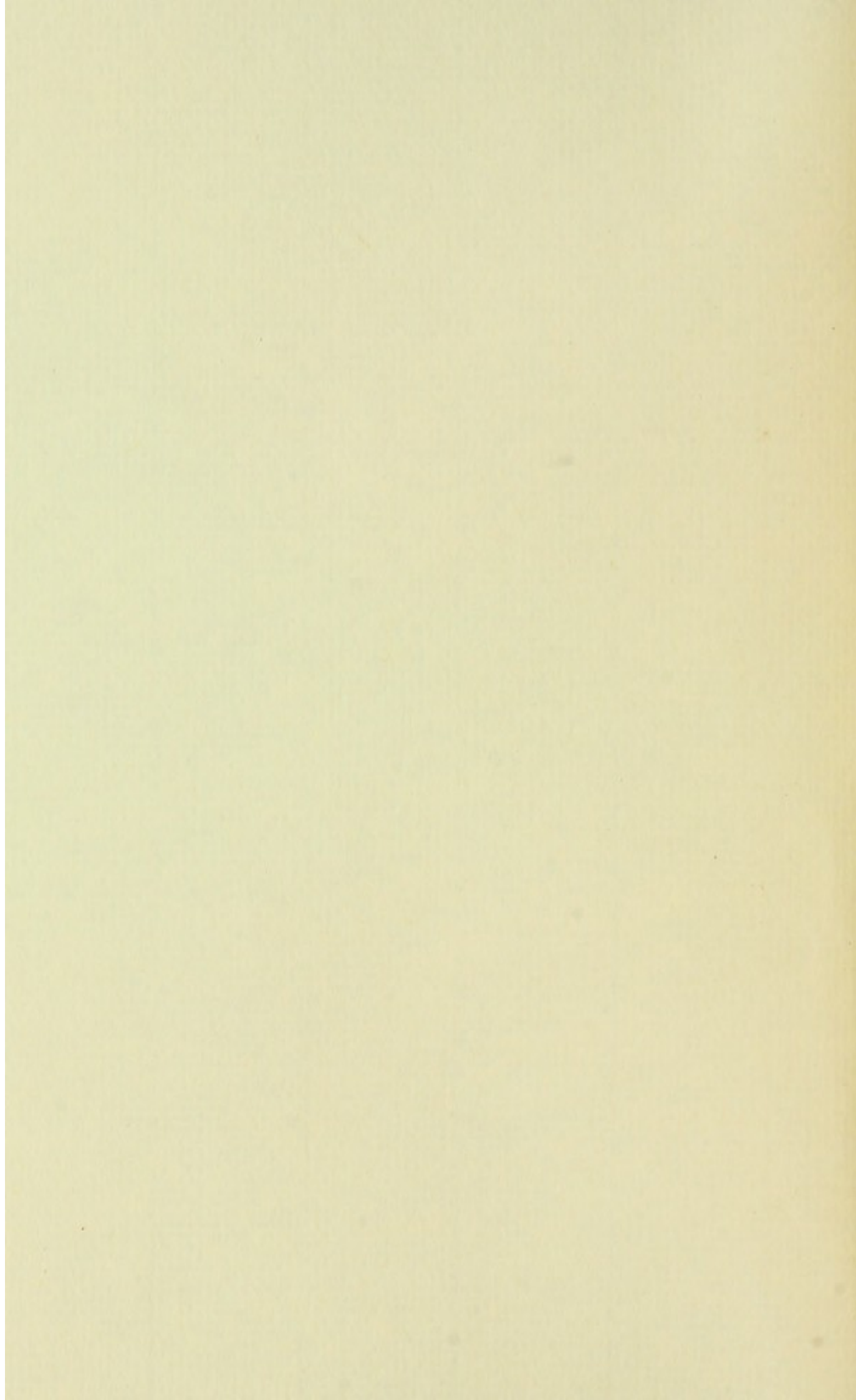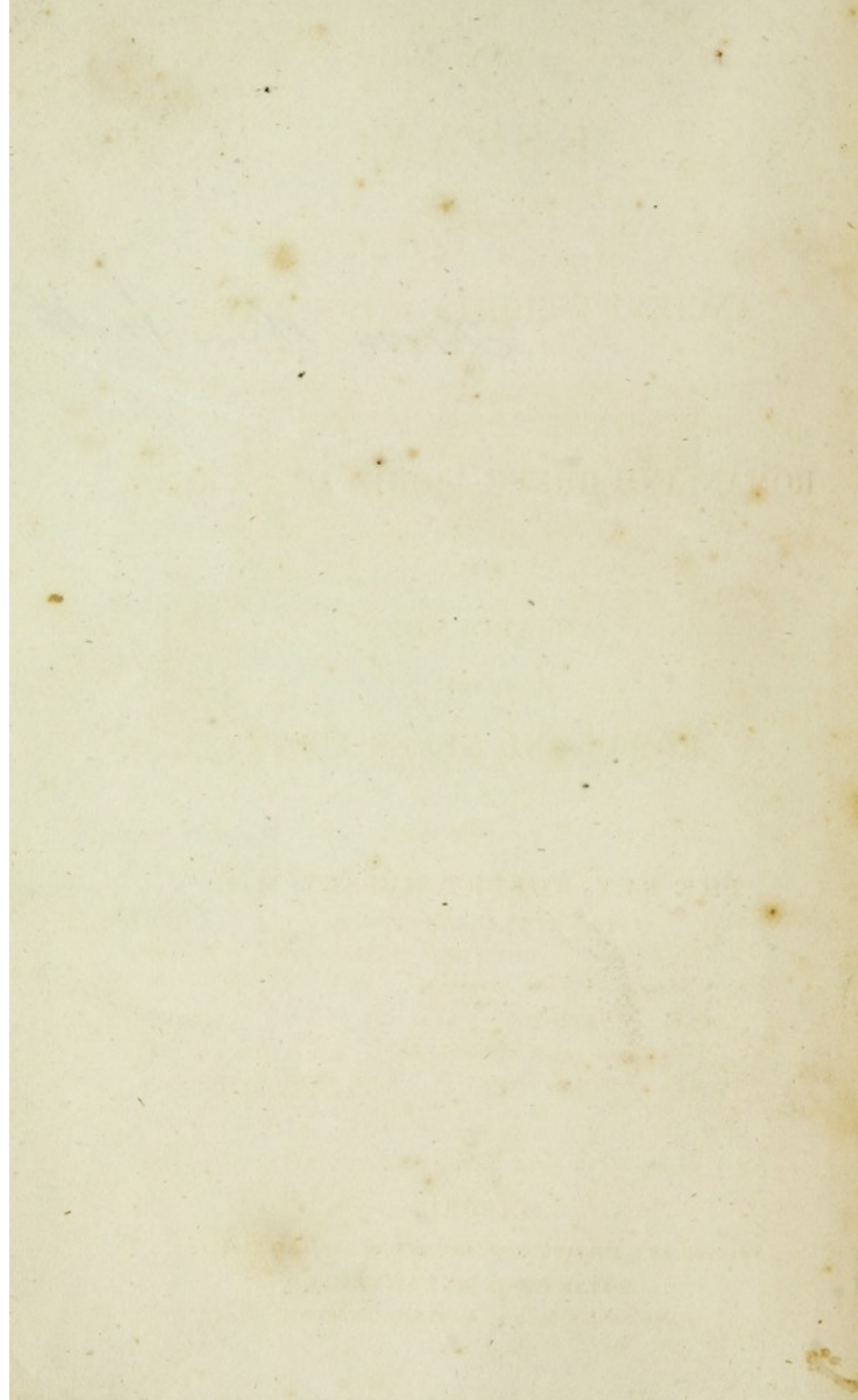
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AN

ESSAY

ON THE

ANCIENT WEIGHTS AND MONEY,

AND THE

ROMAN AND GREEK LIQUID MEASURES,

WITH

AN APPENDIX

ON THE

ROMAN AND GREEK FOOT.

BY

THE REV. ROBERT HUSSEY, M.A.

STUDENT OF CHRIST CHURCH.

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—— χρὴ δὲ καθ᾽ αὑτὸν αἰεὶ
παντὸς ὁρᾶν μέτρον.   PIND. PYTH. ii. 62.

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PREFACE.

It has long been complained, that there is no convenient work containing a good account of the ancient money. And most persons who have had experience in teaching must have seen the effect of this want upon those who learn, in the prevailing ignorance of the subject. It is a very common thing, to find even those who are well informed on many points of scholarship and ancient history at a loss, whenever terms of money and weight occur. If these convey any ideas at all, they are often strangely inaccurate: drachmæ and minæ, or sestertii and sestertia, pass, all alike, for signs of value of precisely the same kind; or, talents of money and talents of weight are mistaken one for the other; and thus coins, money of account, and weights, are mingled in the thoughts of the student in hopeless confusion. The authorities, to which recourse is usually had for information, will not readily correct this: for they have mistakes of their own [a]; and neither the method

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[a] One specimen may be quoted, which perhaps surpasses all in the skill with which it crowds many blunders in a small compass, if, at least, the English translation of the work may be trusted. Beausobre's Introduction, in the chapter on the Hebrew money, says, that the drachma was a silver coin rather less than the denarius, and weighing 8 oz.; that the denarius weighed 10 oz.; that

of reckoning, nor the arrangement used in them, is well fitted to give knowledge in a clear and easy way. What, for example, can be worse chosen, than reckoning the weight of the talents in pounds of troy weight? To which standard some readers would attach no definite idea of value, because they are not used to it; some, through inadvertency, would confound it with the common avoirdupois standard, and thus overrate the result by nearly one fourth [b]. And the meagre tables, which commonly are the only things used, are often scarcely understood, and soon forgotten.

Yet it cannot be said that there is a want of books full of information on this subject. Perhaps no one of the lesser branches of history and philology has had more written about it, than the ancient money. So early as 1675 Labbe, in his Bibliotheca Nummaria, made up a list of nearly 200 writers on the weights and money, beside a not much smaller number of authors on coins : and many works have been added since this was published. Few of these, however, are in form and design fitted for general use, as books of reference; and the few which are so are not now easy to get. It was to supply this want, therefore, that the present work was undertaken : and the object

the sestertius was worth $2\frac{1}{2}d.$, the denarius $7\frac{3}{4}d.$; and that there were minæ of gold weighing 100 shekels, which, according to his own calculation, would amount to 3200 oz.

[b] In Arbuthnot's tables, however, one mistake compensates for another, and in practice corrects it. He rates the Attic talent of weight at 56 lb. 11 oz. in troy weight, which is about one fourth too light; but when it is taken, as it usually is, for common or avoirdupois weight, it is nearly the true weight.

which has been kept in view throughout is, to furnish students with a manual, containing in a commodious shape all the information concerning weights and money, necessary for reading the classical authors of the best ages. For the subject of the weights is inseparable from that of the money; not only, because they were originally the same, but also, because, afterwards, terms common to both meant things quite distinct, which, as has been already said, are often confounded.

In a field already so well trodden, it would be absurd to make any pretensions to originality. The labours of former writers have been used without scruple: and the only novelty consists in condensing and arranging what others have said before. The aid of the coins, however, has been called in, wherever it could be done, to verify or correct the statements of authors: and a pretty large examination of them has enabled me, as I believe, to set right some few mistakes of long standing. But the work was not taken in hand for the sake of these. If any readers wish to go deeper into the subject, than a book for general use can lead them, the way will be shewn them, partly by the short account of writers on the ancient money given in the introductory chapter, which was placed there for this purpose, and partly by the references in the margin of the book to the sources from which any information is drawn: although the multiplying these references unnecessarily has been avoided, and many names left out of writers, who have followed each other in repeating some well-known fact or opinion.

The plan of the work is very simple. The Greek weights are treated of first, beginning with the Attic, which are followed by those of the other standards. After these comes the Greek money, the Attic first, and then those coinages of the other states, which are either of importance enough to need notice on their own account, or may serve as samples of the separate currencies, from the value of which we may reckon the other species of Greek money. The gold money is described after the silver, and the copper after that; for each of the three metals has a distinct history concerning its own circulation in Greece. The same order is followed in what relates to the Romans and the Hebrews. The weights are computed first, and then the money: but the three metals are not thrown into different chapters, but discussed together, so far as is needful, under the general head of money.

The calculation of the measures for liquids grew out of the settling of the weight of the Roman pound by means of the congius. The method is so simple, and the result so certain, if we may trust the authority of the ancient writers who give the proportions, that it seemed fully worth while to add this table, although the work was not designed to embrace the ancient measures in general.

The chapter on the measures of length forming the Appendix, is compiled from the best authorities among modern writers on the subject. This, too, may perhaps seem an excrescence upon the original plan. And certainly, since the few tables of measures of length in general use are, upon

the whole, correct enough for common purposes, there is not so great need of this as of the other calculations. But really there is a great want of information on the subject of the measures of length, as well as the weights and money; which is reason enough for making this addition to a work intended to be generally useful. And, at the same time, it will be interesting to some, and profitable perhaps to many, to be presented with a short summary of the researches which have been made into this part of the subject, and to have not only the results, but also the methods of the calculations set before them.

Some objection may perhaps be made against the manner in which the ancient money is valued, namely, by comparing it with our own silver currency; because the latter passes for rather more than the true value, and therefore will lead to overrating the ancient coins. It is true that in reckoning large sums in ancient money, the difference between the value in our silver coin and the value at the market-price of silver would be perceptible; and if strict accuracy were required, it would sometimes be necessary to take account of this. But, practically, all our ideas of value are measured by the representatives of value to which we are accustomed, that is to say, by the coins current among us; and if we wish to form in the mind a notion of the real value of the talent weight of silver money, we do so by thinking how many of our own shillings so much Greek or Roman silver coin is worth; and this estimate is correct; although if so large a sum were to be paid in

English money at this day, it would be reckoned by a different standard, namely, that of the gold currency. It is evident that the comparison with our silver money is, practically, the only way of valuing the *small* sums in ancient money, such as the single coins of silver. Moreover, it is to be considered further with regard to the large sums, that in late times they were sometimes (we do not know how often) paid in gold; in which case they were reckoned by a comparison between gold and silver, in which gold was much lower than it now is; so that, whenever this happened, the quantity of gold actually paid (as, for the worth of so many talents of silver, for instance) would exceed the value which the abovementioned method of valuation assigned to the ancient silver. But after all, the method used here cannot well lead to error; because the value of the money is reckoned in all cases by finding the quantity of pure silver by weight in each species of coins; of which the market price may be calculated, as easily as the worth of it in our own silver coin: and thus, although the latter is always taken for the tables, because, as has been said, it really measures our ideas of value, the other may be readily used if preferred.

The decimal notation has been used, almost always, for the fractional parts, instead of vulgar fractions, for the greater convenience both of printing and reckoning. It is to be presumed that few readers will find this a difficulty. Engravings, by way of specimens, of the coins described, have not been added, because they would have

needed much time and trouble to prepare, and raised the price of the book; while, at the same time, any good work on coins with plates would better answer the same purpose of shewing the figures of the ancient money; and half an hour's sight of a good collection of coins would give more knowledge than either.

That the work was composed in the hours which could be spared from somewhat laborious occupations, is not more than has been said of many greater and well executed works. But, however trite the excuse, it may honestly be pleaded for defects or oversights; for certainly the book would have had a better chance of being correct and complete, had not the preparation of it been often broken off by long intervals of time wanted for other things.

Those who will take the trouble to follow up the subject, and examine the larger works upon it to any great extent, will not be likely to be very harsh critics: for they will know how dry and repulsive great part of the inquiry is, how full of perplexity, contradiction, and uncertainty, and how great is the difficulty of binding down such " Proteus" forms as the symbols of value in money terms in the chains of system. The knowledge of coins, indeed, takes a high sounding name, and " Numismatology" has followers who think it a " *delightful science*[c]." But few of those who have ventured far into the mazes of the ancient monies,

[c] Sestini, too, calls it " questa nobilissima scienza." Sopra le Medaglie Relative alla Confederazione degli Achei, p. 21.

have found many charms in the pursuit [d]; in which the scales must often be the standard of taste, and arithmetic the rule of interpretation. Let therefore the attempt to separate truth from error on this " wearisome but needful" subject, and to bring it into order in a correct and convenient shape, be judged γνώμη τῇ ἀρίστῃ.

I beg leave, in conclusion, to express my thanks to those gentlemen, who have the care of such public collections of coins as I have consulted in the course of my inquiries. I owe this especially with regard to the British Museum, where, in frequent visits, I always met with a courtesy and attention worthy of that magnificent establishment. I owe much also to the kindness of the Librarian of the Bodleian Library. And at the Hunterian Museum at Glasgow, and at the Royal Library at Munich, I found the greatest urbanity and readiness to assist me, by giving all possible information.

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[d] See Hotoman De Re Num. p. 106. and Pinkerton Pref. &c.

Ch. Ch., Feb. 5, 1836.

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ERRATA.

P. 3. l. 23. *for* Villalpandi's *read* Villalpando's.
P. 26. l. 11. *for* 2.35 grains *read* 2.77 grains.
P. 47. l. ult. *for* mint price *read* price.
P. 48. l. 5. *for* mint price *read* price.
P. 107. l. 14. *for* Appendus *read* Aspendus.
P. 145. l. ult. *for* Achæa *read* Achaia.
P. 188. l. 28. *for* kekkar *read* kikkar.
P. 235. l. 3. *for* παλαιστῆς *read* παλαιστὴς.

INTRODUCTORY CHAPTER.

1. THE ancient weights and money were a subject about which nothing was known, for some time after the revival of ancient literature in Europe. The value of the money, especially, seems to have been thought almost beyond the reach of inquiry; though it is said, that the practice of collecting ancient coins had begun as early as the days of Petrarch [a]. Budé claims the honour of being the first, who undertook a thorough examination of this obscure and perplexing question [b]. It had been already moved, and in part discussed, by Hermolaus Barbarus and Angelus Politianus, who had " sowed the seeds of the inquiry in their commentaries [c]:" but, if we may believe Budé himself, no one who had then touched upon it, had understood any thing about it. Indeed some who wrote after him, or about the same time, bear witness to the ignorance then prevailing on the subject: Portius says [d], few knew the mean-

[a] Schläger, in a letter " vom Werth oder Unwerth der Jüdischen Münzen," quoted in Rasche Lex. Rei Num. vol. ii. p. 514. in Ebræor. Num.

[b] De Asse fol. xi. ed. of 1516.

[c] Agricola De Mens. et Pond. i. p. 2.

[d] De Re Pecuniar. Antiq. Camerarius says, Portius wrote before Budé: Agricola says, after: " deinde Portio, jam edito libro Budæi, sua in lucem proferre." It appears from this, that Portius might have written as early as Budé; but the latter published first: Portius does not appear to have seen Budé's work. This may explain some of the disputes about originality on this subject. See Mr. Greswell's Early Parisian Greek Press, vol. ii. p. 50.

ing of denarius, mina, talentum, very few what ses-
tertia meant, and perhaps none could compare them
with modern money: and Camerarius[e] speaks despair-
ingly, of the attempt to obtain accurate results concern-
ing the value of ancient money. Budé's great work,
De Asse, was printed as early as 1516[f]; and the prin-
ciples which he there laid down are, in great part, the
foundation on which all writers after him have built.
He brought together the most important passages from
the classics, and on them constructed the system of
ancient money; and from the weight of a small num-
ber of coins, computed an unit of value, from which all
the money might be reckoned. There are, as might
be expected, some mistakes in his system, which fur-
ther inquiry in after times has corrected: one of these
is, his reckoning the Roman pound to have contained
100 denarii. But if this error be set aside, it is re-
markable how nearly his value of the Roman pound
weight, agrees with those assigned by the latest and
best calculators from the coins.

2. After Budé there soon followed many learned
men, who trod in his steps. Portius, Alciatus, Agri-
cola, Camerarius, and Cenalis[g], laboured in the same
cause; and each contributed something, by further ex-
amination of ancient writers and coins. But the coins
seem to have been chiefly Roman[h]; and the denarius

[e] De Re Nummar.

[f] De Romé de l'Isle says 1514. Pref. to Metrologie, p. 1. Labbe,
in his Bibliothec. Nummar. gives the date of the work 1522; but
his dates are sometimes incorrect. For more about Budé, see Mr.
Greswell's Early Parisian Greek Press, vol. ii.

[g] The early writers on the subject are enumerated in the second
part of Labbe's Bibliotheca Nummaria. Many of their works will
be referred to again in the next chapter. The most remarkable
only are mentioned here.

[h] These, that is, denarii, seem to have been more common then

and Attic drachma were generally reckoned equal, or, if there was a difference, the denarius was considered the largest[i]. Agricola is distinguished for having turned his attention to the important question, of the fineness of the metal of the coins: and he is the first who is related to have made experiments, for the sake of ascertaining this necessary point. About the middle of this century appeared the Dialogues of Antonius Augustinus, afterwards archbishop of Arragon: and before the end of it, many more valuable works: among which are to be distinguished those, of Arias Montanus on the Hebrew money, in his Antiquitates Judaicæ; Lucas Pætus, on the Roman weights and money; Aldus Manutius, on the drachma and sestertius; Bodin, in his Respublica; Budelius, who collected together into one volume many works of others on the same subject; the Historia Rei Numariæ of Hostus; Simler's vocabulary; Massarius' account of the medicinal weights; and Hotoman, De Re Numaria.

3. The seventeenth century added many more to the number of authors; and before long a great advance was made, towards a more complete knowledge of the subject. Villalpandi's learned treatise, on the whole system of the ancient weights and measures, came out in 1603. This was followed by the works of Waserius, Ciaconius, Snell, and, in 1614, Brerewood; which last, if remarkable for nothing else, deserves at least to be noticed, as the first attempt of an Englishman to draw up a system of ancient weights and money for himself. For the work which bishop Cuthbert Tunstall is said to have composed, was but an abstract of

than now. Portius (who was of Vicenza) says, " nullam putem esse provinciam in qua aliqui ex his non reperiantur." Re Pec. Antiq.

[i] Computed from that corrupt place in Livy, xxxiv. 5[2].

Budé's; and that attributed to Henry Howard earl of Surrey, is altogether apocryphal. Scaliger's De Re Numaria, which was published in 1616, after his death, was one of the most valuable works that had yet appeared, for deep research into ancient writers upon the subject: particularly for bringing to light an unpublished work of Heron relating to weights and money; and the extracts which Scaliger made from the manuscript, have been repeatedly quoted from him by later authors. Salmasius' book, De Usuris, in 1638, also contained a great deal of information concerning the ancient money. In 1642 Selden drew up a short account of the different species of ancient money, and calculated the value of them in modern money; but he did not publish it. It was found after his death, by a bookseller named Pitt, and printed in 1675. And not long after this, in 1643, appeared the great work of Gronovius, De Pecunia Vetere; which, if it has not exhausted the subject, has at least served ever since for the standard book of reference, on all questions as to what the ancient writers have said concerning money. Mersennus, who made the ancient weights come into a kind of system of natural philosophy, produced his treatise De Mensuris et Ponderibus in the following year. All these writers, except perhaps the last named, had bestowed more pains on the examination of ancient authors, and collecting from them all the notices about money, than on the examination of the coins. But we come now to some who began to take up this latter part of the inquiry, and treat it with the attention which it deserved. Savot's " Discours sur les Médalles Antiques" is the fullest and best work that has yet appeared, on the quality and composition of the metals of the ancient coinages, and the relative values of the different species of money: it contains also many accu-

rate observations and calculations of the weights of the coins. It was published in 1627. But the greatest step towards an exact valuation of the ancient money, was made by Greaves, Savilian Professor of Astronomy at Oxford, in his work on the Roman foot and denarius, published in 1647. He first proved and insisted on the true difference between the Attic drachma and the denarius, after having examined many specimens of each coinage: and founded his whole system of values more on calculations from the actual weight of the coins, than on the statements of ancient writers; so as to make the former explain or correct the latter; instead of the reverse, which was the plan generally followed hitherto [k]. Before the end of the same century appeared Bouteroue's Recherches Curieuses des Monoyes de France, which, though not directly concerned with the ancient money, as the name shews, still contained some information about it; and two more works by Englishmen; that of Bernard, in 1688, which, though ill arranged, and dry and repulsive in form, is valuable for the many details in it concerning the coins which he weighed, and the short references to authorities on the subject; and that of Bishop Cumberland, which is a mere compilation.

4. In the beginning of the eighteenth century, in 1708, Eisenschmidt of Strasburg brought out an excellent little work, De Ponderibus et Mensuris, on Greaves' principles. He had carefully examined many coins, as well as writers, and calculated the results with great exactness; and he arranged the whole in a very judicious system, forming the best general manual on the ancient weights, money, and measures, which

[k] Greaves is not named in Labbe's Bibliotheca Nummaria, though his book had been in print twenty-eight years when that was published.

had been published up to that time. After him the
knowledge of the subject rather went back; at least
the writers did. Arbuthnot first published a set of
tables, about 1710; and afterwards added to them a
copious treatise, which he allowed his son to publish
in 1727. Meanwhile, in the interval between these
two, Bishop Hooper had produced his Enquiry into
the ancient measures, which Arbuthnot made some use
of in his second publication. Neither of these works
brought any new light to the question : neither of the
authors seem ever to have examined any coins. The
Bishop's system is learned, arbitrary, and theoretical :
Arbuthnot does not deserve the praise either of accu-
racy or deep research. He is indeed right in confess-
ing, as he does in the preface, that his work contains
many mistakes, but, unfortunately, wrong in saying
that they may be easily corrected by the principles con-
tained in the book itself. It is certainly remarkable,
that when Greaves and Eisenschmidt had so clearly
proved the difference between the Attic drachma and
the denarius, Arbuthnot, whom one might really sup-
pose never to have seen either coin, should pertina-
ciously go back and make them exactly equal. It was
impossible that any system should be correct, until
this difference was understood. Yet Arbuthnot's book
obtained a reputation above any work which had come
out before it, which it deserved less than any. It was
said at one time, to be " daily increasing in value;"
it was " in great vogue all over England;" and was
called " the so much celebrated work of Dr. Arbuth-
" not [1]." But what is really to be regretted, is, that it

[1] See Smith's " Remarks," in his De Re Nummaria, p. 142.
Langwith's " Observations on Dr. Arbuthnot's Dissertations on
" Coins," (published in 1747 by his wife, after his death,) were
written with the intention of finding fault with that work : but they
are not worth noticing. It seems as if Arbuthnot's calculations

has been the groundwork, or rather the very substance
of all the tables of ancient weights and money, which
have been in common use in schools and other places
of teaching in England, from that time to this.   The
tables at the end of Lempriere's Dictionary, which are
the common school authority (!), are all Arbuthnot's:
Encyclopædias follow him: writers on metals and
money are content to take his calculations: and all the
compilers of manuals of antiquities for young students,
tread with implicit deference in his steps; οὕτως ἀτα-
λαίπωρος τοῖς πολλοῖς ἡ ζήτησις τῆς ἀληθείας.

5. But towards the end of that century, the method
of examining coins was taken up again, and the study
of the ancient money placed on its proper footing,
where Greaves and Eisenschmidt had left it.   Many
French writers now engaged in the inquiry, and fol-
lowed it with characteristic energy. Barthelemy, Pauc-
ton, Dupuy, Le Beau, De la Nauze, and De Romé de
l'Isle, all published something on the subject ; but only
Paucton and de Romé de l'Isle attempted to embody sys-
tematic works.   Paucton's Metrologie is a bulky vo-
lume, and valuable for bringing together much infor-
mation from other writers ; but, with regard to the
weights and money, inaccurate, and often theoretical ;
for the author does not seem to have examined the an-
cient coins.   De Romé de l'Isle's work, which has the
same title, is, on the contrary, very valuable for con-
taining accurate tables of the weights of a great num-
ber of coins, and some weights ; but the attempt to
reduce them to a system is an utter failure, from the

were followed out of England too.   For in Mann's Tavole delle
Monete, de' Pesi, &c. published in the Opuscoli Scelti di Milano, xii.
p. 341, that part which relates to the value of ancient weights and
money, compared with the English, agrees exactly with Arbuthnot.
The date of Mann's work, which is only a compilation, is 1779.

author's ignorance of the classics. He was not a scholar by education; but got all his scholarship by five or six months of severe study, undertaken to enable him to verify the results obtained from the examination of coins [m]. As might be expected, he fell into many errors: still, his work is highly useful, on account of the exact statements of details in it, which are brought together from different quarters, both ancient and modern. Barthelemy's inquiries were directed chiefly to the Attic money: and the results which he obtained, cause regret that he allowed himself to be deterred from carrying them further. Within the same period, in 1771, Raper's Essay also appeared in the Transactions of the Royal Society; a work of which it is not too much to say, that it is the best attempt yet made, to combine a general view of the money of the Greeks and Romans in their best times, with an accurate statement of the proofs on which the system rests. But, unfortunately, it is lost to the general reader, by being buried in the mass of the reports of the Society before which it was read; and for that reason, probably, it has been so often overlooked, and the values given in Arbuthnot's inaccurate tables taken in preference to Raper's. Pinkerton's Essay too, which was a little later, deserves attention; for it is full of information from one who had much knowledge of the subject on which he wrote: but it is diffuse, and not always correct, and cannot at all supply the want of a manual for students in general.

6. Since this, few original works have appeared on the money and weights of the ancients. Eckhel's great work is concerned chiefly and properly with the impressions on the coins, or the Numismatology of the subject; and so far, would be passed over in this ac-

[m] Metrologie, Pref. p. xiv. note.

count, with the rest of that great number of authors in the same line. But his Prolegomena contains also much matter relating to the coinage, which bears directly on our question ; and therefore he should be noticed. Letronne's work, published in 1817, contains an account of the examination of Roman coins made on a larger scale than any before; and for that reason ranks among the most valuable. Payne Knight, who deserves to be named with honour, for having set right the old mistake about the coins of Egina, has given the results of some observations of his own upon coins, in the account of the coinage of Greece in the Prolegomena to his edition of Homer. Wurm is named as the author of a small work on weights and measures ; but I have not been able to get a sight of it. And, lastly, Mr. Akerman has given a table of the weights and fineness of some Roman coins, in his late work on that subject.

7. After all, though so many have engaged in the inquiry, it is clear that the subject is far from being exhausted. It would be absurd to suppose that we could ever get a complete knowledge of all the systems of money and weight in use among the ancients : and indeed such knowledge is not wanted. But certainly a considerable part is both necessary and within our reach ; and much of this has been misunderstood. The early writers, who brought deep learning and great industry to the task, wanted many means which have since been brought to light : and they, moreover, were often too fond of building up systems on slight foundations ; in other words, according to the spirit of the age, they generalized without examining enough. One cause of wide spread error was, the confounding statements made by authors of different times ; as, when the values assigned to the drachma, were taken

as the true measure of it for any age indifferently. It was long before the coins were examined much, and longer before they were used to correct mistaken opinions about the weights. Greaves was the first who ascertained the real difference between the Attic drachma and the denarius. For, though others had perceived that they were not exactly equal, as Savot, for example, he was the first who put forward the inequality in a proper light.

Of those who came after, it is to be observed, that, since the first great pioneers of the inquiry, who explored the ground of ancient literature, and first brought to light the principal passages of ancient authors relating to money and weights, they who have examined the coins most, have done most to advance the knowledge of the subject. At the present day there is, perhaps, but little to be added to the stock of information collected by the prodigious learning of such men as Budé, Scaliger, and Gronovius. But they, and others who laboured in the same department with them, wanted a fuller knowledge of the actual state of the ancient coins: and though much has already been done to supply this want, by careful observation of many specimens now in existence, there is still room for more: and the further the examination of coins is carried, the more corrections or verifications of the statements of ancient, and the calculation of modern authors, shall we have; and by so much shall we approach nearer to a full understanding of the subject. In order to carry the inquiry quite to the end, it would be necessary to have all the ancient coins described or registered by classes, with the weight of each coin set down, and the age and condition so distinguished, that the average weight of any one species, for a given age, might be ascertained at once, from the sight of a suffi-

cient number of good specimens. And then it would be further necessary to analyse enough of each class, for calculating the value of the metal, in order to estimate them in our own money. In some catalogues, as that of the Hunterian Museum, and Combe's of the British Museum, the weights have been set down in the manner required: but even in these, the comparative ages of the coins are not clearly distinguished. And very few experiments have yet been made, by assaying the Greek coins, for the purpose of finding out the standard of fineness. It has happened hitherto, that accurate knowledge on these points has been wanted for but few of the Greek coinages: but it is possible to extend this knowledge: and, in order to do so, it will be necessary to examine and compare on a proportionably larger scale. Something of this kind is attempted in the following chapters: but the main object in view throughout has been, to make an useful manual, rather than to push the inquiry to the farthest point: and whoever will apply the principles there laid down, to the examining any number of coins systematically, will be able to add something to our knowledge of the ancient coinages in general.

8. But with regard to the Greek weights, there is still some uncertainty: because, although the denominations of weight and money had the same names, we do not know that they expressed the same quantity of weight. Professor Böckh's discovery, that there was in common use at Athens a second standard of weight, different from that of the money, might raise a question, whether there might not have been a like variety in any other state in Greece. And, if so, it would follow, that the calculations of weight from the coins must be confined to money only, not applied to any general terms of weight for weighing other things.

We have not yet the means of settling this doubt : for most of the proportions which the ancient writers assign between the different talents, belong to the money standard only; and such as are known to relate to weight in general, as those given by Hesychius and Heron, are too loosely described, and of too late an age, for us to calculate from them any system for the early times of Greece. After all, it is a mere assumption, that the common standard of weight was not the same as the money standard, in most parts of Greece. There certainly were some common standards in general use ; and though separate states might have measures of their own, there seem to have been some which had a kind of general circulation, and were understood and allowed in many places. When Herodotus speaks of a thousand talents' weight of alum [n], we must suppose that his readers would at once have understood what measure he used, and known what was the quantity expressed. The talents of weight, therefore, calculated from the coinages of Egina and Thebes, or of Macedonia, Egypt, and Phœnicia, or any other which may be found regular and extensive enough to determine the positive value of the unit of the scale, may be the talents which were commonly used in those countries respectively. And, at any rate, if this mode of calculating them be given up, there is nothing left but to confess, that there are no means of estimating them at all.

[n] Herod. ii. 180.

CHAPTER I.

ATTIC WEIGHTS.

Quærenda pecunia primum est. HORAT. Ep. I. i. 53.

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1. THE names of the Greek weights were also the names of sums of money: for all money with the Greeks was originally a certain weight of silver. The choice of silver for the metal of money was at first arbitrary; and copper or gold might have been used; in which case the same names of weights would have expressed very different ideas of value with equal propriety; but after it had been settled that silver was to be the medium of circulation, the names of weights signifying a certain quantity of that medium, came to be used for symbols of definite ideas of value. This was equally the case, whether the weight of silver was actually formed into a single coin, like the drachma, and other small sums; or was made up of many pieces of different sizes, as the mina or talent: in all cases it was money by being a certain weight of silver.

As the money then was adjusted by the scale of the weights, the amount of the weights may be found from the money: and the knowledge of the exact weight of any one coin in the table of the money, provided only it be coined of the full weight, will enable us to calculate the amount of all the weights in the scale, and consequently, the value of all the corresponding deno-

minations of money. Many modes [a] of calculating the absolute value of the ancient Greek weights have been suggested, and some tried, but none with results so successful as those drawn from the weights of the coins.

The subject therefore, will divide itself naturally into two heads; first, the examination of the coins regarded merely as *weights*, in order to deduce from them the amount of the Greek weights in terms of our own; and, secondly, the examination of them as *money*, with respect to the fineness of the metal, and their proportion to our own money, in order to ascertain the value in our currency.

2. The Greek system of weights seems to have been at first simple and well devised: it contained only four distinct denominations, the talent, mina, drachma, and obol, compounded together with multiples of six and ten, a combination which admits of easy division. Wherever these four denominations were in use, they bore the same proportion to each other [b]: the talent contained sixty minæ; the mina a hundred drachmæ; and the drachma six obols: so that if a change was made in the value of any one, it was necessarily extended through all.

There were different standards used, not only in different countries, but also for different substances in the same country. But little however is known about this last variety; as there are no means of determining the absolute value of such weights: it is only where the proportion of them to the money is given, that we can discover any thing certain about them: the ac-

[a] They are enumerated by Agricola, De Restituend. Ponderib. et Mensur. p. 234; Savot, iii. 1; Eisenschmidt, i. 2; &c.

[b] Pollux ix. 6. Suidas Τάλαντον. Heron. Scaliger de Re Numm. &c.

tual amount therefore depends on the money in all cases.

Of all the systems used in Greece, none is so interesting to most readers of history, as that of Athens. And among the coins, none offer so great facilities for calculation, by their number, exactness, and good preservation, as those of the Attic standard. Moreover, the values of most of the other scales are given by a comparison with the Attic. Upon every account then, the inquiry should begin with Athens: and the first problem to be solved, as the basis of the whole calculation, is, the weight of the Attic drachma. This has been often calculated before, and it is not necessary to repeat what others have said on the subject; but as every independent inquiry is useful, in helping to determine the limits of value in such a question, I will give the results of observations on coins which have not been examined already.

3. The weight of the drachma is to be ascertained with great nicety from the gold coins of Macedonia. These are all of the Attic standard, as it was used in the best days of Athens; they are of full weight, more equally sized than the silver coins, very numerous, and in excellent condition. Indeed, it appears, that in all cases, the gold was coined more carefully, according to the full standard weight, than the silver[c]. Most of the following coins are in the British Museum.

Of staters (or didrachms) of Philip, which are the earliest of that coinage, fourteen, which were in Payne Knight's collection, give an average 132.14 grains for the stater. But of these, ten exceed 132 grs., and one

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[c] Savot first recommended examining the gold in preference to the silver coins, iii. 22. Raper acted upon this principle for the Greek weights, with great success; and M. Letronne for the Roman.

comes up to 133. In the Bodleian Library are two of Philip, each weighing 132.25 grs.

Of the gold coinage of Alexander the Great, the British Museum possesses two tetradrachms, one weighing 265 grs., the other 265.5, and fifty-eight staters. If four, which are rather below weight, from wear, be deducted from these, the remaining fifty-four give an average 132.1 grs. for the stater: and four among them amount to 133 grs. In the Bodleian are two, of which one weighs 132.5 grs., the other 132.

In Payne Knight's collection are some of the next Philip, (the third,) of which four out of five give an average 132 grs.; and one of Lysimachus, weighing 132.2 grs.

The result from these weights is, something above 132 grs. for the stater, or more than 66 grs. for the drachma.

The Macedonian silver gives an average a little below this. In the British Museum thirty tetradrachms of Alexander the Great, in Payne Knight's collection, average 264.23 grs.: but one of these comes up to 276.5 grs., which gives above 69 grs. for the drachma. The remainder of those of Alexander, ninety-one in number, all fall below 264 grs.; and a few almost down to 250 grs. Out of seventy-three drachmæ, the heaviest eighteen average 65.75 grs.; the remainder are a little below 65 grs.: but of these, one comes up to 67.2 grs., and another to 67 grs.

The Macedonian silver coins are not so accurately sized as the gold, but as much so as the Attic silver; and on account of the great number of them, and the good preservation in which most of them are, they deserve to be taken account of among the first. But those of Alexander only need be reckoned, because there is a visible, though slight, falling off in the

weight of those of his successors. After this comes the silver coinage of Attica itself.

Twelve out of fourteen of the oldest Attic tetradrachms in the collection of Payne Knight, now in the British Museum, give the average weight of the tetradrachm 263.98 grs., and one piece among these weighs 266.2 grs. Seven of those in what was called the King's collection, in the same museum, give the average 263.928 grs., and several of these exceed 265 grs. Two also in the Bodleian library weigh more than 265 grs.: and many more of as great weight may be found in other collections. One in the library of Christ Church weighs 266 grs.

The inquiry may be carried farther into the coinages of other states, in the same manner as the Macedonian, and for the same reason: that is to say, where the weight of the coins is throughout so nearly equal to the Attic, as to prove that they belong to the same standard, that weight may be made use of, to help fix the exact weight of the Attic drachma, or to correct the result obtained from other money. This method might be made to embrace a great many classes of coins: but it shall be confined here to a few of the most remarkable.

And there are no coins more remarkable, with relation to the question of the standard of weight, than some of Sicily. In the British Museum there are three of the great ten-drachmæ pieces of Syracuse, which weigh more than 665 grs. In the Hunter collection are four more, as large; of which one is 669.5 grs. in weight. Four very old tetradrachms of Syracuse, in the British Museum, give an average of 266.9 grs.; which makes the drachma 66.7 grs. Five in the Hunter collection give an average of 267.35 grs. for the tetradrachm, or 66.8 grs. for the drachma. And in the latter

collection is one gold coin of exactly 66.5 grs. weight. To these may be added two tetradrachms of an early age, of Acanthus, in the British Museum, which once were in R. P. Knight's collection. These give, one 66.95 grs. the other 67.25 grs. for the weight of the drachma. And many more may be found, among the Sicilian coins especially, and also those of other states, which give as high a standard for the drachma, as these which have been described.

Lastly, the three gold staters among the Athenian coins in the British Museum, and the one at Glasgow, in the Hunterian Museum, give an average of 132.58 grs. for the stater, or above 66 grs. for the drachma.

The result of this is, that from the gold we get an average exceeding 132 grs. for the stater, or more than 66 grs. for the drachma; from the silver, 264 grs. and under, for the tetradrachm, or something less than 66 grs. for the drachma. But considering that there are so many instances of single coins exceeding this average; as, the stater amounting to 133 grs., the tetradrachm to 276, and the drachma to 67; and, especially, the high average of the Sicilian coins; and, that in taking the average of the wear and tear, the variation is all on the side of defect, for there cannot be any excess to compensate for an undue deficiency, it will be correct to set the true value something above the apparent average, approximating to the weight of the heaviest specimens, and, allowing for the loss by injury to the coin, to fix the standard weight at 133 grs. for the stater, or 66.5 for the drachma.

This is the same value as that assigned by Raper, the clearest and most satisfactory of all who have written upon this subject. The method which has been followed here, is the same as that which he used;

but, as the conclusion has been drawn from the examination of different coins, it may be set down as independent testimony : and the two results mutually confirm each other by their agreement.

Other writers have calculated the weight of the Attic drachma to be something different.   It will be convenient, to give at one view the names of the chief authorities on the subject, in their order, and the results which they have brought out, as follows :

Grains.

Budé, in 1516, computed the weight of the

Attic drachma to be, in Troy weight,   59.04

Portius [e], about the same time, reckoned it

$\frac{1}{96}$th of the Italian pound, or 54.71

Agricola [f], in 1533, $\frac{7}{8}$ths of 72 momenta, or 47.25

Scaliger [g], in 1616, 63 grains, which, if it be

French weight, is equal to 51.6

Savot [h], in 1627, ... 51.66

Gronovius [i], in 1643, ... 57.6

Greaves [k], in 1647, ... 67

Bernard [l], in 1688, reckoned the best standard 67

.................................the common coin 66

[d] De Asse fol. 37, &c.   But, fol. 58, he gives the weight something higher, computed from the gold.

[e] De Re Pecuniar. in Gronov. Antiq. Gr. ix.

[f] De Restituend. Pond. Budelius, De Monet. et Re Numm., gives the value of the *momentum*.

[g] De Re Numm. in Gronov. Ant. Gr. ix.

[h] Discours sur les Médalles Antiques, iii. 23. p. 230.

[i] De Pecun. Vet. iii. 6. p. 164.

[k] On the Romane Foot and Denarius.

[l] De Mens. et Pond. Antiq.

Grains.

Eisenschmidt[m], in 1708, the drachma of Solon 68.2

.... of later times 65.53

.... of Philip 65.6

Dr. Birch [n], about 1750, from .... 64 to 68

Raper [o], in 1771, ... 66.5

Barthelemy [p], in 1778, the drachma before

     the Peloponnesian war 67.24

             That of later times 64.78

De Romé de l'Isle [q], in 1789, reckoned four

     standards, namely, the Samian or smallest

     Attic 51.66

         The mean Attic 63.96

         The Attico-Sicilian 65.48

         The great Attic 68.88

M. Letronne [r], in 1817 .... 67.37

Payne Knight [s], in 1820 .... 65.

The earliest of these calculations are not worth
much. Greaves was the first who paid proper atten-
tion to the coins, and weighed them carefully; and it
will be seen that the values found after him, do not

[m] De Pond. et Mens.

[n] On the Roman and Greek Weights and Measures, MS. British
Museum.

[o] Philosoph. Trans. lxi. p. 462.

[p] Anachars. vol. iv. p. lxii. tab. xi.   [q] Metrologie.

[r] Sur l'Evaluation des Monnaies. It may be as well to mention
here, that the French grain equals .8202 of the English. In all
these calculations it is reckoned by two figures of this decimal, as
.82 of the English grain. See Philosoph. Trans. xlii. p. 187.

[s] Prolegom. ad Homer.

vary many grains, being, for the most part, between 65 and 68 grains.

The weight which has been fixed upon, 66.5 grs., may be considered that of the drachma of Solon.   It is not possible to determine with certainty the age of the oldest Attic coins now preserved : but they are generally allowed to be at least as old as the Peloponnesian war ; at which time it is not likely, that there had been any depreciation in the weight of the drachma. There certainly was some diminution afterwards, though not for many years, and then to no great extent.   But there is no reason for making a distinction, between the money before the Peloponnesian war, and that after it, as Eisenschmidt and Barthelemy have done ; because the oldest Attic silver gives no higher average, than the gold of Philip and Alexander ; indeed scarcely so high, if no allowance be made, for greater loss by wear.   But if a little be added to the older coins, to make up for this loss, the exact agreement between the Macedonian gold and the oldest Attic silver, proves that it was not a depreciated standard, which Philip introduced for his new coinage : whether there was any falling off in the coinage of Athens, between Philip's time and the Peloponnesian war, or not, at least he adopted the full standard of that early age ; and, as there is no reason to think, that the standard was just then fixed, or changed in any way from the still older, it may fairly be inferred, that the standard then was the original one established by Solon, when he remodelled the currency, by diminishing the weight of the drachma. The tetradrachms of Athens, of a later age, which are much broader and thinner than the old ones, and have a different style of workmanship, shew a sensible decrease in weight, to the amount of about three grains [t].

[t] Forty-three tetradrachms of this class, from R. P. Knight's col-

But the date of these cannot be ascertained. Barthe-
lemy [u] fixed one to the year B. C. 88, from the name
Aristion upon it, supposing it to be that of the man
who was besieged in Athens by Sulla. And it is most
likely, that the standard of weight had not really been
at all diminished at Athens, before the time of Philip;
because that which he adopted, was, probably, the only
legal one. The broad tetradrachms, which fall short of
this weight, were, therefore, all coined after this time;
and, indeed, from their style and appearance, it might
be concluded at once, that they were contemporary
with those of Alexander and his successors, which cor-
respond exactly with them, both in form, and the gra-
dual diminution of the weight [x].

It may be concluded, therefore, that the legal weight
of the drachma of Solon's currency was 66.5 grains,
which continued in use, until Athens lost her independ-
ence; that, after Alexander's time there was a slight
decrease; and that, in course of time the drachma fell
to the weight of about 63 grains [y]. A very little re-

lection in the British Museum, give about 63.5 grs. average for the
drachma.

[u] Anachars. as above.

[x] Corsini argued from the names upon them, that they were cer-
tainly all coined after Ol. 112; and thought it probable that they
were as late as Ol. 130, which is very likely to be true. Fast. Att.
p. 259.

[y] This diminution took place very gradually. The tetradrachm
of Aristion, mentioned above, weighed 253.83 grs., or gives 63.45
grs. for the drachma. One of the forty-three tetradrachms, men-
tioned above, which give the same average weight, comes up to
265 grs., that is, 66.25 grs. for the drachma. Thirteen gold staters
of Lysimachus, of the Macedonian coinage, in R. P. Knight's col-
lection, give an average of 64.88 grs. for the drachma. Nineteen
tetradrachms of the same king give 65.49 grs. Twenty more give
a little less than 65 grs. But there is a stater of Demetrius giving
66.1 for the drachma. The same thing is observable in the coin-

duction below this, would have brought it down to an equality with the earliest denarius.

This value of the drachma will give the following scale of the Attic weights in avoirdupois weight.

obol .... 11.08 grs.
drachma....................... 66.5 grs.
mina[z]............... 15 oz....83.75 grs.
talent ...... 56lb. 15¼oz. 100.32 grs.

4. These were the weights used at Athens for silver : but this was not the only standard. It had often been conjectured, rather than calculated, by writers on the subject, that there were more standards of weight than one used at Athens; generally, however, it was supposed that the standard of the money, or silver, was the largest ; the estimate being made from the statements of authors of no great antiquity, and especially from the comparison between the Attic and Italian weights. But Professor Böckh discovered from an Attic inscription, the true proportion of a second standard, to that of the silver [a]. The mina of this was called the commercial mina, ($\dot{\eta}$ $\mu\nu\hat{a}$ $\dot{\eta}$ $\dot{\epsilon}\mu\pi\sigma\rho\iota\kappa\dot{\eta}$), and it weighed 138 drachmæ of the silver weight, exceeding the mina of the silver weight by 38 drachmæ. It may be supposed, as the Professor suggests, that the

age of the succeeding monarchs, and in that of the Seleucidæ in Asia; where there is, among other coins, a gold medallion of Antiochus the Great, weighing 522.3 grs.; which, if one tenth of a grain be added, gives exactly 65.3 grs. for the drachma.

[z] The avoirdupois ounce equals 437.75 grains troy; and the avoirdupois pound 7004 grains troy. Philos. Trans. xlii. p. 187.

[a] Böckh, Inscr. 123. vol. i. and Political Econom. Ath. i. Append. The date of the inscription is not earlier than Olymp. 118, nor later than Trajan. See Böckh ad loc.

higher of these two weights is the old standard, used
before Solon's time, the lower that which he intro-
duced. According to Plutarch [b], Solon lessened the
weight of the drachma by rather more than ¼th, so that
100 drachmæ were coined out of a weight of silver,
which, before that, had been equal to no more than 73:
this proportion would make the old mina equal to
about 136.9 of the new drachmæ, instead of 138: but
possibly there might have been some slight change in
the time which elapsed, between Solon and the fixing
of the proportion mentioned in the inscription above,
which may account for the difference. The ratio be-
tween the mina of 138 drachmæ, and that of the silver,
is rather greater than 4 to 3, about 4 to 2.8985, or
4.14 to 3.

It is uncertain to what extent each of these standards
was used. Some have thought, that the larger one, that
is, the old one, which was the only one before Solon's
time, was, at all times, the common measure for all
buying and selling in the markets [c]; the smaller being
confined to dealings in some few valuable substances,
like our troy weights. There can be no doubt that
the former was more used than the other: yet there
were some things, which were expressly required [d] to
be sold by the silver weights. Since there is no
mention of commercial drachmæ, but the commercial
mina was measured by drachmæ of the other scale, it
may be inferred, that the commercial standard was not
used for things sold in small quantities, that is, by the
drachma; but only such as were measured by the mina
weight.

5. But, at some time or other, the commercial weights
were increased. The mina was raised from 138 to

[b] Solon. 15.

[c] Böckh, as above. Portius Re Pecuniar. [d] Böckh, Inscr. 123.

150 drachmæ of the silver standard; the five-minæ weight to six minæ, and the talent to 65 minæ, of the commercial standard [e]. By this addition, the old proportion between the different denominations was destroyed: for the mina was thus augmented by $\frac{2}{23}$ds, the five-minæ by $\frac{1}{5}$th, and the talent by $\frac{1}{12}$th; an unequal increase, which, it might be thought, would have been highly inconvenient. Probably the change was made, for the sake of assimilation with some foreign standard much in use: and it is remarkable, that the talent of the highest augmented weight, namely, 65 minæ of 150 drachmæ each, amounts to a value, which has a proportion to the talent of the silver weight, very nearly equal to that assigned between the Eginetan and Attic talents, viz. 5 to 3 [f].

6. Some other anomalous, or at least unknown, denominations of weight at Athens, are found now and then mentioned. The mina was sometimes called a stater [g]; which, since the stater signified commonly a coin of two or four drachmæ, some have thought to be an expression of value, not weight, and to mean the gold coin of that name. But the Sicilian litra, or pound, was also called stater sometimes [h]; which shews that stater signified weight. The word, indeed, means properly weight in general, like shekel or pondo; and might therefore be applied to any denomination assumed as a standard: it would seem then, that the mina and the pound were sometimes so considered, and accordingly called specifically stater.

The ἡμίεκτον, or half-sixth, might have been either a weight or a coin. It was equivalent to 8 obols [i],

[e] Böckh, Inscr. ibid.   [f] See below, ch. ii. 3.

[g] Pollux, ix. 6. Hesychius explains τετρασrάτηρον by τετράμνουν. See also Scaliger Re Numm.   [h] Pollux, iv. 24.

[i] Pollux, ix. 6. But the passage in Crates is very obscure. See

and therefore implies a denomination of 12 times that value, or 16 drachmæ, for the integer; of which no notice is to be found elsewhere. But others explain the half-sixth to be no more than that fraction of the drachma, that is, the half-obol [k].

7. The obol was not the only fraction of the weight of the drachma. Tetroboli, trioboli, and dioboli, were coined, and are still in existence. Nor was the obol the smallest weight: even of that there were fractional parts in silver money; and the quarter obol, which should weigh 2.35 gr., is still to be seen among the coins of Athens [l]. But the coins of a lower value than this, must not be confounded with the weights [m]: they were of copper, and therefore were connected with the silver, as a measure of value only, and had no reference at all to weight: the smallest weights were the fractions of the obol in silver. It was not till long after the times of which we are here speaking, that the chalci, keratia, and other denominations, were used as subdivisions of the obol in weight [n].

The weights were kept with great care at Athens. The standards or models, σηκώματα, were deposited in the Acropolis; and there were others in the keeping of persons appointed to take charge of them, in the prytaneum, at Piræus, and at Eleusis [o].

Gronov. Pec. Vet. ii. 8. This has nothing to do with the corn measure of the same name in Aristophan. Nub. 643. See Schol. Suid. and Harpocrat. v. &c.

[k] Hesych. v.

[l] There are two in the British Museum which weigh 2.5 grs. each.

[m] Suidas in τάλαντον quotes Diodorus, without making any distinction between silver and copper; and Eisenschmidt, Pond. et Mens. p. 50, interprets his words as if they related to weight.

[n] See Append. Steph. Thesaur. &c.

[o] Böckh, Inscr. vol. i. 150. §. 24. 151. §. 40. 123. §. 5, 8.

Table of the Attic silver weights, in Avoirdupois weight.

				lb.	oz.	gr.
Obol						11.08
6	Drachma					66.5
600	100	Mina			15	83.75
36000	6000	60	Talent	56	15¼	100.32

Table of the Commercial weights, in Avoirdupois weight.

				lb.	oz.	gr.
Obol						15.29
6	Drachma					91.77
600	100	Mina		1	4¾	93.69
36000	6000	60	Talent	75	5¾	14.69

Increased Commercial weights, in Avoirdupois weight.

Five-minæ, which was equal to six minæ of the ordinary commercial standard,

7 lb. 13¾ oz. 14.96 grs.

Talent, which was equal to 65 commercial minæ,

85 lb.   2½ oz. 70.7 grs.

CHAPTER II.

OTHER GREEK WEIGHTS.

vvvvvvvvvvvvvv

Τάλαντα βρίσας οὐκ ἰσορρόπῳ τύχῃ.
ÆSCH. PERS. 346.

vvvvvvvvvvvvvv

1. THE other systems of weight which were used in the different states of Greece, are computed, for the most part, from the statements of historians and grammarians concerning the proportion which they bore to the Attic. These proportions are in some cases confirmed by the weights of the coins, in some cases they are at variance with them: neither do all the assertions of the ancient writers agree, concerning the same system. The inquiry into the values of these different standards will be made by examining the coins, as far as that is possible, and comparing them with the writers quoted.

2. The first to be considered is the Euboic standard, because it is a question, whether it was the same as the Attic, or different. Pollux [a], compared with Herodotus, sets the two down as equal; for he states the Babylonian talent to be equivalent to 70 Attic minæ, and Herodotus to 70 Euboic minæ. But Ælian says the Babylonian talent was worth 72 Attic minæ [b]. Appian gives the value of the Euboic talent in Alexandrian weights, as equal to 7000 drachmæ, or 70 minæ, of Alexandria [c]: but the value of the Alexandrian stand-

[a] Pollux, ix. 6. Herod. iii. 89.   [b] Var. Hist. i. 22.
[c] De Reb. Sicul. v. 2. ed. Schweigh.

ard has itself been disputed   Lastly, Festus gives a value for the Euboic talent, which agrees with no other writer, and falsifies all calculations upon the subject ; he makes it equal to 4000 denarii [d] : this is so improbable, that his authority upon the question has been generally given up, and the place passed over as corrupt.   It is to be supposed that Pollux intended to make the Attic and the Euboic talents equal ; both because he could hardly have overlooked Herodotus' statement : and because, in his list of the different talents and their values, he does not name the Euboic ; which it is likely he would have done, as it was one of those most widely circulated, if he had thought it different from all the others.

The weight of the daricus also strengthens the belief, that the Euboic standard was nearly the same as the Attic.   For since the Euboic was that by which the payments in gold were made to the Persian treasury [e], it is probable that the gold coinage was regulated by the same.   Now the weight of the daricus was very nearly an Attic didrachm : the specimens of that coin now preserved weigh about three or four grains less than two Attic drachmæ ; a difference which is not more than might be due to inaccuracy of the minting, or loss from wear.

Böckh supposes, with great probability, that the change which Solon made in the Attic money, was the reduction of it to the Euboic standard [f] : but, considering the coinage to have been actually below this standard, he reckons the difference between the later Attic and Euboic to be the amount of this deficiency.

[d] Festus v. Euboicum talentum numo Græco septem millium, et quingentorum cistophorum est, nostro quattuor millium denarium.

[e] Herod. iii. 89.　　　　　　　[f] Pol. Ec. Ath. i. 4.

But if, as seems probable, the two standards were very nearly or quite equal, it need not be supposed that the Attic coinage was below weight.

The Romans seem to have considered the Euboic talent equal to the Attic of nearly 80 Roman pounds. For when they had at first proposed to Antiochus, to pay an indemnification in Euboic talents, they afterwards settled, that the sum should be reckoned by talents of 80 pounds each, and paid in the best Attic money; which Livy relates, as having been reckoned by Attic talents [g]. But it is most probable, that they intended to have the payment in Euboic talents in both cases, as they did also in the treaty made with the Ætolians about the same time [h].

It is not known from whence this standard came. It seems incredible, that the island of Euboea should have established a system, which was adopted through a great part of Asia. It is more likely that it was originally invented in Asia, and brought from thence to Greece, perhaps by the Euboeans. Some have connected it with the tradition of an ox being the impression on the first coined money, and so given the name a meaning expressing the goodness of the money, as if compounded of $\varepsilon \hat{\upsilon}$ and $\beta o \hat{\upsilon} s$ [i]. The Etymologicum Magnum says, that the name Euboic, applied to money, is derived from a place in Argos called Euboea, where

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[g] Polyb. xxi. 14. xxii. 26. Liv. xxxvii. 45. xxxviii. 38. See also Appian, De Reb. Syr. 38.

[h] Liv. xxxviii. 9. See also Polyb. i. 62. xxii. 15. 8. Prideaux has observed this also, Connect. ii. 2. p. 138: where he has fallen into error, by supposing that at this time the Roman pound was divided into 96 denarii, instead of 84.

[i] Bishop Hooper, Enquir. into Anc. Meas. iv. 5. Paucton, Metrologie, p. 310.

Phidon first coined money [k]. Neither of these explanations deserve any credit. All that can be said of it with certainty is, that it was one of the early standards in Greece, was extensively used, and was about equal to the Attic after Solon's time [l].

3. The talent of Egina is one of those, which are generally considered the best known, and least liable to doubt. The proportion which it is commonly thought to have borne to the Attic, is five to three. This is taken from Pollux, who says both that the talent contained 10,000 Attic drachmæ, and that the drachma contained 10 Attic obols [m]. Other lexicographers say only, that the Eginetan standard was heavier than the Attic. If this proportion were true, the Eginetan drachma ought to weigh about 110 grains, but it is not found to be more than 96; and the specimens of the two coinages, of Athens and Egina, are of such indisputable authority, that the testimony of a late grammarian may well be questioned, if it is found not to agree with them. But further, there is a passage in an early historian, from which we may infer, that the proportion was not originally that which Pollux states. Herodotus [o] says, that Democedes the physician,

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[k] Etym. Mag. εὐβοϊκὸν νόμισμα : repeated in the Etymolog. Gudianum. Pinkerton, p. 65.

[l] I am inclined to suspect, that, in later times, when the Roman denarius of the empire, that is, the reduced weight of $\frac{1}{96}$ of the pound, passed universally for the Attic drachma, the Euboic was the name given to a standard nearly equal to the ancient and true Attic. There appear some traces of this in what Festus says. See below, iv. 10.

[m] Pollux, ix. 6.

[n] Etymol. Magn. in Αἰγιναῖα. Hesych. Αἰγειναῖον νόμισμα, and λεπτὰς καὶ παχείας.

[o] iii. 131.

after having been paid a talent a year at Egina, was at-
tracted to Athens by the offer of a salary of 100 minæ.
Now if the Eginetan drachma contained 10 Attic obols,
100 minæ at Athens would have been exactly equal to a
talent at Egina, which is absurd : therefore the in-
equality between the two standards was not so great
as ten to one. If we take Pollux's proportion and cal-
culate the Attic from the Eginetan drachma of 96
grains, we get the weight 57.6 grains for the Attic
drachma ; and this will give a clue, by which to inter-
pret this and several other statements concerning the
Attic money weights. The interpretation is simply
this : Pollux, when he speaks of Attic drachmæ, does
not mean the money of the full weight, such as has
been described in the last chapter, which was coined
in the time of Pericles or Xenophon, but such as
passed for Attic in the Augustan and following ages,
namely the Roman denarius : and this too, not of the
earliest standard, at the rate of 60 or 61 grains ; but
as it was coined when the weight had been reduced to
$\frac{1}{8}$th of the Roman ounce, or about 55 grains. It is
notorious that the later writers, as Pliny and others,
are in the habit of reckoning the Attic drachma and the
denarius current at the time when they wrote, at
exactly the same weight and value : it will appear that
a like estimate was used, in regard to the Tyrian,
Alexandrian, and Jewish money ; and unless Pollux
had gone back to some very early writer on the sub-
ject, he would probably have found the same value
assigned to the Attic in comparison with the Eginetan
money. That this was the usual estimate of the Attic
money under the Roman empire, will be more evident
as we go on. For the present, it is enough to say, that
the statement of Pollux, explained in this way, is not
only in no way contradictory to the weights deduced

from the coins, but even confirms them ; for the pro-
portion of ten to six, or five to three, is about that
which really is found, between the Eginetan drachma
and the denarius of the Augustan age.   If the former
be supposed to have been rated in the currency in later
times, a little below the full and original weight, which
was generally the case, the proportion exactly suits the
late reduced denarius.

The weights of the Eginetan money, therefore, com-
puted from the drachma of 96 [p] grains, will be in avoir-
dupois weight,

				lb.	oz.	gr.
Obol						16
6	Drachma					96
600	100	Mina		1	$5\frac{3}{4}$	78.96
36000	6000	60	Talent	82	$3\frac{3}{4}$	30.46

4. The Babylonian standard exceeded that of Athens,
in the proportion of more than 7 to 6.   Pollux [q] gives
the proportion as 7 to 6 exactly ; and Herodotus [r] the
same (reckoning the Eubœan to be the same as the
Attic) : Ælian [s] makes the inequality greater, he rates
it as 6 to 5 : and in all probability it was at least as
much as this.   For Xenophon mentions the siglus,
which was current in Asia for $7\frac{1}{2}$ Attic obols [t] ; and if
this was the drachma of that system of weights, which

[p] The details in proof of this will be given in ch. iv.
[q] ix. 6.   [r] iii. 89.   [s] See above, sect. 2.
[t] Anab. i. 5, 6.   Hesychius, in σίγλον, gives a different value,
eight obols, and misquotes Xenophon.   See the commentators.

D

is highly probable, it would give a talent of 75 Attic minæ, that is, one bearing the ratio of 5 to 4 to the Attic standard. Now if it be objected to this, that Pollux must be understood to estimate the Attic talent in the same manner as before, namely, by reckoning the drachma equal to the denarius; it may be answered, that Pollux most likely took his proportion, in this case, from Herodotus, and considered the Eubœan talent the same as the Attic; for it seems evident he did consider them equal, from his omitting the former; so that here, for once, he gives the Attic money a true value. And there is no reason to think that he would have perceived this incongruity, since he collected from all writers, and put their statements together without discrimination. If then the ratio 5 to 4 be taken, the Babylonian drachma would weigh about 83 grains[t]. But there does not appear to be any set of coins, where this standard prevails with any thing like uniformity. The payments in silver, made by the subjects of Persia to their government, were regulated by this standard [u] : but it is not often mentioned elsewhere.

5. The Egyptian standard appears at first sight the most uncertain of all, on account of the great disagreement in the statements concerning it. There are three different names used for the weights in Egypt: they are called separately Egyptian, Alexandrian, or Ptolemaic. Varro [x] reckoned the Egyptian talent equal to 80 Roman pounds, which would be about the same as the

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[t] Some of the silver darici are nearly this weight : in the British Museum are two, of about 80 grains, and one of 84, which might be drachmæ; but, on the other hand, there are some larger pieces, which might be didrachms, or tetradrachms, weighing about 230 grains, a weight which does not at all agree with such a drachma.

[u] Herod. iii. 89.   [x] Plin. xxxiii. 15.

Attic and Euboic: and the fragment attributed to Galen[y] speaks of the Egyptian mina, as equivalent to the Attic. But Pollux says, the Egyptian talent was but 1500 drachmæ, or $\frac{1}{4}$th of the Attic[z]. The Alexandrian talent is said by Festus[a] to have contained 12,000 denarii, that is to say, to have been double the Attic talent. Appian[b] asserts, that the Euboic (that is, the Attic) talent contained 7000 Alexandrian drachmæ, which would make the Alexandrian talent equal to $\frac{6}{7}$ths of the Attic. And the fragment which bears the name of Dioscorides[c] says, that the Alexandrian mina contained 160 drachmæ (which would be Attic): but Heron[d] equates it to 150, or, in some places, 158 drachmæ of less weight than the Attic. The Ptolemaic talent[e] is reckoned by Heron to be $\frac{1}{4}$th of the Attic: but Cleopatra[f] says, that the Ptolemaic mina was half as heavy again as the Attic. None of these agree with the coins of the Ptolemies, if we understand the Attic drachma to mean the full and ancient standard; and moreover, beside all these, there was a larger weight used at Alexandria for selling wood, which was one fifth heavier than that of the money[g].

The attempt to reconcile these authorities would seem to be, what the old German proverb calls,

[y] Append. to Steph. Thesaur. The Egyptian drachma, which was $\frac{1}{6}$th of the Attic drachma, mentioned by Cleopatra, was only an obol miscalled.

[z] ix. 6.

[a] In talent.   [b] As above.   [c] Append. Steph. Thes.

[d] Heron de Mensur. et Ponder. The drachma there spoken of seems to be one which was to the Attic, as 6.17 to 7 : for 7 of that standard equalled 6 Attic, 1 obol, and 4 chalci.

[e] Scalig. Re Numm.; but he would have read it τριπλάσιον.

[f] Append. Steph. Thes.

[g] Heron, in Scaliger De Re Num.

" making a cloak for the moon." But many of them may be explained with the aid of the coins, if we make one supposition, namely, that the Attic drachma is to be taken for the Roman denarius of about 54 or 55 grains, not for the old Attic of 66.5. For the coins shew a drachma of from 107 to 110 grains. In the British Museum are two gold pieces of Ptolemy the First, of which, one weighs 109.8 grains, which is the drachma, and the other 26.8, which is the quarter drachma. And another of Arsinoe weighs 429 grains, which is a stater of four drachmæ. Many other coins may be found of about the same weight; some of which Raper examined, and computed from them a drachma of about 111 grains[h]. Now this drachma is just double the denarius of the Augustan age, which passed for the Attic drachma: hence, the coins bear out the statements of those, who have rated the Egyptian standard double the Attic, reckoning the Attic at the low weight of the age in which they wrote. They agree also with the estimate of the Jewish writers, and others who will be quoted in speaking of the Jewish weights and money[i], who reckon the Alexandrian didrachm equal to the shekel, or Attic tetradrachm.

And this explains the statements, which set the Egyptian standard equal to the Attic. For the coin of about 219 grains might be reckoned either a didrachm, or tetradrachm, as it contained exactly four denarii: hence, like the Tyrian and Jewish money, it might be sometimes said to belong to the same standard as the Attic, instead of one twice as great, since it was a compound of an equal unit of weight, though with a different multiple. Again, if Appian was more exact in his statement, or took his standard from an earlier age, this too may be reconciled with

[h] Philosoph. Trans. 1771. vol. lxi. p. 462.   [i] See ch. xi.

the others, if the drachma of Alexandria be considered equal to the late denarius: for, by the proportion of 6 to 7, the weight of the Attic drachma, calculated from the denarius of 55 grains, would be about 64 grains, which is very near the truth. And, lastly, upon the same supposition, the wood weights mentioned by Heron, one fifth heavier than those of the money, will be found to agree very nearly with the full standard of the old Attic, or the double of it.

Hence the Alexandrian weights may be calculated, at the higher standard of the double Attic, or double denarius, from a drachma of about 110 grains; which, for convenience sake, may be reckoned equal to our quarter of an ounce, avoirdupois weight, that is, 109.4 grains, as follows:

					lb.	oz.	grs.
			Obol				18.23
6			Drachma			$\frac{1}{4}$	
600	100		Mina		1	9	
36000	6000	60	Talent		93	12	

6. The Tyrian standard is given by Heron [k], as equal to the Attic: and Josephus says, the Tyrian money was equal to the Attic [l]. This also must be understood to mean the denarius, or drachma of about 55 grains; both because that was the common estimate of the Attic in late times, (as has been already said,) and because the Tyrian money appears to have

[k] Scalig. Re Num.   [l] Bell. Jud. ii. 21. 2.

been coined by that standard. The Tyrian coins are of about the same weight as the Alexandrian. Eleven silver coins of Tyre, in the British Museum, give an average weight 214.8 grains. One of Sidon weighs 211.5. Nine of Aradus are rather heavier, and give for the average, 226.5[m]. Upon the whole, we may fairly reckon them, as equal to half the avoirdupois ounce, 218.8 grains; and if these coins were, as they seem to be, tetradrachms, the drachma would be about 55 grains. Hence, the weights are exactly half those given for the Alexandrian in the last table.

7. A Rhodian talent, of the value of 4500 denarii, (that is, drachmæ,) is mentioned by Festus[n]. The weight of this would be about 34lb. 11oz. avoirdupois, reckoning the denarii at the reduced weight, and the drachma of the system would be about 40.5 grains. But the place in Festus is generally considered too uncertain, to put any dependance on it. Heron says[o], on the contrary, that the Rhodian mina was equal to the Eginetan, and five times the weight of the Ptolemaic; which would be $\frac{4}{5}$ths of the Attic, according to his estimation of the Ptolemaic. This would amount to 7500 denarii in weight, for Heron considers the denarius the Attic drachma; that is to say, it would be greater than the weight assigned by Festus in this place, by $\frac{2}{3}$ds.

8. The Syrian talent is said by Pollux[p], to have contained 4500 Attic drachmæ, which must be reckoned denarii, as in the former instances: and then this system would equal the last mentioned, or Rhodian. But,

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[m] See also Num. Hunt. in Tyrus. The same standard appears in the coinage of some of the Syrian kings. See Combe, Num. Mus. Brit. Four coins of Seleucia, in the Brit. Mus., give an average 220.5 grains. See also below, xi. 3.

[n] Talent.   [o] Scalig. Re Num.   [p] ix. 6.

if the Syrian standard was the one used at Antioch, which is mentioned by Heron, it was, according to Heron[q], three times as great as the Attic, that is to say, twelve times as great as Pollux describes it to have been. There was moreover a large standard used at Antioch for weighing wood, which was nearly six times the weight of that used for the money[r].

9. Pollux mentions also a Cilician talent, of 3000 drachmæ, or half the Attic. This, calculated on the same principles as the others, would amount to about 23lbs. 4oz. avoirdupois; and would give the drachma of the system 27 grains in weight.

10. There was also a standard much smaller than any of these; of which the talent was no more than six Attic drachmæ[s], or, $\frac{3}{4}$ of an avoirdupois ounce, and about 71 grains. This was called sometimes the talent of gold[t], because gold was often weighed by it, and sometimes the Sicilian talent[u], because it was retained by the Greeks of Sicily and Italy. It is the only talent mentioned by Homer[x]. It passed at Thyatira also for the weight of six drachmæ[y]: but among the Italian Greeks it was sometimes changed: at one time it contained 24 nummi, afterwards only 12[z]: according to Festus, it had the weight of six denarii (that is, drachmæ) at Naples, three at Syracuse, and half a denarius at Rhegium[a]. It is with the highest of these

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q Scalig. Re Num.   r Heron, ibid.

s Pollux, ix. 6. iv. 24.   Bentley on Phalaris, Sicilian Money.

t Pollux, ix. 6.   u Pollux, ib.

x Iliad ψ'. 269, where see Eustathius. Schol. Ven. Iliad ι'. 122. Odyss. δ' 129. θ'. 393. ι'. 202; in each of which places, any of the larger talents would give an absurdly great amount.

y Lex. Seguer. Bek. Anecd. vol. i. p. 306.

z Pollux, ix. 6.

a Talent. The words are " Neapolitanum sex denarium, Syracusanum trium denarium. Rheginum Victoriati."

values, six drachmæ, that it is often spoken of by classical writers, as Simonides [b], Menander [c], Philemon [d], Diphilus [e], and Diodorus Siculus [f]. This talent was not divided into minæ and drachmæ, but, according to the Italian principle, into nummi and litræ; it appears however to have had originally so much in common with the other Greek systems, that it was divided into 60 parts: for it contained 24 nummi, and each nummus, like the Roman sestertius, seems to have been equal to two litræ and a half [g].

11. The great talent, magnum talentum, is found only in Latin authors; and was for some time a subject of doubt, and a difficulty, until Gronovius [h] discovered the real meaning of the term Great, and explained it, by a reference to the last mentioned talent, the small, or Sicilian. It was merely the Roman name for the Attic or Euboic talent. Talent was a foreign word to the Romans; they first learnt it from their neighbours, the Greeks of the south of Italy and Sicily; and, therefore, naturally assigned to it the same value as it commonly bore in this part of Greece, that is to say, the weight of from three to six drachmæ. When, afterwards, their further intercourse with Greece brought the Romans into contact with the Attic and other large talents, in order to distinguish these from the small one of Sicily, with which they were best acquainted, they added the epithet " Great;" and thus magnum

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[b] Fragm. xlii. ed. Gaisf.

[c] Μέθη, ed. Meineke, p. 108. Athen. viii. 66.

[d] Etymol. Magn. τάλαντον.   [e] Etymol. Magn. ibid.

[f] xi. 26, &c.

[g] That is, if the conjecture of Salmasius and Gronovius, τρίτον ἡμιοβόλιον for τρία ἡμιοβόλια in Pollux, ix. 6, be adopted. See Bentley, as above. Gronov. Pec. Vet. iii. 3. Sometimes it was doubled, to 120 litræ. See Müller, Dorians, iii. 10. 12.

[h] Pec. Vet. iii. 3.

talentum came into use, for the common Greek talent [i]. The computation by talents, however, is seldom used by the Roman writers [k], except when reckoning in Greek money : and it is evident, from the manner in which it is mentioned, that they were not, at first, very familiar with the name [l]; it seems, indeed, to have been used sometimes very loosely, with no exact idea of the value of it [m].

12. There remain to be mentioned some talents of greater weight, of which we know nothing more, than that they are said by ancient writers to have been in use. Hesychius [n] mentions one of 100 pounds ($\lambda i \tau \rho \omega \nu$); Vitruvius [o] one of 120 ; Suidas [p], Hesychius, and Epiphanius [q] one of 125; Dionysius of Halicarnassus [r]

[i] Thus Menander mentions a talent being given as a dowry, meaning of course an Attic talent, $\tau \acute{a} \lambda a \nu \tau o \nu$ $\acute{\eta}$ $\pi \rho o \widehat{\iota} \xi$. Thesaur. p. 81. ed. Meinek. Terence, no doubt, intended to specify the same sum, (which probably also was expressed in the same words by Apollodorus in the original,) when he made Phormio ask, for a dowry, *magnum* talentum. Phorm. iv. 3. 39.

[k] As Hor. Ep. i. 6. 34.

[l] Cicero, Tusc. Quæst. v. 32, 91, after mentioning the talent, adds, " Quæ erat pecunia temporibus illis, Athenis præsertim, " maxima."

[m] Virgil's Auri duo magna talenta were not meant to be worth upwards of 4800*l*. Æn. ix. 265 : nor those which were carried off as prizes in the games, to weigh half a hundred weight each, v. 112. 248. Livy may be suspected of confounding different values, when he calls ten talents (2437*l*.) " scarcely a gladiator's pay." xliv. 31. Qu. Curtius renders 3000 talents of silver, by 30,000 talents of gold. See Curt. iv. 11. 7. Diodor. xvii. 54. and the notes of Wesseling and Dindorf.

[n] In $\tau \acute{a} \lambda a \nu \tau o \nu$.   [o] x. 21.

[p] In $\tau \acute{a} \lambda a \nu \tau o \nu$.   [q] De Mens. et Pond.

[r] ix. 27. Isidorus, (Hispal.) Etymol. xvi. 25, mentions three different talents, which he calls minus, medium, and summum, weighing respectively 50, 72, and 120 Roman pounds. The whole of his chapter on weights is worth very little, on account of the mani-

one of 125 asses ; Hesychius ⁵ three still larger, of 165, 400, and 1152 pounds, respectively. These, we may suppose, were for weighing bulky goods, like the wood weights, mentioned above, at Antioch and Alexandria. And if nothing can be said of them with certainty, at least they shew, that there is a very large part of the system of Greek weights still entirely unknown to us, and likely to remain so. But the knowledge of these is, fortunately, not much wanted. The history of the commerce of the Greeks is not so full and particular, as to require an exact measurement of all the standards of weight: those which can be determined with pro- bability, are enough for the general purposes of classic literature.

fest inaccuracies in it. But indeed, what credit, especially on so obscure a subject, is due to an author who gravely writes about Hannibal taking Corinth ? See xvi. 20.

s In τάλαντον.

Table of Talents of weight of different standards,
in Avoirdupois weight.

	lb.	oz.	grs.
Euboic (or Attic)	56	15¼	100.32
Eginetan	82	3¾	30.46
Babylonian	71	1½	69.45
Alexandrian	93	12	
Tyrian	46	14	
Rhodian (of Festus), and Syrian	34	11	
Rhodian (of Heron)	57	13	
Cilician	23	4	
Sicilian	—	¾	71
Wood weight of Antioch, about 204			
Talent of 100 Roman pounds	74	4¾	24.68
Do. ... of 120	89	2½	29.64
Do. ... of 125	93	14	13.53
Do. ... of 165	122	9½	19.39
Do. ... of 400	297	3	98.72
Do. ... of 1150	855	15	21.75

CHAP. III.

ATTIC MONEY.

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'Αργύριον δόκιμον, ἐπίσημον, γνήσιον, καθαρὸν, ἀμιγὲς, ἄκρατον, ἀκίβδη-
λον, ἔντυπον, ἀκριβὲς, νόμιμον, ἀκέραιον, ἀδιάφθορον, ἄδολον, ἄχραντον, ἀνε-
πιβούλευτον.   Pollux, iii. 10.

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I. HITHERTO the Greek coins have been treated
of, as weights only: they are now to be considered, as
money.   The amount of the several denominations of
weight having been settled, the value of the money is
the value of that weight of silver; which will de-
pend on the fineness of the metal, compared with our
own money.   In this calculation the Attic money will
be the first to come under review, for the same reasons
as the Attic weights.

The Greek money in general, and especially that of
Athens, was of a high standard of purity.   Many
writers have been content to take the Attic silver as quite
pure [a]; but it may be doubted, whether the Athenians
had skill enough in the art of refining, to separate
every particle of baser metal: and the few trials which
have been made with the coins, shew a small quantity
of alloy in them.   Agricola [b] stated that the oldest
Greek silver contained generally $\frac{1}{56}$th of the weight
alloy.   Ciaconius [c] upon trial found $\frac{1}{48}$th part.   M.

[a] Savot, Raper, &c.
[b] De Pond. et Temperat. Monet. p. 298.
[c] De Nummis p. 133.

Tillet assayed three Attic tetradrachms for Barthe-lemy[d], and found in the first, which weighed 265.68 grains, $\frac{1}{72}$nd part of the weight alloy; in the second, which weighed 255.6 grs., $\frac{1}{24}$th part; and in the third, which weighed 254.2 grs., $\frac{1}{19}$th part: the lowest of which is much finer than our own silver coin: for the present standard is 18 dwts. of alloy in the pound troy, or about $\frac{1}{13}$th part.

The experiments which I have myself had made with Attic coins, give results somewhat different from this. They were made with three drachmæ of different ages: the first was a thick one, of the rudest and earliest style; the second, a little later, but still of a thick form, with the head of Minerva resembling that of the oldest coins, but not quite so clumsy; the third, of the latest kind, broad and thin, with the owl standing on the diota, the helmet of Minerva's head surmounted by a high crest, and with other characteristics of the later coinage of Athens. The assay of these was reported as follows; in the pound troy the first gave,

> silver ...... 11 oz. 11 dwts 11 grs.
> gold .... —   —   1
> alloy .... —   8   12

or, about $\frac{1}{28}$th of the weight alloy.

The second gave,

> silver ...... 11 oz. 16 dwts 0 grs.
> alloy .... —   4   0

or, $\frac{1}{60}$th of the weight alloy.

The third gave,

> silver ...... 10 oz. 19 dwts 21 grs.
> gold .... —   —   15
> alloy .... —   19   12

or, about $\frac{1}{12}$th of the weight alloy.

[d] Anachars. vol. iv. p. lxii. tab. xi.

2. The inferences to be drawn from these results, compared with the assay of other Greek coins, which will be described further on, are remarkable; not only, as they concern our computation of the value of the money, but also, as they limit the ages of the three classes of coins, from which the three in question have been selected; provided only, that they be allowed to pass, each for a fair specimen of the class to which it belongs.

It was the boast of the Athenians, that their coinage was of a finer standard [e] than all other money in Greece, and Xenophon asserts, that it was exchanged with profit in every money-market. Now, of these three drachmæ, the first and the third are less fine than other Greek money. Out of nine trials of Greek, and one of Roman silver, the third of the three Attic coins described above, is considerably the lowest of all; and the first of them is likewise inferior to all but two. The second, on the contrary, is of finer standard than all, and therefore this alone can belong to the coinage of which Xenophon speaks. And, as the other two must be of different ages, the first belongs to an age earlier than Xenophon, the second to a later. Thus it appears, that the coins to which the second drachma belongs, that is, the middling class of Attic silver, between the thickest and rudest of all, and the broad thin pieces, may be set down, as contemporary with Aristophanes and Xenophon: the very clumsy and ill executed pieces, from which the first was taken, belong to an inferior coinage of an earlier age; and the broad thin coins to later times, when the money was, for Athens at least, considerably debased.

[e] Aristoph. Ran. 723. Demosth. Timocrat. 243. Xenoph. Vectigal. iii. 2.

It need hardly be said, after this, that the highest standard is the one to be taken for our present purpose; the calculation is intended to be made, of the value of money at Athens in her best days, when she had a right to claim that superiority over the rest of Greece in her currency, which, we know, was awarded to her [f].   We must therefore reckon the Attic drachma to contain but $\frac{1}{60}$th part of the weight of alloy.   Hence, deducting this fraction from 66.5 grains, there remains 65.4 grains of pure silver to be valued.

The comparative quality of these coins proves also, that it was the practice among the Greeks to alloy their money, even where the currency had good credit and wide circulation.   And therefore those writers are mistaken, who have reckoned the worth of it, as if it were all, without exception, fine silver.   For, though it is conceivable, that the alloy in the oldest coins is due to want of skill to refine the metal, yet when the later coins are baser than the earlier, this can be only because they were intentionally alloyed.   The same conclusion follows, from comparing the didrachm of Corinth, described in the next chapter, with the older coinages of Egina or Athens, which are both finer metal than it; and, in the same way, the silver of Alexander with the finest Attic silver, where the former is found to contain nearly twice as much alloy as the latter; and also from the comparison of the two specimens of the Argive coinage, of which the earliest is of the finest quality.

3. In the year 1829 the mint price of silver, of the

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[f] It is evident, that, in later times, though the Attic money had still a high character, it was understood that there was other money in circulation as good or better.   Ἀργυρίου μὴ χείρονος Ἀττικοῦ were the terms, on which the Romans required the Etolians to pay the indemnification of 200 talents. Polyb. xxii. 15. 8.

standard $\frac{11}{12}$ths fine, was 60 shillings the pound troy [g], or, (deducting 20 dwts. of alloy,) 5280 grains of pure silver. At this rate, the value of 65.4 grains would be 8.9 pence, or, little less than 9 pence.

In 1813 the mint price of silver was as high as 83 shillings the pound. This gives the value of the drachma 12.34 pence, or, one shilling and more than a farthing.

These are the values of the drachma, reckoned as bullion, at the market price in our money; and the value so taken varies, according to the changes of the price of silver. To get a fixed value for the coin, we must estimate it in terms of our own silver currency; or, in other words, find the rate of exchange at par, between Attic silver and English silver. This will give the same value for the drachma, so long as our coinage remains the same.

The pound troy is coined into 66 shillings [h]; and, since this contains 5328 grains of pure silver, each shilling contains 80.7 grains of pure silver. Therefore the drachma is worth $\frac{65.4}{80.7}$ of a shilling, or, 9.72 pence, which may safely be called $9\frac{3}{4}d$ [i].

If the drachma be estimated as wholly pure silver, it will be worth $\frac{66.5}{80.7}$ of a shilling, or 9.88 pence, which is less than half a farthing under 10d.

. 4. The Athenians had silver coins of various sizes, from four drachmæ, to a quarter of an obol. Among those now preserved, the tetradrachm is the most common; the tridrachm is not found at all, and the didrachm is very rare. The pempobolus, or five-obol piece, was coined: there is one in the British Museum

[g] Digest of Journals, Reports, and Papers, by Dr. Marshall.

[h] Stat. 56 Georg. III. ch. 68. A. D. 1816.

[i] The fraction .03 of a penny in the drachma makes only about 2s. 3d. in the talent, which is inconsiderable.

weighing 50 grains, which has lost 5.4 grains by wear.
The tetrobolus is found also, and the triobolus and
diobolus. The piece of an obol and a half, or quar-
ter-drachma, was another subdivision. In the British
Museum is one of 16.5 grains, wanting but ⅛th of a
grain of the full weight. And in the same collection
are three-quarter-obols, half-obols, and quarter-obols.

The tetradrachm, in later times, was called specifi-
cally stater [k]; but it may be doubted whether it bore
that name commonly in the flourishing times of the
republic; the word stater generally signifies a gold
coin, in writers of that age [l]. Sums of money were
not always expressed in the highest denomination;
sums larger than a mina, for instance, were often ex-
pressed in drachmæ; as 3000 drachmæ [m], instead of
30 minæ: and sometimes even above a talent the
same mode of reckoning was used; as 10,000 drachmæ [n],
instead of a talent and 4 minæ. The word drachmæ
was often left out; and where such an ellipse of the
name of the species appears, it is always to be supplied
by drachmæ, not minæ, or any other denomination [o].
Ἀργύριον was the general name for all money; and it
is observed that the plural ἀργύρια is seldom used by

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[k] Heron, see Scaliger Re Numm. Phot. στατήρ. Hesych. ἄργυρος.
γλαῦκες Λαυριωτικαί. Matth. xvii. 27, &c.

[l] See Isocrat. Antid. 167. (ed. Bek.) Trapez. 45. 51. Lysias
Aristoph. Op. 42. Aristoph. Nub. 1040, &c. The passages re-
ferred to by Böckh Pol. Ec. Ath. i. 18. cannot be proved to sig-
nify the silver tetradrachm rather than the gold stater. Thucyd.
iii. 70. is as strong an argument for the silver stater, perhaps, as
any place. See Dr. Arnold's note. See also Scaliger Re Numm.

[m] Demosth. pro Phorm. 17. See also Lacrit. Pantænet. Cal-
lipp. &c.

[n] Lys. Aristoph. Op. 42.

[o] Demosth. Pantænet. 42, &c. Aristoph. Equit. 835. It is com-
mon in later Greek also; as, ἀργυρίου μυριάδας πέντε, Act. xix. 19.
Joseph. Antiq. xii. 3. 3. &c.

Attic writers [P]. To change a drachma was called κερματίζω, and the change itself κέρματα ; the singular of which, κέρμα, is not often found in use [q]. It was a common practice with the lower orders at Athens, to carry the small coins in their mouths [r]; which they did the more easily, because, (except during a few years,) they were all silver, down to the quarter obol. Below this there was the chalcus, of which 8 went to the obol: other copper coins were introduced in later times; but the consideration of these will be put off to another chapter [s]. In the table which follows, it will be observed, that the last two denominations, the talent and the mina, are *moneys of account*, the rest are *coins*.

[P] Pollux ix. 6 : but it is found elsewhere, beside the passages quoted by Pollux; as Plato Leg. v. 12. χρυσία καὶ ἀργύρια. In later Greek it is common enough, as Matth. xxvi. 15, &c.

[q] Pollux ix. 6. Aristoph. Vesp. 789, and Schol. Av. 1108. Plut. 379. Plato, Meno 12, &c.

[r] Aristoph. Vesp. 789. Ecclesiaz. 818. Æolosicon, ap. Poll. ix. 6. &c.

[s] Chap. viii.

Table of Attic Money.

Chalcus (of Copper)	¼ Obol	½ Obol	Obol	Diobolus	Triobolus	Tetrobolus	Drachma	Didrachm	Tetradrachm	Mina	Talent	l.	s.	d.	farthings
Chalcus (of Copper)															.8125
2	¼ Obol														1.625
4	2	½ Obol													3.25
8	4	2	Obol											1	2.5
16	8	4	2	Diobolus										3	1
24	12	6	3	1½	Triobolus									4	3.5
32	16	8	4	2	1⅓	Tetrobolus								6	2
48	24	12	6	3	2	1½	Drachma							9	3
		24	12	6	4	3	2	Didrachm					1	7	2
			24	12	8	6	4	2	Tetradrachm				3	3	3
			600	300	200	150	100	50	25	Mina		4	1	3	
			36000	18000	12000	9000	6000	3000	1500	60	Talent	243	15		

CHAPTER IV.

OTHER GREEK MONEY.

Δεύτερον αὖτε γένος πολὺ χειρότερον μετόπισθεν
Ἀργύρεον ποίησαν.   HESIOD. Op. 126.

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1. THE standard of Attica was used in the currencies
of many other states of Greece; and that of Egina
was the rival to it : these two divided between them
most of the coinages in the main land. A third
standard of a definite and regular proportion appears
here and there; namely, that of the silver of the early
kings of Macedon, of the Ptolemies, and of some few
other powers. The coins of the Ionian cities in Asia
and the islands are too irregular to be reduced to any
certain standard; all that can be done with them, is,
to notice a few of their leading features, or shew
where they throw light on any of the classics. But
the money of the chief continental states in Western
Greece is not involved in so great obscurity, and the
value of it may be calculated with probability
enough.

The Attic standard was used at Corinth, Acarnania,
and Amphilochia, Leucadia, Epirus, and Acanthus, in
Sicily, and at Cyrene : it was the standard of Philip's
gold; Alexander introduced it for the silver also, and
by him and his successors it was spread as far as their

conquests [a], until, under the Bactrian kings, it reached to the middle of Tartary.

The other currencies of Greece were all reckoned inferior to the Attic money in fineness : in order, therefore, to find the value of the former by comparison with the Attic, it is necessary to ascertain not only the weight, but also the quality of the metal in each case : and this has been done in the following calculations as far as appeared necessary, or practicable. We will begin with the coinage of Corinth.

2. Two Corinthian coins upon trial appeared of very different degrees of fineness. The first, a diobolus of middling age, was reported from the assay, as follows :

	oz.	dwt.	grs.
in the pound troy, gold			6
silver	11	10	6
alloy	—	9	12,

that is, about $\frac{1}{24}$th of the weight alloy.

The second, a didrachm of rather later age, gave

	oz.	dwts.	grs.
gold			6
silver	11	4	6
alloy	—	15	12,

or about $\frac{1}{15}$th of the weight alloy.

The difference is remarkable [b]; but both qualities

[a] Excepting Egypt, where a different standard was used.

[b] It should be mentioned, that there is one doubtful point about these coins. The Corinthian and Syracusan money have often the same impression; and the same coin may often pass for one of either country. So that it is *possible* one of these two may be Corinthian, and the other Syracusan ; for the latter of them was brought to England from Syracuse. But the place of finding is no argument for or against the origin of a coin : and there was no other positive evidence of this being Syracusan. Both were without any distinguishing mark of Syracuse ; and both had the Koph,

are below the Attic standard. If we take the highest, and reckon the drachma of the same weight as the Attic, 66.5 grs., the value will be $\frac{63}{80}\frac{8}{7}$ of a shilling, or 9.48 pence, very nearly $9\frac{1}{2}d$. If we take the lower degree of fineness, it is $\frac{62}{80}\frac{1}{7}$ of a shilling, or 8.97 pence, not quite $9d$.; which is a very considerable difference. If the mean between them, or $9\frac{1}{4}d$., be considered the value of the Corinthian drachma, the rate of exchange between Corinth and Athens, at par, would be 925 to 975, or about 5 per cent, in favour of Athens, and that without reckoning the inequality in the weight of the money; for it appears from the coins, that the Corinthian silver, like most other of the same standard, generally fell a little below full weight. This would be the profit in exchange, spoken of by Xenophon.

With regard to the small quantity of gold contained in these coins, it is probable that it was unknown to the Greeks themselves ; or, if known not estimated, because it could not be separated from the silver [c]. The same admixture is found in many other cases, and is owing to the same cause. Now that the two metals can be separated, a very small portion of either mixed with the other would make a difference in the value. And, therefore, if it were required to find the exact worth of the ancient coins, at their market-price as bullion, it would be necessary to take the amount of gold in the silver money, or silver in the gold into account, and

the cypher of Corinth, on them. After all, as the weight and form of the coinage was (in this species at least) the same at Syracuse and Corinth, why might not the fineness of the metal have been regulated at both places by the same standard ? In that case there would be no need to distinguish them.

[c] Savot, i. 16, 17. ii. 9. So silver is the only metal found mixed with the gold coin of Alexander. See ch. vii.

estimate the value of it. But in calculating their worth as money, this is not necessary : especially when comparing them together and rating the exchangeable value, since the mixture of the other metal did not affect the exchange. And in all cases the estimate is to be made, by taking account of the quantity of alloy only, and deducting that from the whole weight; neglecting the gold, by reckoning all beside the alloy as silver.

That the Attic standard was used for the money of Corinth, is evident from the weight of the coins, of which there are a great many in existence. In Payne Knight's collection, in the British Museum, are fifty-one didrachms of silver ; of which, if three be set aside, the average weight is very nearly 130 grains, or 3 grains less than the full Attic standard : and the best specimens come within half a grain of it. Some in the Hunter collection even exceed it by a grain ; and one in the Bodleian is half a grain above the Attic didrachm. Indeed nothing can be more notorious, than that the Corinthian coins in general, with very few exceptions, agree in weight with the Attic : and of the exceptions, the greater part are nothing more, than accidental fallings off from the regular standard. This is so plain, that even if ancient writers asserted the contrary, we might prefer the evidence of our own senses, after examining the coins, to their statements. But the belief that the standard of Egina was used at Corinth, has really not even positive testimony of unimpeachable authenticity in its favour. It rests on a passage in Aulus Gellius [d], which has every appearance of an interpola-

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[d] i. 8. The passage is, at Lais μυρίας δραχμὰς, ἢ τάλαντον, poposcit. Böckh (Pol. Ec. Ath. i. 4.) calls ἢ τάλαντον a learned interpolation. The interpolator knew, what Pollux had learnt, that a talent of Egina at one time was reckoned equal to 10,000 Attic drachmæ, but nothing more.

tion, and is wanting in the oldest editions. Professor Müller affirms, that no difference of standard was admitted into the Peloponnesus, until after the Peloponnesian war [e]. If Corinth be included in this assertion, the truth of it may be questioned. It is certainly not easy to prove the age of the earliest of the coins; and there are a few of the oldest, which belong to a different standard. In the British Museum are two; one of Payne Knight's collection, which is too much damaged to lead to any conclusion about weight; and one in the Borrell collection, weighing 198 grains, which is 6 grains above the Eginetan standard. If then the opinion above mentioned were correct, this one coin must have been as old as the Peloponnesian war; and all the others later. But, though this is evidently older than the others, the latter have a good right to be assigned to an age quite as early as the Peloponnesian war. Compared with the only coins of this age, whose date is certain, namely the Macedonian, they would be judged at least so early: and their whole style betokens a state of the arts, which in Corinth, once the most advanced state of all the south of Greece, must have belonged to very early times. Moreover, Thucydides' mention of Corinthian drachmæ as a distinct species of currency [f], seems to prove that the standard of money at Corinth was different from that of the adjoining states, and the rest of Peloponnesus. If the Eginetan drachma was the standard at Corinth, as at Sicyon and elsewhere among the Dorians, there is no reason why the government should have required the shares in the colony to Epidamnus,

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[e] Dorians, i. 7. 15.

[f] i. 27. Thucydides elsewhere names the Eginetan drachma, as a currency used in the Peloponnesus, v. 47, and cannot be thought to have meant the same coin in these two places.

to be paid for in Corinthian drachmæ: but it is intelligible, if Corinth was the only state in the Peloponnesus which used the Attic standard. When, therefore, Pollux says [g], that the decalitron was equal to the stater of Corinth, we must understand him to be speaking of such coins, as are to be seen in great numbers in many collections, under the title of Corinth, namely, didrachms equal to those of Athens [h].

3. Next after Corinth should be noticed Sicily, and especially Syracuse, where also the Attic standard was used. This is equally evident from the coins; and since Syracuse was a colony from Corinth, it is not surprising, that the coinage of it should have resembled that of the parent state [i]. The coins exhibit the Attic standard with great exactness, both in gold and silver. Among the latter are some very remarkable pieces, of the weight of ten drachmæ; one of which, from the collection of R. P. Knight in the British Museum,

[g] iv. 24. ix. 6. At all events, what Pollux states from Aristotle can never imply, that the Eginetan standard was used at Corinth: for he says, that the Corinthian stater was equal to 10 Eginetan obols: but ten obols never made a stater; it was always either twelve, for a didrachm, or twenty-four, for a tetradrachm.

[h] On some of the Corinthian coins the Pegasus (the usual device) is *bridled*. This, in all probability, refers to the old legend, that the bridle was first invented by Minerva, and given to Bellerophon; as Pindar relates, Olymp. xiii. 95. Sophocles, on the other hand, ascribes the invention to Neptune, and claims the honour for Athens; Œd. Col. 712. See also Ælian, V. H. iii. 37. The device, therefore, might have been imagined, in order to assert the right of Corinth to the distinction; and, upon this supposition, it would seem to carry back the coins bearing it, to an early age. The impression of the horse is alluded to by Euripides in the Sciron; Pollux ix. 6.

[i] Pollux also says, that a coin equal to the Attic drachma was current at Syracuse in the time of Dionysius the First, and that he made it pass for four times its worth. ix. 6.

weighs 668.8 grains, giving a drachma $\frac{3}{10}$ths of a grain heavier than the standard fixed on above. These large coins are either copies in silver, or equivalents, of the celebrated gold money coined by Damarete, wife of Gelon, and called from her the Damaretian gold, (χρυσίον Δαμαρέτειον,) which was issued in the year 490 B. C. Probably they are equivalents: for, although Diodorus [k] indeed describes the gold pieces of Damarete, as having weighed ten drachmæ, or fifty litræ, yet, all circumstances being considered, it is likely, that what he says of them, relates really to their value, not their weight. This was Scaliger's opinion, in which he has been followed by Böckh [l]; namely, that the gold pieces in question were half staters, of the value of ten drachmæ. There are no instances of gold coins of this very great size: and though the descendants of the Macedonian princes struck some to the weight of eight drachmæ [m], which is not much less, this was at a time, when gold was much more plentiful in Greece, than it was at the beginning of the fifth century B. C. It might indeed seem unlikely, that a silver coin should have been struck, of exactly the same value as the gold half stater, only to serve as an unwieldy duplicate of it in the currency. Certainly it was not the common practice to coin equivalent pieces of gold and silver elsewhere in Greece, but at Syracuse it was; for there

[k] xi. 26.   It is mentioned also by Pollux ix. 6.

[l] Scaliger Re Numm. Böckh Pol. Ec. Ath. i. 5. So we must understand also the "fifty-drachmæ" coins mentioned by Pollux ix. 6, as gold coins equivalent to fifty drachmæ of silver; which would be, according to the common proportion, of the weight of five drachmæ.

[m] Pollux ix. 6, speaks of some gold coins of the same weight current at Cyrene, which were described by Aristotle, and, consequently, were earlier than those which we have of Antiochus.

are [n] many specimens of gold half staters, of the same age as the ten drachmæ silver pieces: and this is a strong reason for thinking that the coinage of Damarete was half staters, since the old denominations of money seem commonly to have been kept for many years, where the standard of weight did not change. R. P. Knight assigned these large silver coins to the time of the two Dionysii [o].

4. The Attic standard was used in other parts also of Sicily, beside Syracuse, as, at Selinus, Agrigentum, Gela, Messene, Panormus, and Segesta, as is evident from the coins of these towns. The coins of Anactorium and Leucas, which are almost all didrachms, fall sensibly below the full weight of the Attic standard; yet they come so near to it, as to shew evidently that they belong to no other. At Acanthus, which was for some time subject to Athens [p], on the contrary, we find some of the money even exceeding the Attic standard by a little: one very ancient tetradrachm of 267.8 grains, gives a drachma of 66.9 grains; and another, of a later age, gives 67.25 grains. But in after-times, with an improved style of workmanship in stamping, the Acanthian coins shew a very great falling off in the weight. It is to be observed that here, as at Athens, the prevailing coin seems to have been tetradrachms: at Corinth, and some other places, didrachms, and not tetradrachms, were most current.

5. The Eginetan money standard, which may be said to have competed with the Attic in the currency of Greece, had a drachma of the weight of 96 grains; the amount being calculated from the coins of Egina and Bœotia, of which there are many preserved. The actual average is rather less than 96 grains, but, as

[n] In the British Museum.   [o] Archæologia, vol. xix. p. 369.
[p] Thucyd. iv. 84, &c.

these coins are of very great antiquity, and many of them much worn, some allowance must be made them; and there are enough of specimens of this weight and upwards, to warrant the conclusion that the standard was not less. They are for the most part didrachms: there are no tetradrachms; but some drachmæ, half drachmæ, and smaller pieces. Of these, eight di-drachms of Egina, belonging to the Elgin collection in the British Museum, give for the average of the drachma 91.74 grains, but a ninth gives 95.15 grains. Ten, of R. P. Knight's collection, give the average 93.14: but of these, one gives 96.75, one 96, and one 95. One in the Hunterian Museum gives 96.76: one in the Bodleian, 95.75: and one in the Pembroke col-lection, 97.5: and in the collection of Dr. Barnes, of Christ Church, is an obol of 16 grains, which gives exactly 96 for the drachma. The coins of Thebes give a greater weight: ten of the oldest in R. P. Knight's collection give the average of the drachma 94.8 grains, of which, one comes up to 96.25 for the drachma, and three give it above 95 grains: those of a style a little later, are not quite so heavy; but among them, one gives the drachma 95 grains, one 95.2, one 96.25, and one 97.5. Upon the whole, then, seven come up to the full weight of 96 grains, and upwards; eight are between 95 and 96; so that we may fix upon 96 grains as the standard of the drachma, with-out any fear of going beyond the mark.

The standard of fineness, of the silver of the Egi-netan coinage, was reported, from the assay of a tri-obolus of the oldest style, to be, in the pound troy,

	oz.	dwts.	grs.
silver	11	12	12
alloy	—	7	12,

or, about $\frac{1}{32}$rd part of the weight alloy. Hence, the

value of the drachma is 93 grains of pure silver, or, as before, $\frac{93}{80.7}$ of a shilling; that is, 1s. 1d. 3.2 farthings. And the proportion of the Eginetan drachma to the Attic is, as 93 to 65.4, or as 4.18 to 3 nearly.

What Pollux has said about the Eginetan standard, has been already considered. It is evident, that his authority could have no weight, if he stated any thing at variance with the coins: for the comparative value of the Eginetan and Attic money is a plain fact, proved by experiment. But it has been shewn, that Pollux's statements, when rightly understood, agree very nearly with the results of the trial of the coins, namely, that the two standards were in the proportion of *about* 4 to 3. This is further confirmed, by a very probable argument from some passages in Xenophon, relating to the pay of the Lacedæmonian soldiers. The common pay of troops in the Peloponnesian service seems to have been three obols of Egina a day: this was the sum stipulated for, in the treaty made by Argos, Mantinea, and Elis, with Athens [p]; and this was what the Lacedæmonians allowed their confederates to pay, instead of furnishing their contingency of men, if they liked it [q]: it is probable, therefore, that the pay offered by Cyrus to Clearchus' troops, of a daricus a month [r], was about the same sum; which is confirmed by finding that a Lacedæmonian general, Thimbron, offered the same sum to the same men afterwards [s]. Now a daricus was equal to 20 Attic drachmæ [t], and 20 drachmæ a month gives 4 obols a day; and, therefore, 4 obols of Attica are equivalent to 3 obols of Egina, which is not much below the proportion given above [u].

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[p] Thucyd. v. 47.   [q] Xenoph. Hell. v. 2. 22.

[r] Xenoph. Anab. i. 3. 21.   [s] Anab. vii. 6. 1.

[t] Anab. i. 7. 18.

[u] If we suppose the exchange to have been in favour of Athens, this calculation will agree more nearly with that made above.

The largest coin of the Eginetan standard seems to have been the didrachm: there are drachmæ, trioboli, dioboli, obols, and half obols still preserved in collections. The values are as follows:

Table of Eginetan Money.

						Weight.		Value.		
						grs.	S.	D.	farthings	
½ Obol						8		1	0.583	
2	Obol					16		2	1.166	
4	2	Diobolus				32		4	2.33	
6	3	1½	Triobolus			48		6	2.5	
12	6	3	2	Drachma		96	1	1	3	
24	12	6	4	2	Didrachm	192	2	3	2	

It is to be supposed from analogy, that larger sums were paid in this coinage, and that the mina and talent were used where it was current, as commonly as those of other standards: but there is no notice of payments made expressly in this currency, beyond drachmæ, or staters. Perhaps the sum of thirty talents, given by the Eleans for some land round Epeum [x], might have been reckoned in this money, which was the currency of that country; but it is not specified that it was so.

Pollux relates [y], that the drachmæ of Egina

[x] Xenoph. Hell. iii. 2. 30. This was B. C. 398.

[y] ix. 6. Hesychius gives to παχείη δραχμῇ the gloss, τὸ δίδραχμον. Ἀχαιοί, which Gronovius (Pec. Vet. iii. 3.) wished to change, by reading Ἀττικοί. But, probably, it is right as it stands. The coinage which passed current by the name of the "thick drachmæ" was

were known at Athens by the name of "the thick "drachmæ," (παχεῖαι,) and that the Athenians would not call them Eginetan, because, from hatred of Egina, they disliked even to name it. But it is probable, that this story is not very ancient; for the oldest Attic tetradrachms are as thick and clumsy as the money of Egina. It is only by comparison with the Attic money of the age of Alexander, and later, that the other kind appears so bulky; and if the difference was not striking till that age, it can hardly be thought that such bitter hatred existed between the two states, long after they had ceased to be rivals.

6. It appears that this standard was used in Greece in very early times. There was a tradition, that money was first coined in Egina by Phidon[z]; and whether this be true or not, it cannot be doubted that Phidon established a system of weights, or measures, or both, which was used throughout the Peloponnesus: and, connecting the name of Egina with the fact, that the standard which we are considering was used in almost all the states of the Peloponnesus[a], it is highly probable, that the drachma of 96 grains was actually that of Phidon's system of weights, or money, if he coined money. The date assigned to him varies: but Mr. Clinton has shewn, that the middle of the eighth cen-

that of Egina, or Bœotia, of which the commonest species was the didrachm; and it was the money used in all the towns of Achaia.

[z] Etymol. Magn. ὀβελίσκος, &c. This etymologist, indeed, says elsewhere, (εὐβοϊκὸν νόμισμα,) that Phidon first coined gold at Argos; but that is only a late perversion of the old tradition. See Herod. vi. 127. Mr. Clinton has collected the authorities on the subject, Append. Fast. Hell. vol. i. p. 247: to which may be added Etymol. Orion. Theb. in ὀβολός. See also Müller's Dorians, i. 7. §. 15.

[a] Pollux ix. 6, concerning the money with the tortoise on it, which is that of Egina. He also quotes Eupolis calling the obol καλλι-χέλωνον. Hesychius too mentions it in χελώνη.

tury B. C. may be fixed upon with great probability, and supposes, that his reign over Argos might have lasted from 783 to 744 B. C. Beyond the Peloponnesus, these weights were used in many countries on the mainland in northern Greece, and in some of the islands : though the Attic money seems to have prevailed more in the maritime and mercantile states. In later times, in the decline of the free states, the money of the Eginetan standard suffered greater depreciation than that of the Attic : for the latter was kept up by the coinage of the Macedonian princes, who, for many generations, circulated both gold and silver very little below the full weight. But the late specimens of the other sink much below the standard.

The most remarkable of all the coins belonging to this class, are those of Bœotia. There are six or seven of these in the British Museum, which are certainly to be reckoned among the most ancient coins in existence ; probably many of them have seen Bœotia overrun by the armies of Xerxes. The oldest of them has no letter upon it, to mark the country to which it belongs ; the next in age exhibit the letter Θ passing through four changes of shape, as follows in order :

1. the oldest |⊟|

2.   ⊟

3.   ⊕

4.   Θ.

After these comes a great number with a part of the name of Thebes upon them, ΘEB : the latest of which appears quite as old as the Peloponnesian war. But in the same collection there are also several of a much later age, in a very different style, which fall off from the standard of weights 16 grains, and more, in

the drachma, which is more than the usual amount of depreciation.

7. The money of the other countries, where this standard was used, is generally in weight a little below the average taken from the coins of Egina and Bœotia. This was the case in Arcadia, at Elis, Sicyon, Patræ, and, especially, Argos ; the coinage of which last state is in some respects peculiar. There are many specimens [b] of it in the British Museum, of which the greatest part are didrachms; and the oldest in the collection give a drachma of, from about 80 to above 90 grains : but the larger number, which are of much later date, do not give more than from about 60 to 82 grains, or about 74 on the average. They are of very unequal sizes : but there is a single gold coin belonging to this coinage in the British Museum, which, if it is an obol in weight, as seems evident, gives a drachma of 99 grains : it weighs 16.5 grains. Whenever this was struck, it certainly must be taken as a correct specimen of the standard of weight.

The silver is of a fine standard : the assay of a tri-obolus, weighing 42.3 grains, of an early (but not the oldest) style, gave, in the pound troy,

<blockquote>
silver ...... 11 oz. 12 dwts.
alloy ...... —　　　8
</blockquote>

or, $\frac{1}{30}$th of the weight alloy, which is very nearly as fine as the Eginetan money, and contains exactly double the quantity of alloy in the Attic. A triobolus of an age rather later is of a different quality ; it gave, on trial by assay,

<blockquote>
silver ...... 11 oz. 9 dwts.　9 grs.
gold .... —　　　—　　　15
alloy .... —　　　10　　　0
</blockquote>

[b] The impression on the Argive money, a wolf, is mentioned by

or, $\frac{1}{24}$th of the weight alloy. Therefore the value of the drachma, of the higher standard, would be (if we reckon the weight 85 grains) 12.12 pence, or about 1*s.* and half a farthing.

At Larissa, it is remarkable that the money of a comparatively late age exceeds the oldest in weight; but the difference is not much. In Eubœa and Locris the same standard is found : but the money of the latter is of the age of Alexander. Naxus, which in very early times was remarkable for wealth[c], had a coinage early. There are some very ancient coins belonging to it in the British Museum; and which are a little below the average weight of those of Egina and Bœotia. In some other islands also this standard was in use, as Crete, Samos, Seriphus, and Teos. It is found in the silver of Phocæa, in Abdera, and Abydos; in Sicily, at Himera; and at Tarentum and Rhegium: but nowhere does the money appear fully to equal the weight of that of Egina and Bœotia.

8. The third standard of money which circulated in Greece, was that of the early coinage of Macedon. It was used in that country for the silver, until Alexander the Great: although some specimens of the oldest Macedonian money are very irregularly sized. Philip (the Second) first introduced the Attic standard for the gold; and his son Alexander took it for the silver also. Before this, the standard was regulated by an unit, which is supposed to be the drachma, of about 109 grains, or a quarter of an avoirdupois ounce. Ten coins of Philip, in the British Museum, give an average

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the Schol. on Soph. Electr. 6. See Hemsterhuis on Pollux ix. 6. (84.) Pollux says, wrongly, that the impression was a mouse.

[c] Herodot. v. 28.

weight 219.9 grains, of which the half is 109.95 grs. And two of Alexander the First, in the same Museum, which are of a denomination double the last-mentioned, amount (together) to twice 434.6 grs., which gives 217.3 grs. for the smaller coin, and 108.6 for the drachma. Many more specimens, of about the same weight, are to be found among the oldest Macedonian coins. But, perhaps, the most remarkable proof of the standard being such as has been described, is to be drawn from some coins in the Bodleian Library: there are in that collection twenty-one silver coins of Amyntas, all bearing the same impression; such an assemblage as I have never met with elsewhere. They have on one side a head covered with a lion's skin, on the other an eagle tearing a serpent; and they also bear the name of Amyntas on them: they are in very fair condition, and, when weighed all together, give an average 53.95 grs. If this be reckoned 54 grs., (and really more than that might be allowed for wear,) the weight of the coin, which is considered the drachma, would be 108 grs. The Egyptian gold coins which agree with this, namely, those of Ptolemy the First and Arsinoe, have been mentioned above[d]: one of them weighed 109.8 grs., the other two gave the standard 107.2 grs. We may therefore fix the standard weight of this coinage as equal to a quarter of our avoirdupois ounce, or 109.4 grs.

In order to calculate the value of this in our money, the fineness of the silver must be assumed. But there can be no objection to supposing it to be of the same quality with that of the Eginetan money, namely, to contain $\frac{1}{32}$nd of the weight alloy. On this supposition, 109.4 grains would contain 106 grains of pure

[d] Ch. ii. 5.

silver; and, therefore, be worth, in our money, 1*s*. 3*d*.
2.8 farthings, or, very nearly 15¾*d*.

Raper discovered this standard of weight in the
Macedonian and Egyptian coinages, and supposed that
he had found the true Eginetan drachma, because it
bore nearly the proportion 10 to 6 to the Attic [e]. Pro-
fessor Müller, too, asserts, that the Eginetan standard
was used for the money of the Macedonian kings be-
fore Philip [f]. This opinion has no foundation but the
passage in Pollux already discussed, which has been
so often misunderstood, and caused so many mistakes
in calculations concerning the Greek money. The
difference between these two standards was, the pro-
portion 109.5 to 96, or little more than ⅛th; and they
are no more to be confounded together, than any other
two of the most distinct in Greece; each of them having
a separate and extensive circulation.

The other countries, where the Macedonian standard
was used, have been partly noticed already. For this
was the standard of Egypt, (which has been described
above, under the Alexandrian weights,) of Tyre, and of
some of the currencies of Syria. In all of which
places, the money is to be valued according to the esti-
mate just made for Macedonia. To these, perhaps, may
be added the silver coinage corresponding to the gold
daricus; which exceeds the standard in question, but in
some cases by so small a quantity, as to indicate that it
was measured by an equal unit. A silver daricus [g] of
224 grains weight, in the British Museum, would give
a drachma of 112 grains, or, 2.6 grains above the
standard. But it must be confessed, that the few spe-
cimens known of this coinage are not of regular size.
There seems also to have been a silver currency of the

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[e] Philosoph. Trans. lxi. p. 462.   [f] Dorians, iii. 10. §. 12.
[g] Plutarch. Cimon. 10.

same standard, at a very early age, among some of the Thracian tribes, whom we are used to call Barbarians. In the British Museum are two silver coins, which from their style seem to belong to very remote antiquity, bearing the inscriptions, γετας ηδονιον βασιλευς, and γετας βασιλευς ηδωναν : the weights are 417.5, and 427.7 grains, giving a drachma of from 105 to 107 grs. ; and the impressions, obverse, two bulls ploughing, with a man guiding them, reverse, a hollow square not deeply indented. From the high relief of the stamping, it might be judged, that these coins were as old as any of the Macedonian silver; and, if so, though they are more rudely worked than the best of that coinage, the Edonian barbarians seem to have been as far advanced in the art of coining, at that time, as many states in Greece. These two specimens shew quite as much skill as the oldest Attic money. And, lastly, the Rhodian cistophorus seems to belong to a standard which is but very little below this, or the half of this.

But there is another question which presents itself, concerning the money of this standard. It has been reckoned hitherto by a drachma, or unit, of 109.4 grains : but it is not quite certain that this was not the didrachm, instead of the drachma. The large silver coins, of four times this weight, are indeed an argument for believing it to be the drachma ; because we do not find any notice of eight-drachmæ pieces being common at this time ; whereas the tetradrachm was one of the commonest species. But, on the other hand, a drachma of half this weight was so widely current in later times, that it is, at least, a very reasonable conjecture, that there might have been such a standard among the earliest and principal currencies of Greece : and there is no positive notice of any

standard so high as the former value, having existed in early times. It is plain, that the same standard was sometimes rated by a different scale in different places, accordingly as the lowest weight, or the double of it, was taken for the unit. And from the variation of the statements concerning the standard at the same place, it would seem, that sometimes there might have been doubt or confusion, between the denominations to be assigned to the same coin or weight, even in the same place : thus, those who called the Tyrian standard *equal* to the (so called) Attic, would reckon the pieces of 218 grains, tetradrachms ; those who called it *double* the Attic would reckon them didrachms. In the same way, there might have been different scales for the Macedonian standard ; and in some places the coin of 109.4 grs. might have passed for a drachma ; in some for a didrachm, and the drachma have been but 54.7 grs.

If this be admitted, the inference from it is important. For in this drachma of 54.7 grs. we discover the exact value of the later Roman denarius, and the drachma which the Romans and others called Attic, and which passed as equivalent to the denarius. And this may help in part to explain both the reduction of the Roman coin, and the confusion between it and the Attic drachma ; by which a lower value was attributed to the latter, than it seems ever really to have had. For here we find an original, independent currency, with a wide circulation in parts of Europe, Asia, and Africa ; which had been long in use before the Romans came into those countries, and which was but little below the Roman standard, and not much below the later Attic. The Romans, therefore, might very probably have lowered their standard, or rather accelerated the progress of reduction, to meet this, instead of

raising it, or keeping it up to the original weight, in order to preserve the equality to the real Attic: while, at the same time, when the genuine coinage of the Attic money ceased, the well known and important name was transferred to that Greek standard, which was most prevalent, and came nearest to it: and this was done the more easily, because in Macedonia, where was one of the chief issues of the real Attic standard after Philip's death, the two coinages were actually current at [the] same time; namely, the new silver of Alexander and his successors, which was equal in weight to the real Attic, and that of the kings before them, which corresponded with the standard called Attic by the Romans. Nothing is more likely, than that these should, in course of time, have been confounded together, and all the Macedonian money (and the same might have happened in other countries also) passed alike for Attic: and thus such coins as those of Amyntas, described above, which were coined either as drachmæ or triobols of the Macedonian currency, about 390 years before the Christian era, would have passed, under the Romans, for Attic drachmæ equivalent to Roman denarii.

9. The silver of Alexander the Great, and his successors, was, as has been already said, coined by the Attic standard of weight: but the standard of fineness was different. A drachma of Alexander, upon trial by assay, gave in the pound troy,

silver	11 oz.	12 dwts.	3 grs.
gold	—	—	21
alloy	—	7	0.

This contains $\frac{1}{34}$th of the weight alloy. Therefore the value is $\frac{64.5}{80.7}$ of a shilling, or 9.48d.; which may be called 9$\frac{1}{2}$$d$. In this instance the admixture of gold, at

the rate of 21 grains in the pound, or about $\frac{1}{274}$th of the weight, would cause a considerable increase in the value. If gold be reckoned 15 times the value of silver, the drachma so compounded would be worth, as bullion, about 9.8 pence, or more than $9\frac{3}{4}d$. But, for the reasons given above[h], this small quantity of gold is to be neglected in reckoning the worth of the metal as money.

10. After these, there is a great number of coins of various ages and sizes, belonging chiefly to the islands and Asiatic colonies of Greece, which cannot be re-duced to any certain standard. One of the most pro-minent of all in this collection is a little gold piece of about 40 grains, which is perpetually recurring in the coinages of many towns on the coast of Asia Minor, and in the islands: many specimens of it are very ancient, but some display a style of workmanship that belongs to the maturity of art: some are as pale as electrum, some look like the purest gold. This would indicate a drachma of 40 or 80 grains; but there is no coinage which can be reduced uniformly to this scale: and the silver, as it is more abundant, is less regular than the gold. There is, however, too much reason to be suspicious in this class of Greek coins.

Simonides mentions Parian drachmæ[i], as if that currency was one of those which were well known in Greece. He adds a description of the impression upon it; but, unfortunately for numismatology, the name of the device is hopelessly corrupt: Kuhn has read it, " a boat;" Heyne, " a goat." There are a few coins, which are supposed to belong to Paros, now preserved,

[h] See sect. 2.

[i] Δραχμαὶ ταὶ Πάριαι τῶν ἐπίσημ' ἄρατος is the fragment in Diogenes Laert. Arcesil. Kuhn conjectured ἄκατος for ἄρατος; Heyne, τράγος. Simonid. Fr. lxxvi. ed. Gaisf.

and more belonging to Parium in Mysia [k]. But nei-
ther throw any light upon the passage in Simonides.

The coinage of Chios is also mentioned; Thucy-
dides [l] speaks of fortieths of Chios, and Xenophon of
pentadrachms [m]. The fortieth was probably two
drachmæ and a half; for there could hardly be any thing
but the mina, of which it was $\frac{1}{40}$th; and nothing is more
reasonable than to suppose, that, as there was a coin of
five drachmæ, there was also one of half that value.
And the value is exactly such as suits the circum-
stances : for if Callicratidas levied five drachmæ for
each of the men of 140 ships, Mindarus might well
have exacted seven and a half for each of them when
he had but 73 ships. The few coins of Chios in the
British Museum, which belong to the earliest age,
seem to agree with this. There is one weighing 236
grains, which may very probably be a specimen of the
πεντεδραχμία : two others, much worn, are nearly half
this weight ; these may be supposed to be fortieths.
If five drachmæ weighed 236 grains, the drachma
would weigh 47.2. Now there are two small coins of
the same currency, which must have been drachmæ ;
they weigh but 39.5, and 36.2 grs. respectively :
but they are so very much worn, that they might well
have lost even so much as 8 or 9 grains in weight : this
addition would bring them up to the full value of the
drachma of the system supposed. But those of a later
age are considerably heavier, they weigh above 50 grs. ;
from that to 56. If the former of these be assumed to

k See R. P. Knight Num. Vet., the coins in the British Mu-
seum, and Mionnet, vol. ii. p. 321. and 573.

l viii. 101.

m Hellen. i. 6. 12. Πεντεδραχμία is named as a small sum,
Dinarch. in Demosth. 56. (97.) Pollux ix. 6, mentions the πεντά-
δραχμον, as having been a coin current at Cyrene.

be the real weight, the ratio of value to the Attic drachma would be about 47 to 66.5 ; and the value of the Chian drachma in our money, about $6\frac{3}{4}d$. It would follow from this, that the amount of the contribution levied from the Chians by Mindarus, was about 3100*l.*; that levied by Callicratidas was about 4000*l.*

The cistophorus of Rhodes was a coin which had a great circulation in the second century before the Christian era ; but no ancient writer determines the value of it. Festus names it twice[n] ; once he says, that the Euboic talent contained 7500 cistophori ; and once seems to imply, that the Rhodian talent was composed of cistophori : if in the words " Rhodium et cistophorum," we substitute " est" for " et," the sentence is intelligible, and would signify that the Rhodian talent contained 6000 cistophori ; but the value there assigned to this talent, namely, 4500 denarii, is quite at variance with the former passage concerning the cistophorus. The cistophorus is not mentioned in early Greek writers. It occurs often in Latin authors[o], and seems to have been one of the commonest species in Asia Minor, when the Romans first took possession of that country as a province. It had the name, probably, from the impression on the coin, the flower of the cistus[p].   Many

[n] In Euboicum Talent. and in Talentum.   In the latter his words are : Talentorum non unum genus. Atticum est sex millium denarium.   Rhodium et (est) cistophorum, quattuor millium et quingentorum denarium.

[o] Liv. xxxvii. 46. 58. xxxix. 7. Cicer. Ep. Att. ii. 6. xi. 1, &c.

[p] This is Eisenschmidt's opinion, Pond. et Mens. p. 143. Others (as Pinkerton, Essay on Med. i. p. 73.) consider the name cistophorus to have come from the sacred chest of Bacchus ; and a few coins are found with this impression. Mionnet describes the flower as that " of a pomegranate (balaustii), or a rose :" it certainly has no resemblance to the latter. Considering how common the cistophorus was at a comparatively late period in the history of Greek

specimens of it are now in existence. The average
weight is a little more than 200 grains for the larger
pieces, and half that for the next size, about 206 and
103 grains. These two would probably be the tetra-
drachm and didrachm of the system; and if so, the
drachma would weigh about 50 grains, which agrees
very nearly with the first statement of Festus. For if
the Euboic or Attic drachma had fallen down to 63
grains, the Rhodian drachma or cistophorus, of between
50 and 51 grains, would bear to it exactly the ratio of
60 to 75, and thus the Euboic or Attic talent would
contain 7500 cistophori. Upon these grounds, we may
fairly set down the cistophorus as about equal to $\frac{3}{5}$ths
of the later Attic drachma, or Roman denarius of the
republic, and worth in our money (assuming the qua-
lity of the metal to be $\frac{1}{24}$th of the weight alloy,)
about $7\frac{1}{4}d$.

Pausanias mentions a coinage of Trœzene[q], of which
the impression was, on one side a head of Minerva, on
the other a trident; and Plutarch also notices the tri-
dent[r]. A few coins with this impression are pre-
served[s]. Heraclides speaks of the money of Tenedos[t],
bearing the impression of a hatchet: which also is

coins, and that the money with the flower upon it is found in great
quantities, and that this flower may be the cistus, it is a probable
inference that it is so: while, on the other hand, it would be re-
markable, if the coin with the chest on it were the cistophorus, that
so few of them had been found. Augustinus, De Vet. Num. An-
tiquit. ii. says, some call the flower on these coins a rose, some a
heliotrope, some "rosolaccium." Hostus, Hist. Rei Num. derives
the name cistophorus from the figure of the canephora carrying the
chest.

q Corinthiac. ii. 30. 6.   r Thes. 6.
s Bodleian Lib. Num. Hunt. See Eckhel, vol. ii. p. 291. There
are four of these in the British Museum, which indicate a drachma
of about 60 grains.
t See Greaves on the denarius.

found in collections at the present day. Pollux [u] gives a list of the impressions on several coinages of Greece; some of which are erroneous, (seemingly,) and some are still to be seen on the coins. And Hesychius [x] describes the impression on the money of Cyrene. But such notices as these do not help our inquiries into the currency.

Other names of money are to be found in Greek writers, of which nothing is known but their names. As for example, the crapatallus, euthea, or psothia, and kidabus, or kiccabus, which were terms used in jest by the comic poet Pherecrates [y]; the Persian danace, mentioned by Pollux and others [z]; and the siglus, which Xenophon says was equal to $7\frac{1}{2}$ Attic obols [a], of which the name seems to be the same as the shekel of the Hebrews. The Aryandian silver [b], so called from Aryandes, governor of Egypt, who coined it in the reign of Darius Hystaspis, had a great reputation on account of the superior fineness of it; but the size of the pieces, and the standard, are quite unknown. Drachmæ Olympicæ are mentioned by Plautus [c]; but no such currency is known. Little trust, however, can be placed in such an expression from a Roman comic poet. If he has not made some mistake, through ignorance of the different kinds of money in Greece, which is not unlikely, it might be meant for a burlesque epithet to signify excellence; something like the " regale numisma" of Horace.

[u] ix. 6.

[x] Βάττου Σίλφιον.   [y] Pollux ix. 6, where see Hemsterhuis, &c.

[z] Pollux, ibid. Hesych. Suid. v.

[a] Anab. i. 5, 6. Pollux ix. 6, appears to allude to the same under the corrupt form ὕλλους, for which the editors have all agreed to read σίγλους. Hesych. σίγλον.

[b] Herod. iv. 166. Pollux iii. 10. vii. 23.

[c] Trinum. ii. 4. 23.

Table of values of Greek drachmæ of the principal currencies.

Attic standard.

	s.	d.
Attic drachma of the age of Xenophon	0	$9\frac{3}{4}$
Corinthian, or Syracusan drachma	0	$9\frac{1}{4}$
Drachma of Alexander the Great	0	$9\frac{1}{2}$

Eginetan standard.

| Eginetan, or Theban drachma .... | 1 | $1\frac{3}{4}$ |
| Argive drachma .... | 1 | half a farthing. |

Early Macedonian standard.

Drachma of Philip
} .... 1 $3\frac{3}{4}$
Alexandrian drachma

Half Macedonian standard.

Tyrian drachma ....
} 0 $7\frac{3}{4}$ and half far-thing.
Drachma called Attic in later times

| Cistophorus .... | 0 | $7\frac{1}{4}$ |
| † Chian drachma .... | 0 | $6\frac{3}{4}$ |

CHAPTER V.

ATTIC GOLD.

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Χρυσοῦ μὲν, ὃς κίβδηλος ᾖ,
τεκμήρι᾽ ἀνθρώποισιν ὤπασας σαφῆ.

EURIP. MED. 513.

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1. THE gold currency of the Greeks has been the subject of much discussion, and different opinions have been held, as to whether certain states of Greece did or did not coin gold in early times. The question has been confined chiefly to Athens; for though Eckhel went so far as to assert, that the commonly supposed gold coins of Cyzicus and Phocæa were but money of account, he has found but few followers in this opinion[a]. But many arguments have been urged for and against the belief, that Athens issued a gold coinage. The grammarians who have written any thing on the subject, all speak of gold money with reference to Athens, in the same general terms as of other gold coinage; and it does not seem ever to have occurred to them, that there was room for any doubt about it. The earliest of the moderns, who have taken up the inquiry, have followed their authority, and taken it for granted that Athens coined gold as commonly as silver. Since Eckhel's time opinions have been various; and though no one has yet brought forward conclusive testimony from ancient writers, many have held to the

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[a] See Böckh Pol. Ec. Ath. i. 5.

old belief: among these the name which ought to carry most weight is that of professor Böckh. Nevertheless, though all this belongs to Athens alone, the question embraces several other free states of Greece; and a discussion might be raised on much the same grounds, only narrower in proportion to the scantiness of our information concerning these, compared with Athens, whether gold was coined in at least six other states. In proceeding to examine this subject, it needs only be premised, that, to avoid repetition, what has already been advanced by others towards settling the question, shall be referred to in as few words as possible.

2. It is quite certain that silver was the earliest coinage in Greece; that it was generally current throughout the whole of it, for some time before much, if any, gold money was introduced. The opinion of R. P. Knight[b], that gold was the first coined, because it was more readily found and more easily worked, is contradicted, like other *a priori* opinions, by all his-

[b] R. P. Knight, Prolegom. Homer. Gold was still bullion in Palestine nearly 450 years after silver had been current as money; and it is more than 400 years after this, that we first find mention of gold money in the history of the Jews. See ch. xii. The Romans used a copper currency (Suidas in ἀσσάρια adds iron) for nearly 500 years after the date of the foundation of the city, before they coined silver. The Britons, when Cæsar invaded them, had copper and iron money. Cæs. Bell. Gall. v. 12. The Germans circulated, if they did not coin, silver before gold. Tacit. Mor. Germ. 5. The heavy Lacedæmonian iron money indeed was coined out of policy. Xen. Rep. Lac. vii. Pollux ix. 6. And that of Byzantium, which was a very small species, probably from poverty. Aristoph. Nub. 249. et Schol. Pollux ix. 6. and Böckh Pol. Ec. Ath. iv. 19. The stamping the coin was a thing of the least importance at the first making of money. Gold would have been far too valuable for common circulation, in the scarcity of money at the first introduction of it into any country. But, really, the choice of the metal for the currency depended chiefly on the facility of supply.

tory, so far as history says any thing on the subject. For proof of this, we need look no further than to the language of Greece. Most of the money terms in common use are derived from the word ἄργυρος ; but χρυσὸς enters into very few, scarcely any before the age of Alexander. For instance, to shew the difference between them, καταργυρόω [c] signified " to bribe with money ;" but the corresponding verb καταχρυσόω [d] (like καταχαλκόω [e]) had only the literal meaning, " to cover with the metal." Nay, the Athenians persisted in calling a money-changer, a silver-changer (ἀργυρα-μοιβὸς), after the rest of the Greeks had learned to use a more general name [f]. This is enough to shew that silver was the original and general currency in Greece, as certainly as the use of the word æs, in Latin, shews that copper was the original money of the Romans.

[c] Soph. Antig. 1077. So also ἐξαργυρόω, Herod. vi. 86. ἐξαργυ-ρίζω, Thuc. viii. 81. where see Duker. Demosth. Pac. 8. (59.) ἀρ-γυρογνώμων, but no χρυσογνώμων. ἰσάργυρος, Æsch. Ag. 959. ἐπάρ-γυρον. μισθωτὴν, Hesychius. Camerarius, De Re Numm. gives more. Ἀργυρώνητος (Æsch. Ag. 949, &c.) is a word of the same class; but it is remarkable that χρυσώνητος does occur : it was the name given by the Cretans to their household slaves: and, as this was recorded by Callistratus the actor of Aristophanes, the term was in use as early as 427 B.C. See Athen. v. 83. Fast. Hellen. a. 427. Hesy-chius, however, gives the same meaning to ἀργυρώνητος. οἰκέτης ἀρ-γυρίου ἀγοραστός. Comp. Eurip. Alc. 692.

[d] Plutarch. Socrat. Gen. p. 307. (583. 38.)

[e] Herod. vi. 50. Aristoph. Eccles. 826.

[f] Mœris p. 54. ἀργυραμοιβοὶ, Ἀττικῶς. κολλυβισταὶ, Ἑλληνικῶς, Sal-lier and Pierson ad loc. Let not Æschylus' ὁ χρυσαμοιβὸς δ' Ἄρης σωμάτων, Agam. 436. be quoted against this : a solitary expression of a poet cannot weigh against the language of common life and ordinary business. Hesychius had nothing to explain χρυσαμοιβὸς by, but a compound (and that misunderstood) of ἄργυρος. Ob-serve, by the way, that the ἀργυραμοιβοὶ of later times, in our own country, were the goldsmiths. See Jacobs, Precious Metals, ch. xv.

3. But at Athens, in particular, it is evident that in the time of Sophocles gold was considered rare: it is spoken of by him as if it were a costly foreign jewel; " Go," says Creon, in the Antigone[g], " and buy, if you will, the electrum of Sardes and the Indian gold." The poet could hardly have used such an expression, if his audience had been used to see and handle gold constantly in the currency of the country. Sophocles also uses the word ἄργυρος to signify money, or wealth, in the abstract:

οὐδὲν γὰρ ἀνθρώποισιν οἷον ἄργυρος
κακὸν νόμισμ᾿ ἔβλαστε· τοῦτο καὶ πόλεις
πορθεῖ, &c.   ANTIG. 295.

But wherever gold money is in common use, all such ideas are expressed by a reference to that metal[h]. As Virgil, writing in the style of the Augustan age, as Sophocles did in the style of his own time, describes exactly the same sentiment as Sophocles, by

quid non mortalia pectora cogis
Auri sacra fames ?   ÆN. iii. 56.

The difference is striking, if Sophocles be compared with many later Greek writers; as Lucian[i], for example, who constantly speaks of gold money, and sometimes uses χρυσίον for money in general. Many forged works adopt the same style, and speak of gold in a way which would at once prove them to belong to a late age, if there were nothing else to detect them by.

[g] 1038.

[h] What would be the effect, for instance, of borrowing the style of Sophocles, and substituting " silver" for " gold," in Spenser's description of Mammon, Faerie Q. ii. vii. " Great heapes of gold that never could be spent," &c. ? The force of this part of the description would be quite destroyed.

[i] See Charon 11. Timon 41. 56. Necyom. 2, &c.

The so called poems of Phocylides[k], Naumachius[l], and Anacreon[m], betray themselves in this. Even a fragment ascribed to Menander, (in whose time gold money was certainly not uncommon in Athens,) where gold is spoken of in this manner, is brought into suspicion by an unusual word[n].

4. These expressions of Sophocles furnish a strong argument against believing that there was a gold cur-

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[k] Lin. 38. ed. Gaisford, the passage beginning χρυσὲ κακῶν ἀρχηγέ, is a diatribe against avarice much like that of Sophocles in sentiment.

[l] Lin. 57. ed. Gaisford.

[m] Od. xxiii. and lxiii. ed. Barnes. It is to be observed that Euripides, although he is very fond of mentioning gold, does not use the word as these writers do : it is not with him the familiar term for the measure of wealth ; but the attribute of ideal splendour, proper to an heroic or poetic age, like the diamonds and pearls of fairy tales.

[n] Namely, 'Αΐδου, in χρυσὸς δ' ἀνοίγει πάντα κ' 'Αΐδου πύλας. Menand. Sentent. Sing. 538. Meineke. The only authority for 'Αΐδης in an Attic senarian, is an anonymous line in Lucian, Necyom. (which nevertheless *may* be Euripides', see Porson on Hecub. 1018.) It is used by Simonides, fr. ccxxx. 117. ccxxxi. 14. ed. Gaisf. Meineke proposed to read κἂν Αΐδου : but ἂν cannot be joined with ἀνοίγει. Suspicion dogs the mention of gold money in another quarter too, where the manner in which it is spoken of would less have attracted notice ; namely, in Xen. Rep. Athen. iii. 3. and Rep. Laced. xiv. 3. The genuineness of both of these works has been more than doubted ; and the latter place, where χρυσίον certainly seems a strange word to be used of Lacedæmonians in times long before Xenophon, (as we know they had no money in the year B. C. 432. see Thucyd. i. 80.) is preeminently suspected. Schneider (upon other grounds) prints it in brackets, as decidedly spurious. See also a note of Böckh's, Pol. Ec. Ath. i. 8. p. 62. Eng. Tr. Schneider on Xen. Rep. Ath. i. 17. infers from the mention of the ἑκατοστὴ, that the treatise was written before B. C. 413. It is more probable, that it was written many years later, by one who took his ideas of Athenian taxation from historians.

rency at Athens about ten years before[o] the Peloponnesian war. The place in Aristophanes so often quoted on the other side, was written thirty-five years afterwards: and certainly it is possible that gold money might have been introduced within this period. But the passage in the Frogs[p] proves nothing by itself: the money there spoken of is called by both names, χρυσίον and χαλκία; and, since one of the two must be used figuratively, those who espouse opposite sides of the question would naturally limit the meaning, each so as to favour his own opinion: the Scholiast alone turns the passage into evidence, by affirming that the golden statues of Victory were coined into money. The Scholiast's own word would pass for little on the subject[q]; but the authority of Philochorus, whom he quotes, and, if Bentley and Tyrrwhit were right in their conjectures, Hellanicus also, cannot be lightly rejected: and we must in reason admit the fact, that there was a debased coinage of gold money issued at this time. Nevertheless, though this be granted, it by no means follows, that it was a lasting or common practice at Athens to coin gold. This debased coinage is an isolated fact, quite unconnected with the arguments for or against a gold coinage in general. For all those writers who have mentioned or supposed a gold currency at Athens, have always considered it as of a high standard, as being fully equal to the daricus, or the later gold of Philip and his successors. But this debased coinage, which is called in contempt *copper* by Aristophanes, could never have passed as equal to the purer gold of other currencies; and therefore, if there be any weight in the statements of Pollux, Harpocration, and others, as to the fact of there

[o] Arg. Antigon.   [p] 731.
[q] Because he speaks of gold mines at Laurium. Equit. 1091.

being Attic gold money in early times, their statements concerning the value[r] of it shew, that they had no idea of any such money as that spoken of by Aristophanes. Thus it is evident that Philochorus and the grammarians are speaking of two different things, and the testimony of the one cannot be brought in support of the other. And, therefore, supposing the debased gold coinage to have been a solitary experiment, and either to have been recalled, like the copper money, or left to wear itself out, the main question of the general currency of gold at Athens remains much as it was before, dependent on other evidence.

The other places in Aristophanes where gold money is named, cannot be proved to mean any thing more than the foreign gold which was often circulated at Athens[s]. Indeed, it might be contended, from the manner in which it is sometimes mentioned, that it must have been a rarity, something more attractive than any domestic currency would have been. It was the highest of all bribes[t]; and the very name of it acted as a charm in the ears of the people. The herald bids the Persian ambassadors " tell them of the gold money louder and plainer;" and presently afterwards he promises them " pecks of gold[u]." These places indicate, not only what is notorious, that foreign gold did come into circulation, but also that it was a novelty, and imply that the Athenians had little or none of their own.

Demosthenes commonly uses ἀργύριον to signify money, but not always; and the exceptions are only where

[r] Harpocrat. Δαρεικός. Suidas Δαρεικός. Polemarchus in Hesych. Χρυσοῦς.

[s] See Dr. Cardwell, Lect. v.   [t] Equit. 475. Av. 154.

[u] Acharn. 102. 108. Plato, Theætet. 83. mentions the possession of much gold as a characteristic of a king.

he is speaking of foreign gold. In the speech against Phormio he uses the term χρυσίον repeatedly; and there the sum in question is specified as 120 staters of Cyzicus[x]. In the speech in the case of Lacritus, ἀργύριον is used every where except once, and there again χρυσίον is the term for a definite sum of staters of Cyzicus[y]. From this we may infer, that, had there been a home currency of Attic gold, we should have found sums paid in gold often denoted by the proper term, χρυσίον, in many of the other speeches of Demosthenes as well as these two; and that he preferred the constant use of the word ἀργύριον only because the money was always paid in the legal silver currency. In Isocrates the word χρυσίον is used under the same circumstances, where a foreigner is bringing an action to recover a sum paid in gold[z]: and from a passage in that speech we learn, that the exchanging silver for gold (which seems often to have been done for the sake of convenience in taking large sums on board ship) was called χρυσωνεῖν[a], " to buy gold ;" a phrase which strongly indicates that gold coin was not the coin of the realm. It is needless to mention the places in the Attic orators where gold money is expressly said to have come from Persia or Macedonia[b].

5. Beside such arguments as these from incidental expressions, there are others to be drawn from history, which tend to shew that it is not probable that Athens had a gold currency. It is certain that the silver mines at Laurium were generally reputed the chief source of the wealth of Athens; they were that " fountain of silver, the treasure of the land[c]." And

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[x] In Phorm. 27. (914.)   [y] 46. (936.)
[z] Isocrat. Trapezit.   [a] Ibid. 51.
[b] See the Indices, and Dr. Cardwell, Lect. v.
[c] Ἀργύρου πηγή τις αὐτοῖς ἐστι θησαυρὸς χθονός. Æsch. Pers. 238.

though revenue was derived from the country on the Strymon, (which afterwards yielded so much gold,) as early as the time of Pisistratus[d], there is no notice of the gold produce being reckoned among the important possessions of Athens. Thucydides, as has been often observed, mentions no gold money in the treasury at the breaking out of the Peloponnesian war[e]. And the expressions used by Xenophon, about seventy years afterwards, seem almost equivalent to a statement, that the government had not coined any up to that time. For after giving reasons to shew the advantages of a silver currency over gold, supposing it possible that either might be circulated, and maintaining that gold is variable in value, but silver constant, he adds, " and it appears to me that the state too has come to this decision before me," δοκεῖ δέ μοι καὶ ἡ πόλις προτέρα ἐμοῦ ταῦτα ἐγνωκέναι[f]. Could he have said this, if there had been a gold coinage then current? It is true that the gold mines at Scaptehyle had been worked for many years before this[g]; but it does not appear that the produce was coined into money. It was stored in the treasury in small masses in the form of counters, φθοῖ-δες; of which we have proof in the years 412 and 406 B. C.[h]: and there is also mention made of uncoined gold twelve or thirteen years earlier[i]. At the same

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[d] Herod. i. 64. The silver mines in this district were apparently more productive than the gold, in early times. See Herod. v. 23.

[e] ii. 13. This negative argument, however, it must be confessed, is not conclusive. Ἀργύριον certainly may include gold; and Isocrates expressly asserts, that there were both gold and silver in the treasury in abundance, in the times before him; De Pace 59, Antidos. 329. But it does not follow, that this was gold of the Attic coinage.

[f] Vectigal. iv. 10. [g] Thucyd. iv. 105.

[h] See Böckh Inscr. vol. i. 145, 146. and his note on the latter.

[i] Böckh Inscr. 150.

time foreign gold coin was often brought into the treasury. The allies paid their tribute in the money of Egina, Cyzicus[k], and perhaps other currencies. The gold staters of Cyzicus are named in the inventories of the treasurers: there occurs also an instance of false staters of silver gilt[l]: and gold coin from Egypt is mentioned by Cratinus[m]. This is quite enough to account for the occasional mention of gold money at Athens, without supposing that it was coined there. And it is probable that, though they allowed foreign gold to circulate, they were fully aware of the inconvenience of having a double currency of their own. If a coinage in each metal issues from the mint, the relative value of the coins to each other must be fixed by law; but the proportion of value of gold to silver is variable, like that of any other commodity which comes to the market; and if the two are always to be exchanged in the same ratio, in every payment of a debt one party would have it in his power to defraud the other, by taking advantage of a change in the market price. The place in Xenophon, quoted above, seems to shew that this was understood: and, accordingly, it appears to have been the usual practice, to keep the government gold in the treasury, as bullion, allowing foreign gold to circulate, as merchandise, with a variable value[n]; while silver was the only legal tender[o].

[k] Böckh Inscr. 145. 144. 151. and 76, where the specifying νομίσματος ἡμεδαποῦ implies that foreign money also was paid into the treasury.

[l] Ib. Inscr. 150.

[m] Pollux ix. 6. τὰξ Αἰγύπτου χρυσία.

[n] Demosth. in Phorm. 27.

[o] Aristoph. Ecclesiaz. 822.

6. The gold coins which are assigned to Athens remain to be considered. Now there are still preserved many hundreds of silver coins of Athens, probably some thousands; and there are some hundreds of gold Macedonian coins, issued by Philip and Alexander during the space of 36 years, as well as many specimens of Ionian and other gold; but of gold coins which bear the stamp of Athens there are perhaps a dozen in existence [p]. If gold had been coined regularly, whenever occasion required, from the time of Pericles to the destruction of Thebes, that is, for 130 years, it is inconceivable that the disproportion should have been so great. For since the Attic gold would doubtless have been of equal purity with the silver, it would have passed in equal circulation with the Philippics; and could not easily, by any means, have been suppressed, had there been any great quantity of it [q].

In the British Museum there are three gold staters, and one diobolus, bearing the impression of the Attic coinage; and one larger piece of different style, which

[p] At Munich there are 20,000 Greek coins altogether, and not one Attic gold coin among them.

[q] Böckh (Pol. Ec. Ath. i. 5.) supposes, that the reason why so few gold coins are extant is, that the Macedonian kings supplanted all the gold coins of the cities by melting them down, in order that, with the exception of the darici, there should be no gold coin which did not bear their image. But there are extant gold coins of the cities, belonging to the age of the Macedonian kings; which proves that they did not monopolize the right of coining gold. And it can hardly be thought that they would have taken the trouble to recoin gold money of the same standard and worth as their own; which the Attic, if there were any, would have been. Moreover, the number of gold coins of an earlier age, which, after all, are preserved, is great enough to make a strong argument against believing, that the practice of melting down the old money was ever systematically enforced or acted upon by the governments.

R. P. Knight assigned to Athens. In the Hunterian Museum at Glasgow is another stater. Winkelman mentions having seen a small gold coin, apparently a triobol, at Naples[r]. Lord Aberdeen speaks of a genuine Attic gold coin having been found near Athens[s]. Mionnet[t] gives a print of a small coin (apparently a half stater) in the King's Museum at Turin, and another smaller, and of a later style of workmanship, from the collection of M. Hermand at Paris; and mentions a stater in the collection of M. Fauvel. And one or two more staters are said to be in private collections in England[u]. Of these, the largest of the five in the British Museum may be dismissed without further notice. It has nothing about it to prove that it belongs to Athens. The impression is a figure of the coarsest workmanship, seated on two winged serpents; which Knight thought represented Erichthonius, and therefore set the coin down as Attic. But winged figures are found on many other coins, particularly those of the Ionian states, and not on any of the Attic. The reverse is the hollow square (as it is called), shaped like the sails of a windmill, which is the oldest form of all. The whole appearance is rude and clumsy: it is evidently very ancient, or an imitation of a very ancient coinage. The metal is very base: and the weight, 247.9 grains, is entirely at variance with the

[r] Eckhel.

[s] Walpole's Turkey and Greece, vol. i. p. 431. Possibly this may be one of the other coins enumerated.

[t] Supplem. vol. iii. p. 536. and plate xviii. The author of the pamphlet referred to below, " Sopra i moderni Falsificatori," asserts that the smallest of the coins mentioned by Mionnet was manufactured at Athens by a forger.

[u] I was told in the British Museum, that some had been brought there, and compared with those in that collection.

Attic standard. The three staters in the British Museum and the one at Glasgow agree in almost every thing, except that the last is rather paler gold than the others; and the description of one applies equally well to all, " Caput Minervæ galeatum ad d. R, AΘE. Noctua stans ad d. Pone olivæ ramus et luna crescens, ante quiddam ignotum[x];" which is nearly correct of the one published by Mionnet also. Some writers have not hesitated to set down all these as forgeries: and it seems to be proved, that the manufacturers of copies of ancient coins, at Smyrna and elsewhere, have forged some specimens of Attic gold, which have been bought for antiques[y]. Those in the British Museum and the one at Glasgow have certainly every appearance of being ancient work. It is perhaps a suspicious circumstance, that these coins have multiplied of late years: this might cause a doubt perhaps, concerning some of the last discovered, if they were discovered. But some, as that at Glasgow, have been known to exist now for some time; and were described before Eckhel's doubts concerning ancient Attic gold money gave so great value to any coins which could pass for such. The stater mentioned in Walpole's Turkey and Greece is said to have been found under circumstances which left no doubt that it was genuine. And moreover, with respect to the four described above, the exact

[x] Num. Hunter. p. 48.

[y] See an anonymous work, " Sopra i moderni Falsificatori di Medaglie Greche antiche," published at Florence 1826, page 20. I have been told, on good authority, that in a valuable private collection at Athens, there are three or four Attic gold coins: and also upon the same authority, that there is now at Athens a notorious forger, who has avowed himself the maker of some coins in that collection; but whether of these gold, I know not.

agreement of the weights[a] with the Attic standard is a very good evidence in their favour ; for in many cases there are no more certain means of detecting spurious coins than the weight. When the outside of the coin has passed every scrutiny, the weight alone, if it belongs to a class of a known standard, will often convict a forgery with entire certainty. The question therefore is, to what age do these belong, considering them as antiques ? When compared with the old Attic silver, they exhibit a certain degree of likeness, and at the same time considerable difference ; the former shewing that they were made after the same model, and the latter enough to prove that they belonged to a later age. In the general character, the outline, and *drawing* (so to speak) of the impression, they resemble the old silver very closely ; the ungraceful shape and stiff lines of that are repeated on the gold in such a way, that any observer would say at once that the latter was a copy of the former ; for the old Attic silver coins are of a very remarkable style, and there are very few others like them, so that the likeness between them and the gold could not have been accidental. But, on the other hand, the gold is quite unlike the old silver in this respect, that the impression is not in high relief : the old silver is remarkable for its thick bulky form, and the high projection of the impression ; and, as far as the specimens preserved go, the same character appears to have belonged to most other coins, and especially gold, of the earlier ages. But these staters, in thickness, in volume, and in the depth of the die from which they were struck, are just like the gold of the Macedonian coinage. The

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[a] The weights are as follows, 132.3 grains, 132.7, and 132.6, for the staters in the British Museum. That at Glasgow is 132.75 grs.

old silver has always the figure of the owl in an indented square; but only one of these coins shews a part of this [b]; the other three have that surface spherically concave in a slight degree; which is not the form of the old Attic coins, but is always found in the Macedonian gold.

The smallest gold coin in the British Museum weighs 21 grains: it bears the impression of the owl, and on the reverse an indentation in the form of A. The general character of it is much the same as of the staters, but it is rather paler coloured metal.

The style and look of all these coins seems to assign them to a later age than that concerning which we have been arguing [c]. The want of solidity, and other discrepancies from the old silver, are proof enough that they were not contemporary with that; at the same time that the evident imitation of it is exactly what might have been expected, had Athens taken to coining gold in her decline. Gold, we know, was scarce in Greece until the Macedonian empire arose: the plunder of Delphi, the improvement of the mines at Philippi, and the conquest of Asia, successively, brought more of it into circulation [d]: and after this time, as the Macedonian monarchs coined much, so there is reason to think that other states in Greece began to coin some, and gold money was current in many places where little but silver had been seen

[b] This is the one which belonged to R. P. Knight. The head of Minerva on it has been struck three or four times over, in consequence of the coin slipping from under the die in stamping: this is occasionally seen in old coins: there is an Attic tetradrachm in the Bodleian to which the same thing has happened.

[c] Pinkerton judged the Attic stater in the Hunterian Museum to be later than the coinage of Philip. Essay on Medals, p. 83.

[d] Diodor. xvi. 8. Athen. iv. 19.

before [e].　Athens might well have followed this ex-
ample : her coinage continued even after the loss of
her liberty, with very little depreciation [f] : and if,
when the staters of Philip and Alexander were com-
mon, and Etolian, Eubœan, or Acarnanian gold ap-
peared too [g], she had begun to issue money of the same
metal, nothing is more probable than that it should
have been coined in imitation of the celebrated silver
currency of her best days; that money which had
been so well known and so highly prized, that it had
kept the old rude form long unchanged, in spite of the
improvements of art being adopted elsewhere [h].

7. Upon the whole, then, when the probabilities on
both sides are fairly weighed, the balance seems de-
cidedly to incline against the belief, that it was the
practice to coin gold at Athens during her best
days.　The few coins, which can be produced in evi-
dence, may be assigned, with more appearance of truth,
to the age of Alexander the Great, than to an earlier
time.　The want of positive testimony to an Attic
gold currency in ancient writers, coupled with the re-
markable proofs of the prevalence of foreign gold in
circulation, the analogy of terms used in money deal-
ings, and the uniform tenor of the modes of speech
used by writers of that age, all together tend towards
this conclusion.　On the other side is the possible an-
tiquity of the coins, the practice of other states which
coined gold, and the authority of Philochorus for a

[e] Diodorus says, Onomarchus and Phayllus coined gold and
silver from the plunder of Delphi; xvi. 33. 36. The Phocians
would hardly be suspected of having had a gold currency before
this.

[f] Above, ch. i.　If Barthelemy's opinion about the tetradrachm
of Aristion be correct, she coined money till at least the year 88
B. C.

[g] See chap. vi.　　　　[h] Dr. Cardwell, Lect. i, &c.

peculiar and single issue of gold in one particular year.
Let it be granted that this last-mentioned statement is
true; let it be admitted that money was coined from
the statues of Victory: still, this was an exception to
the general rule; this debased coinage was unique; it
has nothing in common with the staters which have
been described, any more than with the χρυσοῦς of the
grammarians, which are described as worth twenty
drachmæ.   There is always some hazard in coming to
a negative conclusion on such a question; because
ignorance is one main argument in favour of it, and
any addition to our knowledge on the subject, by fu-
ture discoveries, may entirely overthrow it.   But as
far as we have light to see at present, the most pro-
bable opinion seems to be, that gold money was not
coined and issued from the mint of Athens in the
greater part of the age between Pericles and Alex-
ander the Great; that the gold money which circu-
lated was foreign coin, and that the only legal tender
was silver.

CHAP. VI.

DOUBTFUL GREEK GOLD.

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Parde, quod on, somwhat of our metal
Yet is there here, though that we have not all.

CHAUCER, CANT. T.

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1. THE undoubted fact, that the common currency of Greece was silver [a], causes a question much like that which has been discussed concerning Athens, when we find here and there a few gold coins in existence, of states which had an ancient and well known silver coinage. This is the case with Egina, Thebes, Argos, Carystus, Acarnania, and Etolia. It would go against all our ideas concerning the money of the Greeks, and the scarcity of gold among them in the age which has been under discussion, to suppose that so many states coined and freely issued gold at that time. And therefore it is necessary to examine separately the specimens of gold coins belonging to each of them, in order to determine what they prove concerning the currency. Of those named, one is in the Museum at Glasgow, one in the Bodleian Library, and the rest in the British Museum.

2. That of Egina should come first, as it belongs to

[a] There seems to be no reason for Pliny's wondering, that the Romans had always exacted the payment of indemnifications from conquered nations in silver, rather than gold: indeed it would have been much more wonderful, if they had not done so. Plin. xxxiii. 15.

the best known and most widely circulated coinage. The impression of the tortoise, on the gold coin of Egina in the British Museum, is like that of the silver, but not of the most ancient style: on the reverse is the indented square: and the shape is as irregular as any of the oldest silver; but the coin is much thinner than the silver. It looks like very pure metal. The weight is very remarkable: it is 18.3 grains, which, reckoning it as an obol, which it must be, gives a drachma of 109.8 grs., very nearly in the ratio of 10 to 6 to the Attic: whereas the silver gives always the ratio of 9 to nearly $6\frac{1}{2}$, or exactly 3 to 2.13.

Böckh quotes [b] an inscription among the Elgin Marbles, as proving that there were gold staters of Egina current B. C. 397. He has printed the words of the inscription, χρυσὸν : οι : στατῆρε, and supposed that they ought to be altered into χρυσῶ στατῆρε [c]. But the inscription itself has not οι at all after χρυσὸν, but a figure like c, which is neither a letter nor a blunder of the stone-cutter, but a mark of a pause or stop. This is evident from two places on the same stone. Four lines above that in question, there is χρυσίον ὃ παρὰ τῷ χρυσοχόῳ ηὑρέθη σταθμὸν : III C στε, that is, στεφανος, the beginning of the description of a separate article: and then, immediately afterwards, ἀριστεῖα τῆς Θεὸ σταθμὸν HHΔΔΔΔⅠΔⅠΙ : c παλλάδιον, &c., the palladium being another item in the account. In the same way in the 18th line the real reading is—υμευς χρυσὸν : C : στατῆρε : II : αἰγιναίῳ ἀρτέμιδος βραυ-

[b] Politic. Econom. of Athens, i. 5. (p. 37. of the Engl. Translation.)

[c] Böckh, Inscrip. 150. The inscription is numbered 305 in the British Museum; it stands a little to the right of the entrance into the great room, against the opposite wall: the words are in the eighteenth line which is legible.

ρωνε——; and the mark c is the stop between χρυσὸν
and στατῆρε, shewing that the former word belongs to
the foregoing article, and has no connection with the
latter, the two staters of Egina, which are a fresh and
distinct statement.

It is true, that if any state in that part of Greece
possessed a gold coinage in early times, Egina was as
likely to do so as any other [d]; because she was one of
the chief commercial towns [e], and one of the richest in
Greece, until overwhelmed by Athens: but the well-
known fact, that the Eginetan general currency was
silver, and the probability, that gold in every shape,
especially in money, was not much used then, forbid us
to admit the belief of a gold coinage upon slight grounds.
The difference in weight, too, between this coin and
the silver is worth remarking. It is true, that the
gold seems generally to have been regulated more care-
fully by the full standard weight; but this difference
exceeds the variation from mere carelessness in the
silver. The talent from this obol is more than 13 lbs.
troy weight heavier than that from the silver. Upon
the whole, then, this coin may perhaps be set down as
a *nummus restitutus*, an imitation of the old coinage,
struck in gold when that metal began to circulate
commonly after the age of Alexander.

3. The next is one of Argos, which in the general
character is much like the last. It bears the Argive
arms, the wolf's head, and the hollow square on the
reverse: the workmanship is rather finer than that of
the oldest silver, and the metal looks very pure. This
also is an obol; the weight is 16.5 grains, which gives

[d] Except perhaps Corinth, where, according to Theopompus,
(Athen. v. 20.) gold was found when nowhere else in Greece. But
we have no gold of Corinth.

[e] Herod. iv. 152.

a drachma of 99 grains, exceeding that of the silver coin of Egina by 3 grs.: and this is about what might have been expected, if the silver coinage of Egina were allowed to be a little short of the full standard, but this gold coin were struck accurately up to the full weight. It exceeds the silver of Argos itself by rather more than this; for the Argive money, as has been seen above, seems to have been an inferior coinage, and short in weight; but, as the Eginetan currency was certainly the standard, this is of no importance. Now if it be doubted, whether any state in Greece Proper coined gold at the early age denoted by the impression of the hollow square on the coin, there is perhaps no one state less likely to have done so than Argos [f]; unless indeed we go back to the days of the wealthy Pelopidæ, and call this the money of " golden " Mycenæ [g]." This therefore, as a solitary specimen of Argive gold, may be assigned probably to the same age as that of Egina [h].

4. There is also one of Carystus in Euboea, bearing a head of Hercules covered with the lion's skin; on the reverse a bull sitting; above it KAPY, below, a club. There can be no doubt, from the device and workmanship of this, that it belongs to a comparatively late age, that is, not earlier than Alexander. The weight is 49.3 grs., which, as it is doubtless a triobol, gives a drachma of 98.6 grs.; that is, 2.6

[f] Ἀρκάδας τε καὶ Ἀργείους, τοῖσι οὔτε χρυσοῦ ἐχόμενόν ἐστι οὐδὲν, οὔτε ἀργυρίου, Herod. v. 49: this plain statement effectually bars the descent of the old traditions of the wealth of Argos from the poetic to the historic age.

[g] Πολυχρύσοιο Μυκήνης, Hom. Il. η΄. 180, &c. Soph. El. 9.

[h] The small gold coin of 41 grs. which R. P. Knight assigned to Elis, Num. Vet. in Elis, belongs to a class of coins of the same weight, prevalent in Ionia and the islands, and has no connexion with Elis.

grains above the average calculated from the silver for the Eginetan and Bœotian money, to which standard this belongs.

5. Of Ætolia also there is one, which is evidently of an age at least as late as the gold coinage of Philip and Alexander. The workmanship is fine and elaborate, and the weight exactly that of the stater, or Attic didrachm, 132.7 grs. These four coins are all in the British Museum.

6. The Theban gold piece at Glasgow is very unlike the old Bœotian silver, but exactly resembles a much later coinage. The Bœotian shield upon it is in very low relief: the amphora on the reverse is of a different shape from that of the old silver, but a copy of that on the thin late pieces : the surface is concave on the side of the amphora, and the inscription has the ancient ϵ in the first syllable, and the η in the last, ΘΕΒΗ. It is very high coloured gold. No one would imagine this coin to be earlier than Alexander, from the style of the workmanship; and the weight, 59.75 grs., is quite at variance with the ancient Bœotian standard of weight.

7. Lastly, there is one of Acarnania in the Bodleian Library, of which the impression alone is sufficient proof that it belonged to as late an age as the last mentioned. The weight is 65.25 grs., or $1\frac{1}{4}$ grs. below the full standard of an Attic drachma.

8. Now of these six gold coins, only two have any pretensions to belong to the age in which the question is raised concerning the gold coinage, namely, from Pericles, or before his time, down to Alexander. The question then is, whether upon the evidence of two golden obols, against the concurrence of every probability from the testimony of history in general, and notices of money in particular, and the compa-

rison with the silver in existence, we shall believe
that there was any current gold coinage commonly cir-
culating in Greece.   As the case stands at present,
I think that this is not probable; that at least it
is more probable that these coins were struck in later
times, or for particular purposes, than that there
should have been a gold currency in the respective
states during the time in question.   Until more coins
of this kind shall be found, which can by their number
or their quality put the fact beyond doubt, it seems
more likely than any thing else to be true, that the
national currency of the free states on the mainland
of Greece, and most of the adjacent islands, was silver.
If any of these coins are really so old as the age of
Pericles, it is most probable that they were part of a
very small and unimportant issue of money : they
were struck perhaps of a limited number, for parti-
cular occasions, and were isolated examples of depar-
ture from the usual practice, like what Philochorus has
related of the debased coins struck from the statues of
Victory : they had little effect upon the general circula-
tion, and scarcely obtained for themselves any name or
notice, while the universal currency, from which all
the language of trade and money matters was taken,
remained as before, silver.   The gold which did pass
current was foreign gold.

CHAPTER VII.

CURRENT GOLD IN GREECE.

<div align="center">──────────</div>

Χρυσὸν βροτῶν γνώμαισιν μανύει καθαρόν.

<div align="right">PHOCYLID. AP. PRISCIAN. METR. TER. 25.</div>

<div align="center">──────────</div>

1. THE Greeks from the earliest times looked upon the countries of the East as the great source of all wealth, and of gold in particular. Much gold was to be a part of the spoil of Troy [a]; and there was a constant influx of that metal from the same quarter, from the time of Crœsus, to the Macedonian conquest; although, as early as the Peloponnesian war, Carthage was known to have accumulated a great store of both silver and gold [b]. India produced much gold probably in very early times [c]: Arabia is said by ancient historians to have supplied it also [d]: in Armenia and Colchis it was found [e]: Crœsus worked mines in Troas,

[a] Ulysses says to Achilles, " If we take Troy, do you νῆα ἅλις χρυσοῦ καὶ χαλκοῦ νηήσασθαι. Iliad. ι΄. 279. It is remarkable that silver is omitted. Compare Il. ζ΄. 48. θ΄. 473. Od. ξ. 324, &c. From these places we might infer, that before money was coined in Greece, (that is, in Homer's time,) there was very little silver there.

[b] Thucyd. vi. 34.   [c] Herod. iii. 94, 98, &c.

[d] Strabo and Diodorus. See Reitemeier vom Bergbau der Alten, i. p. 26. Niebuhr doubted the fact, because he found no trace of mines in Arabia. But Reitemeier justly remarks, that gold might have been found near the surface.

[e] Upon the subject of the mines of the ancients, see Reitemeier,

<div align="center">H 3</div>

and elsewhere, and many rivers yielded much dust from the washing of their sands.   All these sources contributed to the stock possessed by the Asiatic princes; and hence, though the vulgar notion among the Greeks, of the wealth of the " gorgeous East," was much exaggerated, there was a considerable quantity amassed, before the Greeks had much in their possession.

2. The earliest gold money which is known to have come into Greece, was the stater of Crœsus [f].   One of the traditions about money attributed the first coinage of both gold and silver to Lydia [g]; whether this be true or not, at all events the gold coins of Crœsus were among the earliest ever seen by the Greeks.   This stater is supposed to have been worth the same as the daricus and that of Philip, namely, 20 Attic drachmæ. But no ancient writer gives any information which enables us to determine this, nor have any specimens of the coin ever been found.

3. The daricus was another foreign species of gold universally current in Greece for many years, for a much longer time, and in much greater abundance than the stater of Crœsus.   There is some doubt about the origin of it.   Darius Hystaspis, as is well known, reformed the Persian currency, and coined gold of the purest standard [h] : hence it has been commonly supposed that the daricus was so called from him.   But Harpocration [i] and others assert, that the name was older than this Darius, and taken from an earlier king:

as above, (pointed out by Böckh, Pol. Ec. Ath. i.)   His work gives a general account of all the mines of the ancients.

   [f] Herod. i. 54.   [g] Herod. i. 94.

   [h] Herod. iv. 166.

   [i] Schol. Aristoph. Ecclesiaz. 598. Harpocrat. δαρεικὸς, and Suidas after him.   Hesychius says, ἐκλήθησαν, ὥς τινες φασὶν, ἀπὸ Δαρείου. See also Prideaux, Connect. P. i. b. ii. p. 129., who argues upon the other side.

and the manner in which this is stated, in opposition
to the contrary opinion, shews that a question had
been raised upon the subject.   No earlier king of the
name of Darius is known : but both the coin and the
name of the daricus appear to be older than Darius
Hystaspis.   The adarkon, or darkemon, a weight or
coin of gold, mentioned in the Bible in David's reign[k],
is supposed to be the same : and if the word was one
of ancient origin, it was probably only the accidental
likeness of it to the name of Darius, coupled with the
fact of his improving the coinage, which made him pass
for the inventor of it [1].   The daricus passed in the year
B. C. 401. for twenty Attic drachmæ[m], which is the
value of the stater of Philip and other staters.   But,
upon comparison, the daricus does not appear worth so
much as the later gold coins.   There are a few of them
preserved, having been recognised for darici by the
impression of the archer, according to the description
of Plutarch[n]; but they are less pure gold, and a little
below weight.   The two in the British Museum weigh
128.2 and 128.5 grains : that at Glasgow 129 grs.
Barthelemy[o] gives the weight of three at Paris, 128.5,
128.7, and 128.9 grs., which is more than 4 grs.
below the Attic standard.   Their passing for twenty
drachmæ gives the ratio of gold to silver a little more
than 10 to 1, which is lower than we can suppose gold
to have been in Greece generally at that time.   The
value in our money, computed thus from the drachma,
is 16*s*. 3*d*.; but if they are reckoned by comparison

[k] See below, ch. xi. sect. 5.

[1] The fact, that there were silver darici, furnishes an argument
against believing that the name owed its origin to Darius' improv-
ing the gold money.   See above, ch. iv. 8.

[m] Xenoph. Anab. i. 7. 18.

[n] Agesil. 15.   [o] Acad. des Inscr. xlvii. p. 201.

with our gold currency, they amount to more. Barthelemy says, that they are 23 karats ($\frac{23}{24}$ths) fine [p]. If so, they are $\frac{1}{74}$th finer than our standard gold, and, reckoning them at 129 grains in weight, contain 123.7 grs. of pure gold : therefore in value they equal $\frac{123.7}{113.12}$ of a sovereign [q], or, about 1*l*. 1*s*. 10*d*. 1.76 farthings.

4. The stater of Cyzicus was another gold coin current in Greece, and especially at Athens. All that is to be found concerning the value of it, is the fact, that a little after the year 335 B. C.[r] it passed on the Bosphorus for twenty-eight drachmæ of Athens [s] : according to which, it ought to be to the daricus in the proportion of 7 to 5 ; and, if the daricus weighed nearly 130 grs., the Cyzicene should weigh about 180. At all events, even if something be allowed for an unusually high price of gold just at that time on the Bosphorus, it must have been worth more than the daricus. There are some coins, both gold and silver, of Cyzicus preserved [t] : but they are of very unequal sizes, and there are not enough of them to determine the weight of the drachma or unit of the standard. Among these, however, as almost every where else among the coins of Asia Minor and the adjacent islands, is found the small gold piece weighing about 40 grs. : and some of the larger coins are multiples of this. There is one of 80 grs., and two of little more than 240 : supposing, then, 40 grs. to be the weight of half a drachma [u], we might deduce from it

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[p] Acad. des Inscr. xxi. p. 24.　　[q] See below, sect. 11.

[r] Demosth. in Phorm. 43. (918.)　　[s] Ibid. 27. (914.)

[t] See Sestini Degli Stateri antichi, Num. Hunter. and the coins in the British Museum.

[u] But, on the other hand, if these small gold coins are reckoned as drachmæ, they agree exactly with the calculation of the so called

a stater of 160 grains ; which applied to the value given
above, of 28 Attic drachmæ, will give the ratio of gold
to silver on the Bosphorus $11\frac{1}{2}$ to 1 : which is a very
probable proportion.   If the value be calculated from
the equation in drachmæ, it is 22s. 9d.

5. The stater of Phocæa was in circulation in the
fifth and fourth centuries before Christ [x]: but, as it
was of baser metal [y] than the last two species, it seems
not to have spread so widely as they.   The value of it
in Attic money is not known, nor can it be ascertained
with certainty from the coins.   Sestini [z] gives one
weighing 276.5 grs., which he considered a double
stater.   The half of this, 138 grs., would differ but 5
grs. from the Attic didrachm : but there are no traces
of the Attic standard in the rest of these coins.   There
was also a coin of Phocæa called a sixth, ἕκτη [a], cur-
rent at Athens, which Böckh supposed to be a fraction
of the stater, and therefore silver.   But perhaps it was
the sixth part of the mina, like the fortieth, or half-
pentadrachm, of Chios ; and if so, it was gold.   The
gold stater of Philip was $\frac{1}{3}$th of the mina, and, if the
stater of Phocæa bore the same proportion to the mina,
the hecte would be five-sixths of it.   It is evident from
the coins of Cyzicus and Lampsacus, that there were
gold coins of different denominations, not multiples of
each other ; and there might at Phocæa have been a

Rhodian and Syrian talents, and the drachma belonging to that
standard, which came out 40.5 grs.   But we do not yet know
enough to speak with certainty on the subject.   See above, ch. ii.
sect. 7, 8.

[x] Thucyd. iv. 52.   Demosth. Bœot. 44. (1019.)   It is men-
tioned by Pollux, ix. 6.

[y] Hesych. Φωκαΐς.   [z] Degli Stateri antichi.

[a] Böckh Inscr. 150.   Hesychius (in ἕκτη) says, the ἕκτη, τρίτη,
and τετάρτη were coins of silver, or gold, or copper.   These, of
course, were subdivisions of different integers.

twofold division of the mina by five and by six, into staters and hectæ.

6. Lampsacus also coined staters, which must have belonged to the same period as the last-mentioned, though they are not mentioned by ancient writers. The coins of Lampsacus now preserved are of unequal weights; but it is remarkable that some of them are exactly the weight of the daricus, that is, about 129 grains. There are two of these in the British Museum, which appear to be of the purest gold; and Sestini describes three more of about the same weight.

7. Samos appears to have had a gold coinage in the time of Polycrates; for he was said to have imposed on the Lacedæmonians, by gilding the money of the country, which they took for gold coins [b]; and it cannot be supposed, that he should have counterfeited a coinage which never existed. But the coins of Samos, like others already mentioned, are too irregular to attempt to determine their standard or value, even if any of them may be believed to go back to near the age of Polycrates.

8. Out of Ionia, it appears that the island of Siphnas had a gold coinage also. It possessed both gold and silver mines, and had grown very rich from the produce of them, as early as the time of Crœsus [c]. This would make it not improbable, that the Siphnians might have begun to coin gold before the rest of the Greeks in the west: and there are a few gold coins of an early age, which have been supposed to belong to this island [d].

9. For the same reason, perhaps, it might be thought

[b] Herod. iii. 56.　　　　[c] Herod. iii. 57.
[d] R. P. Knight Prolegom. Homer. p. 28 ; but what he read as ΣI, seems to be only an unmeaning indentation.

probable that Thasus[e] should have coined gold ; and, accordingly, a few gold coins of Thasus are described as preserved in some collections[f].

In Sicily also some gold was coined early : that of Demarete, wife of Gelon, has been already mentioned[ff]. At Cyrene, too, gold money was current as early as the time of Aristotle, and some of the coins were as large as four staters, or eight drachmæ[g].

10. But beside those which have been mentioned, many, or indeed almost all of the Ionian cities coined some gold money.   There are in existence gold coins of Chios, Teos, Colophon, Smyrna, Ephesus, and many other places : in short, almost all the large cities and islands round the coast of Asia Minor, from Appendus to Abydus[h], seem to have contributed a few specimens to this class of Greek coins[i].   Of these, Colophon was celebrated for the art of refining gold[k], which probably was employed in the coinage.   Perhaps some allusion to the coinage of Rhodes may be contained in the fable of the shower of gold which Jupiter rained upon it[l].   But the greater part of these currencies are involved in utter darkness as to their standard or value, compared with others better known. It is probable they did not circulate very widely ; for

[e] Herod. vi. 46.

[f] Mionnet i. p. 433 ; but these coins seem not very ancient.

[ff] Ch. iv. sect. 3.   [g] Pollux ix. 6.

[h] Abydos had gold mines at one time. Xen. Hellen. iv. 8. 37.

[i] See Sestini Degli Stateri antichi, and the coins in the British Museum, chiefly those which were in R. P. Knight's collection.

[k] Strabo ix.   See Reitemeier ii. p. 80. Suidas χρυσὸς Κολοφώ-νιος.

[l] Pind. Olymp. vii. 63, where see Bentley.   Homer, indeed, says only θεσπέσιον πλοῦτον κατέχευε Κρονίων. Il. β΄. 670, where see the Schol. The worship of Minerva, of course, signifies the cultivation of arts and manufactures. See Strabo, xiv. 2.

the weight seems to be very ill regulated, and the
metal is very base in most of the coins. But they
were current commonly enough to account for the allu-
sions to gold money in the old poets [m]; which, consi-
dering how little is left of the works of these poets,
are more numerous than in the Attic writers. And this
agrees with the difference in their circumstances, ac-
cording to the opinions expressed above; for the former
lived in the countries where the Ionian gold passed
most in circulation: but the Attics were used to the
silver currency of their own and the adjoining states.
It is remarkable too, that the quantity of base gold
among these coins illustrates the frequent allusions to
counterfeit money, especially gold, which is found in
ancient writers, both those of Athens and others [u].
For among the Athenians such expressions must have
been derived from foreign money; since, even if they
had a gold currency, it undoubtedly was of a fine
standard ; and their own silver was so pure as to sug-
gest no such ideas. And it was probably from the
same sources that the Lacedæmonians had drawn the
gold which Plato says they had accumulated, as well
as silver, at Sparta to a very great amount, the pro-
duce of their conquests during many years [v].

11. There remains to be considered the gold coin-
age of Macedonia, which came into circulation under

[m] As Hipponax Fr. iii. x. xii. ed. Welck. Pythermus in Hip-
pon. Fr. xxv. Theognis γνωμ. 77. 719., which is attributed to Solon
by Plutarch, but falsely, if we follow Lucian Charon 12. Simo-
nides Fr. ccxv. ed. Gaisf. Pind. Ol. 1, 2, &c. Fragm. in Plat.
Epist. 1.

[n] Theognis 119. 418. 449. 499. 1101. Bacchyl. ap. Priscian.
Metr. Ter. 25. Æsch. Ag. 581. Eurip. Med. 503, &c. Harpocrat.
in βάσανος.

[o] Plato, Alcibiad. 38. Comp. Xen. Hellen. ii. 3. 8. Müller, Do-
rians, iii. 10. §. 11. Polyb. vi. 49.

Philip, and lasted to the end of the independence of Greece. The stater of Philip is, as has been already said, of the weight of two Attic drachmæ: and the quality of the gold has always been considered very high. Bodin reckoned it to contain but $\frac{1}{100}$th part alloy [p]. Patin speaks of having found it to be above 23 karats 16 grains ($23\frac{1}{2}$ kar.) fine [q]. And Pinkerton asserts [r], that the gold of some of the Ptolemies is 23 karats 3 grs., ($23\frac{3}{4}$ kar.) fine. A stater of Alexander, which was assayed for me, gave in the report,

gold ...... 11 oz. 19 dwts 6 grs.
silver ..... —   —   18
alloy ...... —   —   0.

This should be reckoned as pure gold, for the silver, which is but $\frac{1}{320}$th part of the weight, was either not known to be present, or left there because it could not be separated: the stater, then, would be worth 133 grs. of fine gold. Our sovereign contains about 123.4 grs.[s] of gold 22 karats (or $\frac{11}{12}$ths) fine, which, after deducting $\frac{1}{12}$th, leaves 113.12 grs. of fine gold: therefore the stater is equal to $\frac{133.11}{113.12}$ of a sovereign [t], or 1*l.* 3*s.* 6*d.* 0.672 farthings.

[p] De Rep. iii. 6. 43.

[q] There is no such division as 23 karats and 16 grs. recognised by our goldsmiths now. An imaginary division is made of the pound troy into twenty-four parts, which are called karats. The karat is sometimes subdivided again into four imaginary grains, called karat grains. But the French goldsmiths divided it into 32 grs. See Patin Hist. des Medailles, vii. p. 57. and Bouteroüe Recherch. des Monoyes Introd. p. 2.

[r] Sect. v. p. 40. He there says, the gold coins of Philip and Alexander " are of the utmost purity :" he does not say whether he assayed either these or the coins of the Ptolemies.

[s] It is more exactly a fraction, 123.39479, &c.

[t] The value which it is said actually to have borne in circulation very lately is still higher : " the gold of Philip still passes current

If the market value, as bullion, were reckoned, and the silver in the stater taken into the account, this would lessen the worth of it by about 3 farthings, if silver be valued at $\frac{1}{15}$th of the price of gold.

The value of the stater of Philip, estimated from the amount of silver for which it was exchanged, namely, twenty drachmæ [u], is much less than this; it is only 16*s*. 3*d*.: the difference between the two, measures the difference between the ratio of gold to silver in that age, and the ratio at the present time. But it is evident, that the higher value is the true one. That is to say, whenever a sum of money is expressed by an ancient writer in terms of gold staters of Philip, in order to find what that sum would really be equal to in our money, we must substitute twenty-three shillings and five pence for the stater. The other mode of reckoning includes the comparative value of silver, which was much greater in former times than now.

This value for the stater of Philip, 1*l*. 3*s*. 5*d*., will serve for nearly all the gold money coined by the Greeks after the establishment of the Macedonian empire. Alexander and all his successors, except the Ptolemies, coined by the same standard. The Attic gold staters were exactly equal to it. The kings of Epirus had gold money of the same size. Some of the smaller states adopted it likewise, as Ætolia for instance: and others coined half staters, as Acarnania, which appear also in Sicily among the money of Syra-

in the unfrequented parts of Greece : the value of the piece is 20 piastres, or about 25 shillings." Letter from Lord Aberdeen in Walpole's Turkey and Greece, vol. i. p. 431.

[u] Pollux, ix. 6., quotes Menander for the ratio 10 to 1. See also Harpocration and Suidas in δαρεικοὶ, Hesychius and Suidas in δραχμὴ, and Hesychius in χρυσοῦς. A corrupt passage of Suidas, in ὀβολὸς, seems to describe the value of gold as only six times that of silver.

cuse.   But nevertheless, in most of these last there is a little falling off from the standard of weight [x], and probably there may be some diminution of the fineness of the metal ; so that, strictly speaking, in estimating them, some slight deduction ought to be made from the value assigned to the money of the full weight and highest degree of fineness.

[x] In the British Museum are six gold half-staters of Syracuse which come up to 66 grains each, of which one is 66.4. grs.   All these have bigæ on the reverse ; but after them comes a series with a tripod in the place of the bigæ ; and these fall at once 6 grs., to 60 grs. and under.

CHAP. VIII.

GREEK COPPER.

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Is there any coper here within ? sayd he.
Ye sire, quod the preest, I trow there be.—
He went his way, and with the coper he came.

CHAUCER, CANT. T.

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1. COPPER was very little used by the Greeks for money in early times. It does not appear ever to have been admitted into the general currency, or to have passed in circulation as equivalent to silver, until a comparatively late age. The language of money-dealings does not recognise the word χαλκὸς; it occurs there even less than χρυσός. The proportions of the coins, and other denominations of money, seem to have been calculated solely on the principle of silver being the medium: Eckhel thought that there were no copper coins of undoubted antiquity[a]; and even those which bear the impression of the oldest style, Barthelemy supposed to have been struck in a late age, and to have revived or retained the form of earlier times[b]. There are indeed several copper coins bearing the name of Hieron, which have been assigned to the first

[a] Proleg. General. ch. viii. Epiphanius, Mens. et Pond., ascribes the invention of copper coins to Egypt: for no other reason, as it seems, than *because* the Alexandrians called their silver money χαλκίνα [χαλκία].

[b] Barthelemy, Acad. des Inscr. xxiv. p. 39.

king of Syracuse of that name; and some with the name of Gelon, ascribed to his reign [c]; but the workmanship is so unlike that early age, and so closely resembles that of the times of Alexander and his successors, that it is much more probable that these coins belong to the second Hiero, who lived during the first Punic war [d]; although it is by no means unlikely, that copper was coined and circulated in Sicily in the time of Hiero the First, or Gelo.

It seems that silver was originally the universal currency [e] on the mainland of Greece, and that copper was used only for a smaller subdivision of the species. Unlike the Roman currency, which began with copper, and changed to silver as wealth increased, the Greek coinage seems to have been generally silver from the first, and to have admitted copper for the smallest coins only, when, as money was spread through many hands, the least possible subdivisions of it were needed. No one can say to what extent little copper pieces might not have been used in the separate states, for home circulation. It is possible that a debased coinage [f], of tokens rather than money, like modern paper currency, might have been used in many places; but even if this were really the case, such coins were but counters, and are hardly to be reckoned as money; and they would be so insignificant, for all general purposes of valuing the money of the ancient Greeks in connection with history, that they may be passed over in the present inquiry.

2. At Athens a copper coinage came out very early for a short time, to take the place of some of the silver

[c] Mionnet vol. i. p. 328. 330. and Pinkerton vi. p. 77.
[d] See R. P. Knight in Archæolog. xix. p. 369.
[e] Eckhel ibid.
[f] See Böckh Pol. Ec. Ath. i. 6. iv. 19.

money; but it was called in again in the year B. C. 392 [g], and the silver currency restored. There was however after this time, and probably before it, a smaller denomination of copper money for the fractional parts of the obol. The smallest silver coin, as has been said above, was the quarter-obol; the chalcus was half that, or one-eighth of the obol [h]. The value in our money would be, therefore, .79 (or more than $\frac{3}{4}$ths) of a farthing; which, as our copper money passes for about double its real value, would be by no means extraordinarily diminutive; but in Demosthenes' time it was reckoned one of the smallest of all coins [i]. It was called specifically chalcus (χαλκοῦς), but χαλκίον and χαλκία were also used commonly to signify copper-money [k]. There was another copper coin, or token, current in the same age, called σύμβολον, of which the value is not known: Pollux quotes Aristophanes, and other comic poets [l], who name it, but does not give

[g] Aristoph. Ecclesiaz. 815.

[h] Harpocrat. and Suidas τριτημόριον and τεταρτημόριον. Pollux ix. 6; and see Meineke on Philemon Sard. p. 381. But Suidas in τάλαντον and ὀβολὸς divides the obol into six chalci only, quoting Diodorus. Pliny, on the other hand, in describing the Greek weights used by the Romans, says, that the obol contained ten chalci: this is to be understood of the weights in use with the apothecaries of his time. xxi. 109. (34.) Heron agrees with Pliny. De Mens. et Pond. Excerpt. Paris. 1688. Isidorus makes the chalcus the fourth part of the obol; Dioscorides the third. See Append. Stephan. Thesaur. Isidor. Etym. xvi. 25. and Grialius ad l. The grammarian in Bachman. Anecdot. Parisin. in one place says, that the obol contained six chalci, in another eight. See ὀβολὸς and τεταρτημόριον.

[i] Demosth. Dionysod. i.; and see the Indices. Aristot. Rhet. iii. 9.

[k] Pollux ix. 6.

[l] Hermippus and Archippus, Poll. ibid. Timotheus sent out such tokens in a scarcity of money in the expedition against Olynthus. See Böckh, Pol. Ec. Ath. ii. 24.

any further information. And a small copper piece, which bore the name collybus, is mentioned also by Pollux [m], as a coin of an early age ; though to what country it belonged is not said. We may suppose that this was a common name for small money ; since κόλ-λυβος [n] signified generally " changing money," and κολλυβιστὴς " a money-changer." In later times the chalcus was subdivided into lepta, of which, according to Suidas [o], it contained seven. The obol also was coined of copper [p] instead of silver, and much other money of that metal came into use, as well as gold. So early as B. C. 185, we find talents paid in copper by Ptolemy Epiphanes [q].

3. But in Sicily [r], it seems that a copper currency was in use at an early age. The litra of Himera and Agrigentum was that from which the Romans took their libra, or pound ; and, if it was not originally exactly the same as the Roman pound, it cannot be supposed to have been ever very different. Now thirty,

[m] He quotes Callimachus for it, ibid.

[n] Pollux iii. 9.

[o] In τάλαντον and ὀβολός. Isidorus, however, says that the chalcus ($\frac{1}{4}$th of the obol, according to him) was the smallest weight in use. xvi. 25.

[p] Lucian, Charon. 11. And copper coins were probably meant in the passage in Plaut. Amph. iv. 4. 42 : the fifty talents were silver, the philippei gold, and the obols copper : which mode of reckoning, in the three metals, like our pounds, shillings, and pence, is a certain proof that this was the composition of a late age. To say nothing of the anachronism in the mention of philippei, which Plautus would scarcely have admitted, even if the play were all his own, not copied from the Greek.

[q] Polyb. xxiii. 9. 3.

[r] See Müller, Dorians, iii. 10. §. 12. The λίτρα was known in Athens in Sophocles' time. Λιτροσκόπος, for ἀργυραμοιβὸς, is quoted from him by Photius in λίτρα.

or perhaps sixty [s], of these litræ were contained in the small talent of these countries; and Pollux says, that the litra was equal to an obol of Egina. In order therefore to make the first supposition, that the litra was the Roman libra, or pound weight, agree with the assigned value of it, as money, in silver, it is evident that they must be estimated in different metals; and hence Bentley's [t] explanation, that the talent in silver money was the worth of a certain number of pounds of copper by weight, seems almost certain. It follows then, that there must have been a copper currency originally in these countries, when the silver coinage was fixed by a proportion to the value of a certain weight of it. And it is most likely that the copper was the earliest: for if that had been introduced after the silver, like the chalcus at Athens, it could never have been computed by such large measure as the pound weight, but would have been reckoned in small pieces, as change for the silver; but if the first money was copper, the larger denominations of that would naturally have been replaced by silver; and thus, as at Rome, the pounds of copper would have been represented by their equivalent, a small piece of silver. Thus it appears, that a system of money beginning with copper, and then becoming a silver currency, had place among the Greeks of Magna Græcia, as well as the Romans: and since there is no trace of this on the Grecian continent, from whence the western colonies came, it may be inferred that it was the native growth of Italy. This may be partly accounted for, by the scarcity of silver in the Italian peninsula, compared with Greece; at the same time that there was a considerable quantity of copper produced there. Temesa

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[s] See above, ch. ii. 10.   [t] Phalaris, Sicilian Money.

exported it as early as Homer's time [u] : and it was to
be found in Campania [x] and Hetruria [y].   In all proba-
bility the nations of Italy had established a copper
currency before any of the Greek settlers came there ;
and they, after their arrival, though they had been
used to silver money, adopted the old currency in part ;
and thus both silver and copper were used in the south
of Italy ; while towards the north, and in the centre,
the copper alone continued generally in use, until the
Romans began to coin silver.

[u] Odyss. a'. 184.   Cramer, Italy ii. 417.

[x] Plin. xxxiv. 2. Isidor. Etym. xvi. 20.

[y] See Niebuhr Hist. Rom. vol. i. p. 449.   Transl. of 3rd ed.
Copper is now produced in Sicily from mines near Castro Gio-
vanni, the ancient Enna.   See The Classic and Connoisseur in
Italy and Sicily, vol. ii. p. 296.

CHAPTER IX.

ROMAN WEIGHTS.

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Ponderibus librata suis.

OVID. MET. i. 13.

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1. THE following calculations of the Roman weights are intended to apply to the time from the middle of the fifth to the middle of the ninth century from the building of the city ; or, to express it more particularly, the period from the first coining of silver money, to the settlement of the weights by the measure of the congius in the reign of Vespasian. Doubtless, if we could ascertain correctly the standards within these limits, they would hold good in great part for some time both before and after. But the present inquiry is directed only to those times which constitute the best part of the Roman history ; and all the materials for computation are taken from within the period specified : so that the conclusions are to be understood as properly concerned neither with the obscure notices of an earlier age, nor the depreciation and alteration in the system of weights and money brought in afterwards.

The methods of calculating the weights may be summed up in the following four. 1. The comparison with the Greek weights. 2. Ancient weights still preserved. 3. Coins. 4. The weight of the water

contained in the congius of Vespasian.   Of which the
last two alone give satisfactory results.

2. The first, the comparison with the Greek weights,
if we confine it within the limits of time fixed above,
consists merely in a few statements of the weight of
some talents in Roman measure.   For the equations
in money, as that of the drachma to the denarius,
belong to another part of the subject, and will be
treated of elsewhere.   Eighty Roman pounds [a] are
said by Varro to have equalled the Egyptian talent,
by Polybius to have equalled the Euboic, and by Livy
the Attic [b].   But of these, the Attic talent is the only
one whose weight is known by an independent calcu-
lation.   That weight was 399,000 grains troy : whence
it would follow, that the Roman pound equalled 4987.5
grs., which is too little.   Other calculations of the
weight of the pound would make eighty exceed the
Attic talent by about $2\frac{1}{2}$ lbs. avoirdupois.   If so, in
the payment made by Antiochus, in which it was sti-
pulated that this value of 80 pounds should be the
measure of the talent, the Romans gained $2\frac{1}{2}$ lbs. of
silver on every 57 lbs., or more than 4 per cent. which
certainly seems a great deal ; but yet, perhaps, was
not more than the average rate of extortion practised
by them in their treaties with the vanquished [c].
At all events, we cannot depend on this, perhaps, arbi-

[a] See above, ch. ii.

[b] I reckon the Attic and Euboic talents equal, according to the
calculations above, ch. ii.   But if Livy is inaccurate, and the pay-
ment was made, (as was there hinted,) in Euboic talents, it must be
confessed that this place favours the opinion of their being unequal.
If the Euboic exceeded the Attic as 72 to 70, according to Böckh's
valuation, it would contain 410,400 grs.; which would give 5130
grs. for the Roman pound.

[c] Priscian found no difficulty in supposing as great an inequality
as this : he maintained, that the difference between the talent and 80

trary valuation of the talent, so as to calculate the exact weight of the pound from it : and must proceed to consider the other methods.

3. The ancient weights are too unequal and inconsistent with each other to give any certain result. Many of them belong to later times than those about which we are now inquiring : though this would not be altogether fatal to the calculation from them, since the standard of weight fixed by Vespasian might have lasted for many years ; and weights used after that time might serve our purpose, if there were any set upon a uniform and accurate scale. Many of them probably belonged to the provincial towns [d] ; and many have no mark of their denomination. The three quadrusses, as they are called, in the British Museum, which, though perhaps money, were, at least, we may suppose, coined by integers of the pound, are probably among the oldest relics of that kind in existence. They weigh each about $3\frac{3}{4}$ lbs. avoirdupois, which would make the Roman pound 6566.25 grains. The stone weights, which are common, are of a later age, and a very different weight. The largest in the British Museum, which must have been five pounds, is 28126 grs. ; which would give 5625.2 for the pound. But this has the name of Rusticus Præfectus Urbis on it, which shews that it belonged to the fourth century [e]. Out of twenty-four other specimens in the same collection, no one agrees exactly with this, and no two agree exactly with each other ; though they appear to de-

Roman pounds was $3\frac{1}{2}$ pounds. It is true he made the difference lie on the other side, arguing in support of an opinion which it is needless here to discuss. De Fig. Num. iii.

[d] Perhaps the weights in the provincial towns were as liable to falsification as the measures. See Juven. Sat. x. 101.

[e] See Gruter Inscr. p. ccxxii.

scend gradually from 5 lbs. to $\frac{1}{4}$ lb., and there seem to be as many as five duplicates of the same weight. Gruter [f] gives many more such weights, from 10 lbs. downwards; his largest two give a pound of 5061.46 grains; one, which has the same name on it as that in the British Museum, Rusticus, but which is damaged, and has lost some weight, makes the pound no more than 4440.59 grs.: and the other specimens in his table shew as little agreement as those in the British Museum. The copper asses, which were money, will not serve to adjust these differences: for they were gradually diminished in weight, from a pound to half an ounce [g].

The weights found at Herculaneum might be thought likely to determine the true standard, because they are, at least, of undoubted antiquity. But the same kind of variety is found between them, as amongst the others, and therefore no certain conclusion can be obtained from them. In the catalogue there are nearly 30 given, of various sizes, from 3 ounces to 122 lbs., (Roman weight,) of metal and stone. Among these we find some, which would seem to have been intended each for a pound, varying from 11 oz. to 13 oz.: two, which might be taken for 2 lbs. each, weighing 1 lb. 11 oz. each: three, seemingly of 10 lbs. each, weighing 11 lbs. in two cases, and only 10 lbs. 1 oz. in the third. But the most remarkable difference is in the larger; there is one of 50 lbs., and another of 100, each marked with their weight [h]; and they are found to be equal in

[f] Inscr. p. ccxxi. De Romé de l'Isle gives more; of which, if the largest three were 100, 90, and 10 pounds respectively, they agree in giving the Roman pound 4959.36 grs. troy weight. This exact coincidence is suspicious. Probably his authorities had not weighed them very accurately.

[g] Eisenschmidt Pref. British Museum, &c.

[h] Bayardi's explanation of P.ON, (that is, L PON,) "librarum

modern Roman weight to 49 lbs. and 99 lbs. respectively. There are two more of the same weight as the larger of these; but both want the handle, and therefore have lost some of the original weight; and whatever is added to compensate for this, will make them by so much exceed the other perfect one of 99 lbs., and increase their disproportion to the smaller perfect one, that of 49 lbs. A fourth, of nearly the same weight, might be of great importance to the inquiry, but that unfortunately this also has lost the handle: for it bears an inscription signifying that it was made according to the standard of weight in the Capitol in the reign of Claudius [i]. It weighs 96 Roman pounds, or 502,656 grains English: but, since the addition to be made for the loss of the handle is arbitrary, it does not help us towards finding the standard of the pound weight. The largest of all the weights amounts to 122 Roman pounds, and is inscribed TA. H. If this means $\tau \acute{a}\lambda a\nu$-$\tau o\nu$ $\acute{\epsilon}\kappa a\tau \grave{o}\nu$, the talent of 100 lbs., it leads our calculation more astray than ever; for these must be pounds of quite another scale. It would seem more probable, that this should be one of the talents mentioned above, which were equal to 125 Roman pounds [j]. Out of all the Herculanean weights, then, there are but two which offer any ground for calculation; the only two large specimens which are perfect, those of 49 and 99 Roman pounds. Of these the former, which weighs 256,564 English grs., gives a pound of 5131.28 grs.:

pondo," seems mere trifling. L must evidently stand for 50, whatever the T on the other side be, but which I cannot believe to have any thing to do with talentum. It is singular that Bayardi should have missed the obvious meaning of the inscription, when that on the next weight is PON. C. Catalogo de' Monum. di Ercolano, p. 351.

[i] Tib. Claudio Cæsare August. P. M. Divi filio III. Cos. Ponder. Exact. in Capitol. Cur. Œdil.   [j] Ch. ii.

the other, weighing 518,364 grains, gives a pound of 5183.64 grs., which it will be seen is but 21 grs. less than the result of the congius ; and so small a difference in the two calculations is not of much importance, when we find much greater between the Roman weights themselves. If therefore all the other specimens be set aside, and we take the liberty to confine the calculation to these two, or rather this one, the larger of the two, without taking the others, which give different values, into the account at all, we may consider the result as so nearly agreeing with that, which will be given as the most probable value of the pound, as to strengthen the general conclusion in fixing upon that as the standard [k].

4. The coins have been used by many writers, as the only method to be relied on for finding the standard weight of the pound. Their number and agreement certainly enable us to approximate to the truth, but still the result needs correction, for reasons which will be given. There are three classes of coins from which separate calculations have been made, the denarius of silver, the aureus of gold of the scrupular (which was the earliest) coinage, and the aureus of the coinage which succeeded that : and they all nearly agree. The denarius, of which more will be said in the next chapter, has been found on the average, in the best

[k] Bayardi supposed the ancient Roman pound to be equal to the modern, and that all the Herculanean weights which have been mentioned here, were a little below the full weight. There are several among the other specimens, of from one to six pounds, which he gives as agreeing exactly with the modern Roman. That pound is equal to 5236 grs. of English weight : therefore the pound of the larger perfect Herculanean weight falls but 52.36 grs. below it. I take the value of the modern weights from the table in Rees' Cyclopædia. De Romé de l'Isle gives the same value : but Greaves makes it 5256 grs.

specimens, to weigh about 60 grains; and, since 84 de-
narii made a pound in the early ages of the coinage[1],
this gives 5040 grs. for the weight of the pound. The
scrupular aurei have been computed by M. Letronne[m],
to be of the standard of 21.368 French grs., or 17.52
grs. troy weight, to the scruple. These were struck,
Pliny[n] tells us, by the scruple, so that one scruple of
gold should be worth 20 sestertii of silver; and hence
such coins as bear the mark XX, and those whose
weight is a multiple of the weight of these so marked,
have been recognised as belonging to that coinage.
M. Letronne weighed 27 of these. Four in the British
Museum are very nearly the same weight; they are as
follows :

    1, marked XX, (1 scruple,) weighs 17.2 grs.
    1, ... XXXX, (2 scruples,) ... 34.5
    1, ... ↓X, (3 scruples,) 51.8
    1, ... (4 scruples,) 68.9,

giving an average 17.24 grs. for the scruple, or, about
$\frac{1}{4}$ of a grain less than M. Letronne's value. If the
scruple be set at 17.5 grs., since it is the twenty-fourth
part of the ounce, the pound will weigh, again, 5040
grs. The other aurei, which were coined next after
these, according to Pliny's account, were at the rate of
40 to the pound : and, if the weight of the pound was
5040 grs., they would have amounted to 126 grs.
There are, accordingly, several coins found of about this
weight. In the British Museum are some of from 124
to 128 grs. In the Bodleian is one of J. Cæsar, weigh-
ing 126.5 grs., and one of Antony of 126 : and Raper
mentions many more. Thus these coins also agree in
the same value for the pound weight.

[1] Plin. xxxiii. 46. Celsus v. 17. Scribon. Larg. Pref. ad fin.
[m] Sur l'Evaluation des Monnaies Grecques et Romaines.
[n] xxxiii. 13.

But though this coincidence is so complete, yet, after all, there are strong reasons for suspecting that the result is somewhat below the truth. For in the first place, calculating the value of the larger quantity from the smaller, or the whole from one of the parts, is always an uncertain method. The least variation in the smaller quantity or part may make a very important difference in the value deduced from it. It is not a safe course to take, except where there is full security that the smaller quantities are regulated with the most minute and scrupulous accuracy; which was the case in the coinages of Athens and Macedonia, and some others, but not in that of Rome: for the great inequality in the weight of the denarii is notorious. And, moreover, which is very important in the question, there was very early a tendency in the Roman mint to make the money below weight [o]. There was a gradual reduction of weight, first in the copper as, then in the denarius, and afterwards in the aureus; and we do not know at all how soon the diminution began. With respect to the denarius, the chief element in the foregoing calculation, we know that it lost one-eighth of the weight before Pliny's time: yet we have no notice when or how this important change was made; it might be the limit of a gradual depreciation which began early; and if so, what security have we, that any given specimen of denarius may not have come into the depreciated period, and thus be a grain or two, at least, below the standard? If we could say with certainty, that any denarii now in existence were coined soon after the year U. C. 485, we might stand on firmer ground in making the computation: but the truth is, that the exact age of none of the denarii is

o Plin. xxxiii. 13, 46.

known : the most that can be said of any is, that from their style and weight they are judged to belong to the last age of the republic. On the other hand, there are many single specimens of them, which exceed what has been fixed on as the average weight, by enough, and more than enough, to bear out the higher value of the pound ; but these are counterbalanced by the great number of a lower weight, when the average is taken by weighing on a large scale. Considering then, that another mode of calculation, not open to these objections, gives a result rather above that of the coins, and that, for the reasons given, it is very likely the coins should have been a little below the real standard, it seems, upon the whole, best to take the higher value, which is that deduced from the congius.

5. The congius of Vespasian, or, as it is commonly called, the Farnese congius, was made A. D. 75, according to the standard of the measure in the Capitol, and the contents of it weighed 10 pounds, as the inscription on it testifies ; Imp. Cæsare VI. T. Cæs. Aug. F. IIII. Cos. Mensuræ exactæ in Capitolio. P. x. It was for many years at Rome, where it was examined by Pætus, Villalpando, Greaves, and others. But before 1721 it had been removed to Dresden ; where it remained long unnoticed, until Dr. Hase recognised it, and brought it again to light by publishing an account of it in the Memoirs of the Academy of Berlin in 1824[p]. Under his inspection it was filled with water, and carefully weighed, and the weight of the water was found to be equal to 63460.6 French grains. The result of the experiment, therefore, was, that 10 pounds of Roman weight equalled 63460.6 French grs., or one pound equalled 6346.06 ; which in troy weight is 5203.769 grs. There is no reason to doubt

[p] Histor. Philolog. Klasse, p. 149.

the accuracy of this trial; and the measure itself is obviously more likely to give the true standard of weight, than calculations made by summing up the weights of known species of coins. Nor is it to be supposed that the weights should have varied much in Vespasian's time, from what they had been in the republic. The money might have fallen in weight, and certainly had done so: but the standard of the market weight, we may suppose, had neither fallen nor risen sensibly for many years.

Dr. Hase's weight of the pound agrees very nearly with that, which Auzout [q] obtained from weighing the congius full of water, namely, 6276 French grains, or 5146.32 grs. troy; which is but 57.44 grs. (troy) less. But as it is not likely, that any exceeded the last experiment in accuracy, or performed it under more favourable circumstances, we may without hesitation take this value for the exact amount, adding only about $\frac{1}{4}$th of a grain for the sake of making it up to the whole number 5204 grs.[r] Reckoning the pound then

q Acad. Roy. des Sciences 1680. vol. vii. par. i. p. 317. Eisenschmidt (i. ii.), who rejected the calculation from the weight of the congius, and followed that from the coins alone, urged against Auzout's experiment, the difference in weight of water at different temperatures. This difference, he said, might amount to 4 grs. per ounce, between summer and winter. No one has observed that the height of the barometer would make a sensible difference also. If the congius were weighed against brass weights, brass being less than $\frac{1}{8}$th of the bulk of water, the difference in weight for the variation of one inch in the barometer would amount to about 4 grs. If it were weighed against leaden weights, the difference would be greater. Nevertheless it may be assumed that all the weighings were performed at about the average temperature and density, and these minute differences neglected. In Dr. Hase's experiment the temperature is noted.

r This value is but 32 grs. below the modern Roman pound. Therefore those writers cannot be called greatly inaccurate, who make the ancient and modern weights equal.

to have had this weight, the denarius, of 84 to the pound, would weigh very nearly 62 grains, or, more exactly, 61.95238, &c. grs ; the scruple 18.07 grs. : and there are many denarii of this weight, and more than this.   The scruple exceeds that of M. Letronne's calculation by only about $\frac{1}{2}$ a gr., a difference no greater than what might be due to a very little inaccuracy or dishonesty in the mint.   So that, on the whole, the result obtained from the weight of the congius does not contradict that derived from the coins, but rather corrects it : the former approximates as near to the truth as, under all circumstances, could be expected ; the latter solves the problem, by giving the exact value of the pound.

The two tables following contain the Roman weights below a pound, calculated according to this value : the former the parts of the pound, the latter those of the ounce.

Table of the parts of the Roman pound in Avoirdupois weight.

	Sextans	Quadrans	Triens	Quincunx	Semis	Septunx	Bes or Bessis	Dodrans	Dextans or Decuncis	Deunx	As or Libra	oz.	grs.
Uncia	433.666 grains, or											$\frac{3}{4}$	105.36
2	Sextans											$1\frac{3}{4}$	101.29
3	$1\frac{1}{2}$	Quadrans										$2\frac{3}{4}$	97.21
4	2	$1\frac{1}{3}$	Triens									$3\frac{3}{4}$	93.14
5	$2\frac{1}{2}$	$1\frac{2}{3}$	$1\frac{1}{4}$	Quincunx								$4\frac{1}{2}$	89.05
6	3	2	$1\frac{1}{2}$	$1\frac{1}{5}$	Semis							$5\frac{3}{4}$	84.95
7	$3\frac{1}{2}$	$2\frac{1}{3}$	$1\frac{3}{4}$	$1\frac{2}{5}$	$1\frac{1}{6}$	Septunx						$6\frac{3}{4}$	80.88
8	4	$2\frac{2}{3}$	2	$1\frac{3}{5}$	$1\frac{1}{3}$	$1\frac{1}{7}$	Bes or Bessis					$7\frac{3}{4}$	76.75
9	$4\frac{1}{2}$	3	$2\frac{1}{4}$	$1\frac{4}{5}$	$1\frac{1}{2}$	$1\frac{2}{7}$	$1\frac{1}{8}$	Dodrans				$8\frac{1}{4}$	42.57
10	5	$3\frac{1}{3}$	$2\frac{1}{2}$	2	$1\frac{2}{3}$	$1\frac{3}{7}$	$1\frac{1}{4}$	$1\frac{1}{9}$	Dextans or Decuncis			$9\frac{1}{4}$	38.50
11	$5\frac{1}{2}$	$3\frac{2}{3}$	$2\frac{3}{4}$	$2\frac{1}{5}$	$1\frac{5}{6}$	$1\frac{4}{7}$	$1\frac{3}{8}$	$1\frac{2}{9}$	$1\frac{1}{10}$	Deunx		$10\frac{3}{4}$	64.54
12	6	4	3	$2\frac{2}{5}$	2	$1\frac{5}{7}$	$1\frac{1}{2}$	$1\frac{1}{3}$	$1\frac{1}{5}$	$1\frac{1}{11}$	As or Libra	$11\frac{3}{4}$	60.45

Table of the parts of the Uncia, in Avoirdupois weight.

							oz.	grs.
Siliqua[r]								0.75
6	Scripulum, Scripulus, or Scrupulum							18.06
24	4	Sextula						72.27
72	6	$1\frac{1}{2}$	Sicilicus					108.41
96	8	2	$1\frac{1}{3}$	Duella			$\frac{1}{4}$	35.12
144	12	3	2	$1\frac{1}{2}$	Semuncia		$\frac{1}{4}$	107.46
288	24	6	4	3	2	Uncia	$\frac{3}{4}$	105.36

It is to be observed, that these terms were not confined to the meaning of weight only. *As* signified properly unit; like our word ace, which is derived from it. Some suppose it to have been the same with the Greek εἷς[s]. It was used for any thing divided into twelve parts; and the other terms were applied to the parts, as, " horæ unius dextante sicilico[t]," fifty-one minutes and a quarter. Libra is more commonly used for a pound weight than as. Pondo is also very often used in the same sense, although Gronovius asserted that it was always the ablative case, and signified " in weight[u]." Sometimes *libra* and *pondo* are used together; as, " coronam auream libram pondo."

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[r] Priscian says, the siliqua was the same as the Greek κεράτιον or λεπτός. Fig. Num. ii. 11.

[s] Salmas. de Usur. 19. p. 575. Varro, however, derives it from æs. L. L. iv.

[t] Plin. xviii. 75. (32.)

[u] See Scheller's Lex. v. Gronov. Pec. Vet. i. 6.

CHAP. X.

ROMAN MONEY.

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—Fuit in pretio magis æs, aurumque jacebat.
Nunc jacet æs, aurum in summum successit honorem.

LUCRET. V. 1272.

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1. THE Roman currency was at first copper, of which the ancient Latin name was *raudus*. When and by whom that metal was first coined is uncertain: the traditions about the beginning of the coinage in Italy varied, as in Greece. It was attributed to Servius Tullius [a], to Numa [b], to a time coeval with the beginning of the city [c], and to Janus, or Saturn [d]. Perhaps the last of these accounts is nearest to the truth: for ascribing it to Janus or Saturn would mean, that a copper currency was in use among the states of Italy, before the time when the first settlers from Greece, or Troy, came thither; which probably was the case. And the Romans, we may suppose, would have adopted it, as soon as Rome acquired an organized government.

The first coinage was by the pound weight: the as, or unit, was a pound of copper, equal, by the foregoing valuation, to a little more than $11\frac{3}{4}$ ounces of avoirdupois weight. It is said to have borne the impres-

[a] Plin. xxxiii. 13. where see the commentators. Cassiodor. Var. vii. 32.

[b] Epiphan. Mens. et Pond. Isidor. Etym. xvi. 18.

[c] Plin. xxxiv. 1.

[d] Macrob. Saturn. i. 7. Isidor. Etym. xvi. 18.

K 2

sion of " pecus," either a bull, a sheep, or a pig ; and that thence came the name *pecunia*[f]. This has been much disputed ; but what relates to the impression is borne out, by finding very ancient pieces which have either the bull or the pig on them. As the pound weight was the unit, so all the accounts were made in terms of weight, and hence came the common phraseology of the Latin in terms applied to money, as *expensa*[g], *impendia*, &c. Hence also the expression " æs grave," copper measured by weight, which, when the copper coinage was much reduced in size, was used to signify the old heavy coins as distinguished from the later. But the phrase seems properly to have referred to the standard by which a sum of money was measured, not to the size of the coins. And thus, as Niebuhr explains it [h], a sum of æs grave would signify, not so many of the old asses reckoned by tale, but so much of any kind of copper coins, whether old Roman or foreign, reckoned according to the old style, by weight.

Silver was first coined five years before the first Punic war[i], A. U. C. 485. B. C. 269; and the denarius was

[f] Varro L. L. iv. p. 24, 25. R. R. ii. 1. Plin. xxxiii. 13. Plutarch. Public. 11. Niebuhr's argument against the impression of the bull on the earliest asses is curious ; it is simply this, that because an as of a third age has it, but an as of a second age has it not, therefore an as of the first age could not have had it, as Timæus asserts it had. The quadrusses in the British Museum, however, have the bull; and they, as far as weight goes, may pass for specimens of the earliest age : see chap. ix. 3. Niebuhr Rom. Hist. p. 450. last edition, translated by Messrs. Hare and Thirlwall. Isidorus makes the connexion between *pecus* and *pecunia* to be, that money was first coined out of hide : others, that cattle were at first the measure of wealth.

[g] Plin. xxxiii. 13, &c. [h] Niebuhr R. H. i. p. 458.

[i] Plin. xxxiii. 13. Zonaras, Annal. vol. ii. p. 51, says, that the Romans first began to coin silver drachmæ, when they had gained great wealth from the conquest of the Caricini in Samnium.

made equal in value, as the name expresses, to ten asses. If then the as had not changed, the denarius would have been in value ten pounds of copper. But the size of the as was gradually reduced after this, and we do not know that it had not been before. The perpetual variation found in the weight of the oldest Italian copper money now preserved, confirms the belief, that it had not remained constant up to this point. Pliny says, that the first change was made in the first Punic war, when the as was reduced from a pound to two ounces, in order to enable the government to meet the expenses of the war. But this incredible state-ment is disproved by the copper coins, which upon examination shew that the diminution in weight was gradual[k]. The same may be said of the other two reductions mentioned by Pliny, and assigned each to a single point of time, the first lowering the as to an ounce, the second to half an ounce. For the weights of the coins shew that all the changes were made by degrees : the laws which Pliny describes as having been passed to effect them, must be regarded as conse-quences, rather than causes of the reduction. If copper had risen in price, copper money would pass for more than the nominal value ; and the government might at intervals lower the standard of weight of the coinage, to meet the rise in the value of the metal, which would tend to keep prices of commodities equal. And the laws, which marked the limits of the changes within certain periods, were intended to settle the currency, not arbitrarily depreciate it.

When the as was reduced to the lowest value, half an ounce, the number of asses in the denarius was also changed ; and sixteen were made to pass for a denarius

[k] Eisenschmidt Pref. De Romé de l'Isle. British Museum, &c.

instead of ten, except in paying the troops[1]. The reason of this change in the number of asses was, probably, convenience in reckoning by sestertii : since the fourth of the denarius would thus be four asses, instead of two and a half, a much better sum for calculation. After this, it was the practice to coin the sestertius in fine brass, a compound of copper, of a kind which was double the value of the common metal[m]. Consequently, the sestertius, being equal in value to four asses, was in weight only equal to two, that is, one ounce ; which was at that time the largest copper coin. The dupondius, or double as, was coined also of the same metal as the sestertius, the fine or yellow brass : these two kinds of coins seem to have been generally introduced about the time of Augustus.

2. The denarius of silver, according to the value calculated for the pound in the last chapter, must have weighed originally above 61.95 grains. But if the value of it, as money, be computed according to that weight, the result will be above the truth ; since, although the standard was so high, and perhaps the first specimens of the coinage might have averaged really so much, and although many coins now in existence come up to it[n], yet the average of the vast number of denarii found in numerous collections falls decidedly lower. The average weight may be fairly set, as was said above, at 60 grs. for the age to which most of the best denarii which we have belong, that is to say, the end of the commonwealth and beginning of the empire. M. Letronne's average was taken from 1900 spe-

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[1] Plin. as before. Comp. Tacit. Ann. i. 17.

[m] Plin. xxxiv. 2. and Pinkerton sect. vii.

[n] Four quinarii in the British Museum give a mean value 34.075 grs., which makes the denarius 68.15 grs. One denarius weighs even 73 grs. And in the Bodleian is one of 64.75 grs.

cimens, from which he excluded all that were damaged; and the remainder, in number 1350, gave a mean weight 59.9089 grains, only .0911 of a gr. below 60. It would be tedious, to attempt to describe in detail many of the experiments made upon the weight of the denarius. It will be enough, to set down in one table the results obtained by those, who have made the most accurate and successful inquiries into the subject, not by extracting from books only, but by examining and weighing the coins.

Budé[o] computed the denarius to weigh
  in troy weight........................ 59.04 grains

Porcius $_9\frac{1}{6}$th of the Italian pound, or, 54.54

Agricola 54

Snell[p] .... from 63.14 to 75.03

Scaliger 59.04

Savot[q] .... consular denarius 59.04

.... den. of the empire 51.66

Gronovius 57.6

Greaves 62

Bernard ...... consular denarius 61 to 62

.... den. of Tiberius 59 to 60

.... Vespasian 53

Eisenschmidt .... consular denarius 60.9

.... from Nero to Septimius Severus 53.3

[o] Budé (de Asse) reckoned the denarius equal to the French gros of 72 grs., and thence computed the pound at 100 denarii. If this notorious error be corrected, and the pound reckoned at 84 denarii, his results very nearly agree with those of some of the latest and best writers on the subject. For the other authors referred to here, see chap. i.

[p] De Re Numm. in vol. ix. of Gronov. Antiq. Gr.

[q] But he obtained a higher value from the aureus, 63 grs. troy.

De la Nauze [r] .... 59.97 grains

Raper 60

Le Beau [s] 60.16

Birch 62.57

De Romé de l'Isle ... consular denarius 59.04

.... den. of the empire 51.73

Letronne 59.95

Mr. Akerman [t]............................ 56.5

Of these, Letronne and Raper, De la Nauze, Eisen-schmidt, Greaves, and Bernard, are the most to be de-pended on, and they agree in the higher value: only two of them reckoning the denarius less than 60 grs. by a very trifling quantity. It is supposed here throughout, that this is the coin of the standard of the commonwealth, reckoned at 84 to the pound. When the rate had fallen down to 96 in the pound, as it had done early in the empire, the weight was of course reduced. If the full standard of the old coinage was (very nearly) 62 grs. to the denarius, the standard of the reduced would be 54.2 grs. If we calculate the reduced weight from a proportion to the average of the old denarius, that is, as $\frac{7}{8}$ths of 60 grs., the standard of the reduced coinage will be 52.5 grs. : and many denarii, of a later age especially, weigh no more, indeed much less than this ; nor can there be a doubt, that the coinage was short weight under the new re-duced standard, to as great an extent as under the old higher. It is uncertain when this fall in the standard took place, for it is not mentioned in his-tory ; for which reason, and because the same thing

[r] Acad. des Inscr. xxx. p. 359.
[s] Acad. des Inscr. xli. p. 181.
[t] Rare and unedited Roman Coins. Lond. 1834.

was done with the copper, we may suppose that the diminution was gradual. Some have conjectured, that it was completed in Nero's reign [u]: certainly that emperor reduced the gold money to the lowest point which it had reached before Pliny's time, and might possibly have done the same to the silver, by fixing the limit of the denarius at 96 to the pound. But it is likely that it was done earlier. Pliny dates the beginning of the reduction of the gold coinage from the emperors (*principes*): and since generally the gold was more accurately regulated than the silver, we may suppose, that the weight of the denarius began to fall at least as soon as that of the aureus. Hence, the beginning of the reduction may be attributed to Augustus; and in his long reign there might have been a great change effected, so that even his next successor might have brought the standard down to the scale of 96 to the pound.

There were also some pieces coined considerably above the weight of the denarius. Specimens of these may be found in collections, weighing from 90 grains to 100, and upwards. The form and style of them is like the denarii, and they have every appearance of being as old as any of the Roman silver. If they had belonged to a later age, they would at once have been set down for double denarii: but if they are estimated according to the standard of the commonwealth, of 60 grs., and upwards, to the denarius, they would seem to be only sesquidenarii, or a

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[u] Savot iii. 9. Mersennus Pr. viii. Bernard p. 106. Eisenschmidt i. ii. p. 32.   Others have assigned it to Claudius' reign, or earlier. See Brerewood xiii.   I think that Sueton. Jul. 54. proves, that 84 denarii still went to the pound, about the year B. C. 50. For if we reckon 96, the proportion of the value of gold to that of silver is 7.8 to 1, which is incredibly low: the value on the other supposition, 8.9 to one, is more probable.

denarius and a half. They cannot be adjusted very conveniently to the scale of the rest of the money, on either supposition. And, since their number is not great, they may be set aside as an irregular species, coined when the mint was in a disordered state. For the Roman mint was at one time very ill regulated: the fluctuations in the currency were so great before the prætorship of Marius Gratidianus, that sometimes no man knew what he possessed [x]. There is nothing surprising therefore in occasionally finding specimens of coins at variance with the regular standard [y].

3. The silver coins went, at one time, from the denarius down so low as the fortieth part of the denarius, the teruncius. They were, the quinarius, or half denarius, the sestertius, or quarter denarius, the libella, or tenth of the denarius, (which was equal to the copper as,) the sembella, or half libella, and the teruncius, or quarter libella.

The copper coins went no lower than the sextula, or sixth of the ounce [z].

If the denarius weighed 60 grains, the teruncius of silver would have weighed but $1\frac{1}{2}$ grs.; which some have thought an incredibly small size, and therefore have doubted whether the teruncius ever was coined in silver; since it certainly was in copper. But Varro distinctly names it among the silver coins, with the libella and sembella, which he has expressly elsewhere called silver [a]. When silver was scarce at Rome, as in

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[x] Cic. de Off. iii. 20. Plin. xxxiii. 46.

[y] See Eisenschmidt iv. p. 134. Pinkerton considered these large denarii to be some of the very earliest silver coinage, struck in the sixteen years which intervened between the first coming out of the denarius and the reduction of the as. p. 131.

[z] Varro L. L. iv. p. 40.

[a] Varro L. L. iv. p. 40. ix. p. 133. Plautus names the libella

all probability it was for many years, there is nothing unreasonable in supposing even so small a coin as this to have been in circulation. The quarter-obol at Athens was but little more than $2\frac{1}{2}$ grains : and money more diminutive may still be found in some countries [b]. But we are not bound to suppose, that this small fraction of the denarius was still coined in silver, after the as was reduced to one sixteenth of the denarius ; for then the teruncius would have been $\frac{1}{64}$th of the denarius, (which is less than a grain in weight,) whereas Varro describes it only as a subdivision of the libella, when that (which was equivalent to the as) was $\frac{1}{10}$th of the denarius. Still less, when the denarius was reduced to 54 grs. ; for the teruncius would then have weighed but about $\frac{4}{5}$ths of a gr. When the as was reduced to the lowest value, it is probable the teruncius was coined in copper only. The libella continued after the last reduction of the as ; for it is named often by Cicero, and elsewhere : but it is not confined to the meaning of a silver coin equal to the as : indeed, Gronovius denied that there was such a coin even when Varro wrote of it [c]. It is used to express a fractional part, but it is not quite certain what part : perhaps the tenth, as Gronovius explained it ; for the original sense of it was, the tenth of the denarius. It seems still to have been the name of a coin in Cicero's time [d], and that one of the smallest value. It is probable that it was then the smallest piece of silver money ; for it is used proverbially for a very small sum, like as ; but, we may sup-

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argenti, Captiv. v. i. 27. So Hotoman, Selden, Greaves, Eisenschmidt, &c. take Varro's words.

[b] There are in the British Museum some specimens of a kind of money current in some eastern countries, which are small pieces of gold-leaf.

[c] Pec. Vet. ii. 2.   [d] See Pro Q. Rosc. iv. &c.

pose, was not the same piece as the copper as. No
silver coins of this size, however, are found among
Roman coins now.

4. In proceeding to the last step of our calculation,
the value of the Roman silver coinage in our own
money, the denarius must be reckoned, not at the high
weight of 62 grains, which was the original standard;
but at the average, as it is found in the best speci-
mens, namely, 60 grs. It remains, therefore, now to
consider the fineness of the metal, in order to find the
value of this weight. The Roman money, both gold
and silver, as well as the Greek, has often been esti-
mated as pure metal: and it is probable that at one
time, early in the coinage, the Romans did not inten-
tionally mix any alloy. But the practice was intro-
duced before the end of the commonwealth [e]; and
whether it was intentional or not before this time, no
Roman money has yet been found quite fine. Agricola,
the earliest authority on this subject, states, that the
alloy in the silver coins before Vespasian, is $\frac{1}{48}$th of
the weight; but afterwards twice as much, $\frac{1}{24}$th.
Ciaconius found the same proportion in the early
coins. Bouteroue, in 1666, reports the assay of a de-
narius of Augustus, not quite $\frac{1}{56}$ of the weight alloy.
M. Darcet, according to the account given by M.
Letronne, found that the proportion of alloy in the
money of the commonwealth varied, from .007, or
$\frac{1}{142}$nd, to .035, or $\frac{1}{28}$th, and that the standard was a
little debased under the first emperors. The mean

[e] Plin. xxxiii. 13. 46. Eckhel, Proleg. Gen. p. i. c. 7, doubted
the correctness of Pliny's assertions. Pinkerton confirmed what he
said with respect to Antony debasing the denarius with iron, by
trial of a coin of Antony. Pinkert. sect. i. p. 40. With regard to
the quantity of alloy, Mr. Akerman gives a coin of Antony con-
taining little less than $\frac{1}{4}$th of the weight alloy; which much ex-
ceeds the proportion attributed to Livius Drusus by Pliny.

quality which M. Letronne took from these experiments was $\frac{1}{25}$th alloy. Mr. Akerman gives the denarius of Augustus as containing about $\frac{1}{40}$th, that of M. Antonius $\frac{1}{31}$ts, and that of Nero $\frac{1}{11}$th alloy. A quinarius of the commonwealth, which was assayed for me, gave $\frac{1}{31}$nd of the weight alloy[f]. It is evident from the difference between these proportions, that the quality of the metal was changed a good deal at different times : and the coins in this respect, as well as in the inequality of their weight, confirm what we are told of the fluctuations in the Roman currency. It is therefore hopeless to attempt to fix upon any proportion as the real standard for a length of time. We can only take an average, the mean between the variations within that time. And, upon the whole, it seems fair enough to take, as the average, $\frac{1}{30}$th of the weight for alloy : for the higher standard will give a value above the truth, considering how the coinage was lowered afterwards ; and yet, on the other hand, we do not want to estimate the debased money of Nero or M. Antonius. If then $\frac{1}{30}$th be deducted from the weight of the denarius for the alloy, there will remain 58 grains of pure silver to be valued : and, since the shilling of the present coinage contains 80.7 grs. of pure silver, the value of the denarius of the commonwealth will be $\frac{58}{80.7}$ of a shilling, or 8.6245 pence; which may be reckoned in round numbers $8\frac{1}{2}d$.

If silver of the standard $\frac{11}{12}$ths fine cost 5 shillings the ounce in the market, the real market value of the

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[f] The assayer's report was, in the pound troy,

silver	11 oz.	11 dwts	15 grs.
gold	—	—	21
alloy	—	7	12.

denarius, or 58 grains of fine silver, will be 7.9 pence, or not quite 8 pence [g].

If the same method of reckoning be applied to the reduced denarius of 96 to the pound, since the higher denarius was worth 8.6 pence, the other will be worth about 7.5 pence, or $7\frac{1}{2}d$: which, according to what was said above, would be the value towards which the denarius was approaching in the reign of Augustus, and which it really bore under the succeeding emperors.

5. Upon comparing this value with that of the Attic drachma, as it has been calculated above, there appears a difference of about a penny between them; the denarius being but little above $8\frac{1}{2}d$, the drachma almost $9\frac{3}{4}d$. And since they have been so often reckoned equal by writers on the ancient money, it is necessary to say something concerning the proportion between

[g] It is curious to compare these values with those reckoned in English money of an early age. Latimer, in 1550 and 1552, made the denarius equal to ten pence, and said it was " such another peece as our testorne ;" which passed for 12 pence, but was a debased coin. The coinage at this time was of a low standard, and subject to great alterations. Ten pence of the standard of 1549 would be in money of the present day but 4.9 pence; and in 1551 only half that. In 1552 a new commission was made out for the mint, and the coinage much improved : ten pence would then have been worth nearly 11*d*. of our money. Latimer's reckoning, however, was in the debased money; and consequently he rated the denarius at not more than 5*d*. See Lat. Serm. i. at Stamford, and Serm. on Septuages. Sund., and Ruding's Annals. Sanderson, in 1631, reckoned the Roman penny (denarius) to be worth $7\frac{1}{2}d$.: this would be now nearly 8*d*. or about 7.98 pence. Sanders. Serm. i. ad Aul. Ruding in 1626. Prideaux, in 1718, gave it the same value, ($7\frac{1}{2}d$.) Connect. ii. ii. Probably both took it from Brerewood, De Pond. (1614.): but Selden, in 1642, reckoned it only 5*d*. Seld. De Numm.

them. The question has been much discussed, and
partly mistaken on both sides; but may really be
settled in very few words. It does not follow from
what Pliny[h] and others have said, about the denarius'
being exchanged for the drachma in the seventh and
eighth centuries of Rome, that the drachma of Pericles
was not more than equal to the denarius of Augustus;
nor have modern writers any grounds for asserting on
these authorities, that the two species were absolutely
and universally equal, as they do when they give
them the same value in tables of ancient money. On
the other hand it does not follow, that because Greaves
and Savot discovered that the Attic drachmæ really
weighed more than the average denarii, therefore Pliny
was mistaken when he wrote that they passed for
equal[i]. There can be no doubt that there was the
difference of at least five or six grains, between the
old Attic drachmæ and the average denarii. But the
latest drachmæ fall off in weight as much as 3 grs.,
and come down to 63, instead of upwards of 66;
while, on the other side, the original and full stan-
dard weight of the denarius was, as has been shewn,
about 62 grs. Thus they approached at one time
really to within a grain of equality, and so small a
difference might easily have been overlooked[k].

[h] For all these given fully, see Gronov. Pec. Vet. ii. 6, 7.
Hotoman Re Num. p. 116. Hostus Hist. Rei Num. ii. 7, &c.

[i] The well-known passage, where Livy seems to equate the
tetradrachm to about 3 denarii, (xxxiv. 52.) must be given up. If
it is not a gross blunder of his own, (which is not impossible,) it is
a corruption of the text. Comp. Liv. ib. c. 50. The tridrachm,
which Budé conjectured should be read for tetradrachm, is not
found to have been current in Greece.

[k] Nevertheless I cannot help believing, that with the aid of a
correction in that most uncertain subject of criticism, a numeral,
we may discover the true proportion in Varro; who, if we had all

It seems quite certain, that we must not look for great accuracy in the expressions concerning equality of value, used by the Roman and later Greek writers on these subjects. The drachma and the denarius were at one time nearly enough equal to pass for equal; and when the Romans were fixing the terms on which conquered nations should pay them, they would not have been scrupulous about the exact equality of the accounts, but only have secured themselves from loss, and provided that, if there were an inequality, it should be in their favour. When this rate of exchange had been established by usage, it continued, although the denarius was much reduced in value. When the denarius was but $\frac{1}{96}$ of the pound, it was much below the true value of the original Attic drachma; though still they were rated as equal. But when this change took place, Rome was mistress of the world: the coinages of Greece had either ceased, or had become Roman, and Greece itself was but a province. Consequently there was no money coined now by the old high standard: the denarius was reckoned equal to the drachma, and represented it; and if drachmæ were coined, they were made equivalent to the denarius. The name of the Attic standard still remained, and some ancient money of that kind might be in existence; but whatever there was of it had now been undergoing the wear and tear of circulation

his works, would be the best authority in the matter. Pliny (xxxv. 30.) has Talentum Atticum $\overline{XVI}$ taxat M. Varro. This is nonsense, and cannot be the true reading. The simplest correction is, to add an X, and make it XXVI. Now 26 sestertia make 6500 denarii; and if they equalled a talent, or 6000 drachmæ, the proportion of the drachma to the denarius would be 65 to 60; which is very near the truth, for the best times of the Attic coinage.

for many years, and each succeeding year helped to
diminish the weight ; while all the new money, which
came out from the Roman mints, was of the standard
of the latest denarius. Thus at last the two names
came to signify exactly the same weight and value ;
and 'Attic drachma' or ' denarius' stood indifferently for
a coin, which was really neither a genuine Attic
drachma, nor a denarius of the original standard, but
the eighth part of a Roman ounce. This being a fact
beyond dispute, what Polybius says relating to the
subject is surprising. In two passages[1], well known
and often discussed, he gives the value of the obol in
Roman money. In the former he says directly, that
the obol equalled 2 asses : in the latter, that the pay
of the foot soldiers (which was 5 asses) equalled two
obols ; whence the obol would appear to be equal to
$2\frac{1}{2}$ asses. The latter of these would be near enough
to the truth : for if the obol equalled $2\frac{1}{2}$ asses, the
drachma, which he would reckon the same as the de-
narius, would be 15, instead of 16 ; and he might be
content with expressing himself thus in round num-
bers, and omit the fractional parts. But the other
equation gives a drachma equal to 12 asses, which is
quite an anomalous value. In neither place is it said
that the Attic standard (the common one) of obol is
meant. One is tempted to suspect, that in the former
of them Polybius was thinking of some other stand-
ard : and it is remarkable, that among the coins of
Achæa of a late age are some of a smaller size[m] .

[1] ii. 15. 6. and vi. 39. 12.   Gronov. P. V. iii. 2. enters fully into
the subject, and refers to all the writers upon it. Comp. also
above, ii. 3 ; below, xi. 2.

[m] R P. Knight, however, denied that the Achæans coined any
money, and referred all these to that country while a Roman pro-
vince. Num. Vet. p. 313. But see Eckhel.

It is worth noticing, that the assay of the quinarius mentioned above, gave 21 grains of gold to the pound troy, or about $\frac{1}{274}$th part of the weight. This is due, as in the former cases, among the Greek money [n], to the want of skill to refine the silver ; and is to be neglected in the valuation of the money, as was said above. If the value of the compound were calculated exactly at the market price, and gold reckoned at 15 times the value of silver, the presence of 21 grs. in the pound troy would make a sensible difference. It would more than compensate for the quantity of $\frac{1}{30}$th of alloy, and would have the effect of making the coin $\frac{1}{250}$th part above the value of fine silver : which in the denarius of 60 grs. would be equivalent to an increase of nearly $\frac{1}{4}$th of a gr. in weight, making it in value equal to nearly 60.25 grs. of pure silver, or 8.95 pence, which is very little less than 9d.

If the denarius be reckoned in value $8\frac{1}{2}d$., the sestertius will be 2 pence and half a farthing ; the as, at 10 to the denarius, 3.4 farthings ; at 16 to the denarius, $2\frac{1}{8}$ farthings, (or 2.125.)

6. The Romans reckoned money in early times by the as. Before the coining of silver the as was the only standard : but afterwards also the computation in copper was still kept, and distinguished from that in silver by the word *æs*, which signifies that the terms used denote a number of asses. The as was commonly also multiplied by a thousand, and then reckoned in the same way as the sestertius. Thus *septuagenos æris* [o] is 70 asses ; *mille æris*, 1000 asses ; and *decies æris* [p], a million of asses : the last of which forms will be more fully explained, in describing the mode of reckoning in sestertii. *Æs grave*, like-

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[n] See chap. iv. 2.　　　[o] Liv. xxiii. 23.　　　[p] Liv. xxiv. 11.

wis e,as has been said above, was another expression
signifying money reckoned by the old standard, of a
pound of copper to the as. Multiples of the as above
two were expressed by compounds of numerals; *du-
pondius*, or *dupondium*, signified two asses; then came
tressis, three, &c. up to *decussis :* and the multiples of
ten, as *bicessis*, twenty asses; *tricessis*, thirty, &c. up
to *centussis*, a hundred, which was the highest com-
pound [q] : few of these, however, are found in use.
According to the foregoing calculation of the value of
the as, *mille æris*, or 1000 asses, would equal in our
money 3*l*. 10*s*. 10*d*.

Generally, however, the Romans reckoned in ses-
tertii; and in all large sums the sestertius was multi-
plied by a thousand, and the computation made in
sestertia, or sums of a thousand sestertii [r]. The dena-
rius seems to have been seldom used for reckoning
money by, but it was sometimes : Varro speaks of the
phrase " mille denarium [s] :" Cicero has, " statuis quid
ad denarium solveretur," of estimating an account of
foreign money in the Roman currency [t]; and in an
obscure place of Terence [u], " mille nummum" is under-
stood to mean a thousand denarii, as being equivalent
to the same number of drachmæ. Various forms were

[q] Varro L. L. iv. p. 40. viii. p. 118.

[r] Although the reckoning was in sestertii, the coin in which
payments were made was the denarius. This is proved by the
number of them remaining : and " ars facta *denarios* probare" is
the expression of Pliny concerning assaying the coinage. xxxiii. 46.

[s] L. L. vii. p. 98.

[t] Pro Quint. 4. (17.)   But, " denarium XXXIX millia," Ver.
ii. ii. 55. (137.), is not a case in point ; except so far as the 300
denarii paid by each censor are an instance of computation by that
coin. " Denarios quingentos" occurs in Suet. Aug. 67 ; " Bigatos
quingentos," Liv. xxiii. 15, &c.

[u] Heaut. iii. 3. 45.

in use for computations by sesterces. The coin itself was called *sestertius*, or *sestertius nummus*, or simply *nummus*; which word, when standing alone it signifies a coin, generally means sestertius, and no other[x]. A thousand sestertii was called *mille sestertii*, or *m. sestertium*, or *m. nummi*, or *m. nummum* or *nummorum*[y], or *m. sestertii nummi*, or *m. sestertium nummum*. Multiples of a thousand were reckoned by sestertia; but the singular *sestertium*[z] is never used for a thousand sestertii. The plural *sestertia* is used with all numbers up to mille; or instead of sestertia sometimes millia is used, as *sexcenta millia*; or sometimes one of the two is understood, and neither expressed, as in *decies centena*[a]. Sometimes *nummum* is added, as in *bis dena super sestertia nummum*[b]. But a thousand sestertia is expressed, not by *mille sestertia*[c], but *decies sestertium*: and sums above this in the same way, by numeral adverbs ending in *ies*, as *undecies* 1100, *duodecies* 1200, *vicies* 2000, *tricies* 3000, *tri-*

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[x] The exceptions are not important. Plaut. Mostell. ii. 1. 10. has been quoted, as if the *nummus* signified the *as*. I believe that it there really stands for the obol. The play was taken from the Greek, and *talentum* follows in the next line but one, which word Plautus would not have used from choice; and three obols was the common pay. But, after all, the sense is complete if *nummus* be taken, as in the same play, iii. 1. 123, and as no doubt a Roman audience would have understood it, for merely a very small sum.

[y] Cicero says, that the custom in his time was always to use *nummum* for *nummorum*, Orat. 46. (156.) But there is the best authority for *nummorum*. See Schell. Lex. in Nummus.

[z] Gronov. Pec. Vet. ii. 2.

[a] Juven. Sat. x. 335. Hor. Sat. i. 3. 15.

[b] Hor. Epist. ii. 11. 33.

[c] Gronovius quotes one place in Cicero (Ver. ii. i. 14.), where *mille millia* is found; but says there is no other like it, and suspects it to be corrupt. Pec. Vet. ii. 2. See also Eckhel Mon. Rom. i. iii. 5.

cies quinquies 3500 sestertia, &c. But the series of
forms with the adverbs is sometimes varied. Cicero
has in the same passage [d] *quaterdecies* for 1400, and
decies et octingenta millia for 1800 sestertia. When
the adverb of a smaller number comes before that of a
larger, it multiplies the latter; as *quaterdecies mil-
lies,* 14,000 times a hundred sestertia; which expres-
sion in Suetonius [e] comes immediately after the con-
trary form *millies et quingenties,* 1500 times a hun-
dred sestertia. The adverbs are not used below *de-
cies,* or 1000 sestertia: for all sums less than that
could be expressed by simply multiplying sestertia, or
millia, as in *octingenta millia,* quoted above, for which
octies would not be used if it stood alone. Therefore
wherever the numeral adverb is used, the numbers
expressed are to be multiplied by 100, and the word
signifying the denomination of money, to be under-
stood of the sestertia, or sums of 1000 sestertii [f]. In-
stead of writing sestertium at full length, the symbol
HS, or IIS, was often used ; this was a contraction of
L L S, for *libra libra semis.* It stood either for ses-
tertii or sestertia ; and therefore it may be doubted
sometimes which of the two is meant [g]. When the
numeral is written in cypher, not at length, and has a
line over it, as HS. $\overline{\text{CCCC}}$, it is to be read as the ad-
verb, and consequently multiplied by 100, and under-
stood of sestertia. Thus HS. $\overline{\text{CCCC}}$ is, quadringen-
ties, or forty thousand sestertia [h]. In many examples
of the form with the numeral adverbs, the singular

[d] In Ver. ii. i. 39. (100.)　　　　　　[e] Aug. 101.

[f] Cenalis illustrated the forms by calling sestertii *common sol-
diers,* sestertia *chiliarchs,* and the adverbs ending in *ies centurions.*
This harmless waggery greatly raised Gronovius' wrath : he de-
nounced it as " stulta et inepta κακοζηλία." Pec. Vec. i. 4.

[g] See Plin. xxxiii. 40, and 55.　　[h] Eckhel Mon. Rom. i. iii. 5.

I. 3

number is used, as sestertii decies: and Gronovius considered the word *sestertium,* when joined with the adverbs, to be likewise always thes ingular number, not the genitive plural, as it is in the other forms. The explanation which he gave of it was, that the word *pondus* is always understood, signifying a pound weight of silver; so that sestertium in the neuter would properly stand for *sestertium pondus argenti,* two pounds and a half of silver; which he calculated to have been originally equal to 1000 sestertii, and thence to have represented that value ever after[i]. Hence it follows, that if we find the singular form, *sestertii,* or *sestertio,* joined with a numeral in cypher, we know that it means the numeral adverb, as *sestertio X* would stand for *decies,* not *decem.*

According to the value assigned above to the denarius, $8\frac{1}{2}d.$, the sestertius was worth $2d.$ and half a farthing; and therefore 1000 sestertii would amount to $8l.$ $17s.$ $1d.$

The sestertius, being thus the smallest denomination of money used in large accounts, was applied sometimes proverbially to any very small sum. *Sestertius nummus,* or oftener *nummus* alone, stood then for an indefinitely small coin, as *nummo sestertio addici*[k], " to be sold for nothing;" as we use the phrase to " cut off with a shilling," &c. Very often, however, the lower species, the as, was used in this way, to signify a trifling sum, as *vilem redigatur ad assem*[l], &c.

7. The quinarius, the next silver coin above the sestertius, was called also *victoriatus,* from the impression of a figure of Victory which it bore. According to Pliny[m], victoriati were not coined at Rome,

until some years after the first silver coinage. He
says, that Clodius, or Claudius, first brought in a
law for coining them, before which they were imported
as an article of trade from Illyria. This Claudius is
probably the person who obtained a triumph for his
victories in Istria, whence he brought home a large sum
of money [n]; and if so, Pliny would fix the first issue
of victoriati from the Roman mint to about A. U. C.
577, that is, 92 years after the first silver coinage.
Pliny's account has been controverted by some modern
writers [o]; and certainly it seems incredible, that the
denarius and the sestertius should have been current
so long before the intermediate species, the quinarius.
Pliny, however, does not say, that the quinarius was
not coined, but that the victoriatus was not : and pro-
bably the true explanation is, that the quinarius was
coined as early as the other silver money, with a cor-
responding impression, and they were all equally cur-
rent ; but that a coin equivalent to the quinarius, with
the impression of the figure of Victory, was afterwards
introduced from Illyria ; which, in course of time, be-
coming very abundant, and being very well known by
the impression, if it did not supersede the Roman qui-
narius, at least gave the name victoriatus to the whole
species ; until by Claudius' law, coins of the same kind
issued from the Roman mint, and the victoriatus be-
came part of the currency of the country. The Illy-
rians, we know, had a silver coinage of their own [p];

[n] Liv. xli. 13.   [o] Eckhel Mon. Rom. i. iii. 3.

[p] Liv. xliv. 27. xlv. 43. Eckhel does not notice the former of
these two. It is obvious that Livy, at xli. 13, uses denarius for
foreign coin equal to it, as Eckhel concludes. The same thing is
equally apparent in viii. 11, where a sum of denarii is described, as
having been paid by the Campanians, sixty-eight years before that
coin was struck at Rome ; meaning, probably, Greek drachmæ,

and there were silver mines in that and the adjoining countries; and therefore there is nothing improbable in supposing that many of these coins should have been imported. Indeed, it is not unreasonable, though it is not necessary to make such a supposition, to imagine that when the importation of this foreign silver became regular and great in amount, the mint masters at Rome might have calculated upon it as a constant means of supply in the currency, and regulated their issues accordingly, by lessening, or stopping the quinarii; until Claudius' law brought about a change.

8. The denarius, like the victoriatus, took another name from the impression on it: it was called often *bigatus*, or *quadrigatus* (*nummus*), from the car with two or four horses stamped on it. A peculiar kind of denarii had still a different name; these were the *serrati*, so called because the edges were notched like a saw, which was done at first in order to prove that the coins were solid silver, not plated forgeries. We do not know, however, that these were circulated any where except in Germany [q]. Pliny assigns the bigæ and quadrigæ to the silver coinage generally, without distinguishing between the species [r]. But it appears that both terms are always used to signify denarii only [s]. They are often named by Livy, some-

which were current in Campania. And it is, I think, not much more doubtful, that the *Illyrium argentum* was the common species of the Illyrian currency, coined in Illyria, namely, the victoriatus.

[q] Tacit. Germ. 5. See Dr. Cardwell, Lect. vi. Many copper coins of a like shape, that is, with the edges notched, may be seen among the money of Antiochus Epiphanes: but this seems to have been intended merely for ornament. Brit. Mus.

[r] xxxiii. 13.

[s] I am surprised to see that Scheller, in his Latin Lexicon, (trans-

times as brought into Rome from a conquered coun-
try ; as bigati from Spain by Fulvius [t], from the In-
subres, Cenomani, Ligures, and Boii, by Cornelius and
Minucius [u]. If we are to understand by bigati nothing
but the legal coin of Rome from the government mint,
it seems strange that these generals should have col-
lected so much in the remote countries of Gaul and
Spain. I cannot help thinking it highly probable, that
a great deal of this money, though rightly estimated as
Roman denarii, and circulated as such, had never seen
the mint at Rome. In short, as the victoriati were
coined in Illyria, and thence imported as money to
Rome, where they passed in the Roman currency, so
it seems very likely, that money regulated after the
Roman standard, and intended to pass as Roman
money, might have been coined in various places
where there was silver, and thence circulated through
the provinces and adjacent countries, and even in Italy
and Rome, as Roman money. This in fact would be
to those countries which produced the precious metals,
nothing more than exporting them coined, rather than
in the form of bullion : and, since a great variety of
coinages was in circulation in Greece and Italy, there
is no reason to think this either impracticable or un-
profitable. Most of the provinces [x] contained silver
mines, and so especially did Spain; and therefore
in these countries we might expect that money should
have been coined, if in any. And the impres-
sion of the coins was not original, or peculiar to the

lated by Mr. Riddle,) says of the quadrigatus, that " its value can-
not be ascertained."

[t] Liv. xxxvi. 21.

[u] Liv. xxxiii. 23.   They are mentioned also xxiii. 15, and the
quadrigati xxii. 52.

[x] Plin. xxxiii. 31.

Romans: cars with two and four horses, as well as figures of Victory, are found on many Greek coins of the age of Alexander the Great, and later. Livy speaks of denarii being brought in great quantities from Istria by Claudius [y]; and, though it is not too much, considering Livy's loose way of writing, to say that he meant by denarii some coins equal in value to them, yet, if the Istrians consumed some of their silver by coining it into denarii to circulate with the Roman money, Livy's expression is quite correct. If this supposition be admitted, it would follow, that many of the older Roman silver coins might have come from no Roman mint, but might be the workmanship of foreigners, whether Spaniards, Illyrians, or any thing else. And truly the difference between some specimens is so great, that the supposition would rather help the subject; by serving to give a reason for this remarkable inequality, without accusing the Roman mint-masters of great dishonesty, or great carelessness. It will be understood, of course, that this conjecture is applied only to these countries while independent: no country could have coined money thus after it became a Roman province.

The name *denarius* is used occasionally, with some laxity of meaning, for other coins, or even for counters. The denarius aureus is mentioned by Pliny [z], as if that had been the common gold coin at Rome. It is found occasionally [a]; but the average size of the aureus was about twice that. Very probably Pliny meant the common aureus, though he called it dena-

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[y] xli. 13.   [z] xxxiii. 13.

[a] There is one of Augustus in the British Museum, weighing 60 grains, and others of less weight. Gronovius (P. V. iii. 15.) is mistaken in saying that this coin was never struck at Rome.

rius [b]; for he uses the name elsewhere, of gold money current in Greece [c], which seems to be the common stater, or piece of two drachmæ in weight; for the half stater, or gold drachma, is rare among Greek coins, except those of Syracuse. The name denarius might have been applied loosely to these, because to the eye they do not appear so much to exceed the denarius as they do in weight [d].

In later times a copper coin was called denarius; whence came the denier of the moderns. The earliest notice of this copper denarius, quoted by Ducange [e], belongs to the reign of Aurelian. Afterwards frequent mention of it is found; as in the codes of Theodosius and Valentinian.

9. Gold was first coined at Rome 62 years after the beginning of the silver coinage, A. U. C. 547. This is the account which Pliny [f] gives, though like many other things related by him, concerning the Roman money, it has been controverted. It was regulated so that the scruple should be worth 20 sestertii; which gives the proportion of gold to silver in value, as 17.14 to 1. The scruple should weigh 18.06 grains, according to the foregoing tables; and, as has been said above, there are a few specimens of this coinage

[b] This is quite certain, if in xxxiii. 13, at the end, X. XL. be the true reading, and the first X. rightly understood to mean denarios, as some explain it.

[c] xxxiv. 17. xxxvii. 3. The *denaria Philippea* have often been quoted from Plaut. Rud. v. 2. 27 : but the better reading seems to be *minæ Philippicæ*. Gron. P. V. iii. 15. Schmieder ad l. We may say, " incidit in Scyllam" &c. of the change, as far as the interpretation is concerned; but Plautus often blunders in Greek money. If *denaria Philippea* were the reading, I should have no hesitation in referring it to the common stater, or gold Philippic.

[e] In denarius.   [f] xxxiii. 13.

in existence which are very nearly the weight of the scruple, and multiples of it.

The scrupular gold coinage was succeeded [g] by that of a different standard, at the rate of so many pieces to the pound : which proportion was gradually increased, and the weight of the coins lessened, by the successive emperors down to Nero. The first proportion, according to the best authorities for the text of Pliny, was, that 40 were coined from the pound; the last was 45 : hence the original weight of the aureus would have been 130.1 grains, which was gradually diminished till it reached 115.64 grs.

Raper supposed, that there was another distinct coinage, intermediate between the scrupular and the later one mentioned by Pliny. He was led to this conclusion, by finding several coins bearing the name of Sulla, of above 165 grs. in weight [h]. If there was any such, that could be regarded as of a new standard, it probably lasted for so short a time, that it need not be taken into the account in any general table of money. But after all, the scrupular standard might have been merely changed by taking a new multiple. Nine scruples would make 162 grs.

Except these of Sulla, none of the aurei now in existence come up to the full standard of 40 to the pound, or 130.1 grs. The nearest to it that I have been able to find is one of Pompey of 128.2 [i]. But this

[g] M. Letronne, from examination of the coins, computed, that the change from the scrupular standard to the fraction of a pound was made between 700 and 705 A. U. C. He found two coins, he says, of Jul. Cæsar, one of the former, the other of the latter standard.

[h] These coins are noticed in more than one collection : in the Num. Pemb. are three. Yet I must confess, that the two specimens in the British Museum appear to me somewhat suspicious.

[i] Brit. Mus. The inscription is, " Magnus Imp Iter. R, Præf

falling off is not more than might have been expected, from observing the usual practice of the Roman mint in all their coinage : indeed, the deficiency of only 1.8 grains is coming very near the full weight. M. Letronne fixed the average of the aureus of Julius Cæsar's coinage at 125.66 grs., and that of Nero's at 115.39. Raper computed the latter to be no more than 112 grs. It appears that throughout there was a certain proportion kept pretty nearly, between the weight of the denarius and that of the aureus, namely, that the latter was about twice the former [k]. From M. Letronne's table, comparing the gold and silver money from J. Cæsar to Domitian, it would be inferred that the gold actually exceeded the silver standard by a small quantity; for in every case the aureus is a little more than twice the denarius. If the weight of the denarius be fixed at 60 grs., the aureus, according to this proportion, should weigh a little above 120 grs. M. Letronne takes the average of the aurei of Augustus 121.94 grs.; and twenty of the same in the British Museum give very nearly an equal amount, 121.26 grs. It will be better, however, to take a number a little below this for our present calculation : for the aureus was soon reduced, as has been said above; and mention of it occurs oftener in writers from Augustus downwards, than it does before that time : so that the full weight of Augustus' coinage might often give rather too high a value. Let it be fixed therefore at 120 grs.: and then the next point to be considered will be the fineness of the metal.

Class et Oræ Marit ex S. C." This is a rare and valuable coin; there is another like it in the collection at Munich.

[k] Very probably the standard proportion was that of the first gold coinage after the scrupular, when 40 aurei and 84 denarii, respectively, were struck to the pound, namely, 2.1 to 1.

10. The Roman gold within the period now under consideration, seems to have been coined without any intentional mixture of alloy. They did not, perhaps, always succeed in refining it entirely : and there was generally a portion of silver in it in the native state [l], which they could not separate. Some gold coins of Vespasian were tried at the mint in Paris, in the 16th century, and found to contain but $\frac{1}{788}$th part of alloy [m]. Ciaconius, who assayed some ancient coins, reports, that Roman gold is of the same quality as that of the Macedonian kings [n]. M. Darcet's experiments [o] ascertained, that it remained the same from Augustus to Vespasian, and that the quality ranges between .002, or $\frac{1}{500}$th, and .009, or $\frac{1}{111}$th part of the weight alloy. The mean between these two is $\frac{1}{300}$th ; and since the three hundredth part of 120 grains is .4 of a gr., the aureus would contain 119.6 grs. of pure gold. As a sovereign contains 113.12 grs. of pure gold, the value of the aureus will be $\frac{119.6}{113.12}$, or 21s. 1.536d., that is, 1l. 1s. 1d. and a little more than a half penny.

The aureus passed for 25 denarii [p]: therefore the value of it, reckoned in the Roman silver money, would be 17s. 8½d. ; the difference between the two values being in proportion to the difference between the comparative values of gold and silver in those times, and at present. In the Roman currency under the emperors, the proportion was between 12 and 12½ to 1 : now it is nearly 15 to 1. But it is remarkable how much greater the inequality was, if we take Pliny's statement, when the first gold was coined : the proportion was then, as has been remarked, 17.14 to 1. Gold therefore was then dearer, or silver cheaper at

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[l] Plin. xxxiii. 23.   [m] Bodin de Republica iii. 6.
[n] De Nummis p. 133.   [o] Letronne Sur l'E. d. M. p. 84.
[p] Tacit. Hist. i. 24. compared with Sueton. Oth. 4.

Rome, than in most parts of Greece a few generations before this; where, as was said above [q], the average proportion was 10 to 1, and the highest mentioned 13 to 1. Gold, however, afterwards fell in price at Rome. In A. U. C. 565 the proportion was 10 to 1 [r]: and Cæsar's conquest of Gaul is said to have brought so much into the market, that it sunk to about 8 or 9 times the value of silver [s]: but this, perhaps, was not standard, or fine gold [t]. In later times again it rose to 14⅘, and even, in the time of the emperor Maurice, to 18 times the price of silver [u].

[q] Chap. vii.

[r] Polyb. xxii. 15. 8. Liv. xxxviii. 11.

[s] Suet. Jul. 54. It was sold at three sestertia a pound. If we reckon 84 denarii to the pound, this is 8.9 to 1 : if 96, it is 7.8 to 1. Cornarius, in his note on Plat. Hipparch. 6. says, that the same ratio held in his time, " hodie enim octo partes argenti," &c.

[t] Savot iii. 11.   [u] Savot iii. 19.

Table of Roman money after the denarius was divided into sixteen asses, and was ¹⁄₇th of the ounce, or 60 grains; up to the reign of Augustus.

Coin	Ratios					L.	S.	D.	Farthings.
Copper									
Sextula									.35416
Quadrans	1½								.53125
Triens	2	1⅓							.7083
Semissis	3	2	1½						1.0625
As	6	4	3	2					2.125
Dupondius				2				1	.25
Sestertius				4	2			2	.5
				8	4	2			
				16	8	4			
Silver									
Teruncius									
Sembella	2								
Libella	4	2							
Sestertius	8	4	2						
Quinarius, or Victoriatus	16	8	4	2				4	1
Denarius		16	8	4	2			8	2
Value of the gold coins in Roman silver money { Half Aureus or Denarius	12½						8	10	1
Aureus	25	2					17	8	2
Real value of the gold coins in English currency { Half Aureus	12½						10	6	3
Aureus	25	2				1	1	1	2
Mille Nummi (Sestertium)	8					8	17		1

Table of Roman money when the denarius was ⅛th of the ounce, or 52.5 grains; after the reign of Augustus.

									L.	S.	D.	Farthings.
Sextula												.3125
1½	Quadrans											.46875
2	1⅓	Triens										.625
3	2	1½	Semissis									.9375
6	4	3	2	As								1.875
				2	Dupondius							3.75
				4	2	Sestertius					1	3.5
				8	4	2	Quinarius or Victoriatus				3	3
				16	8	4	2	Denarius			7	2
Aureus, reckoned at 25 Denarii,										15	7	2
Aureus, reckoned in English currency,										18	5	3.25
Mille Nummi (Sestertium)									7	16	3	

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CHAPTER XI.

HEBREW WEIGHTS.

Pergin', sceleste, mecum perplexe loqui ?

TERENT. EUNUCH. v. i. i.

1. THE third and last part of the subject of ancient weights and money, which it is proposed to treat of, lies within smaller compass than either of the former two. But in proportion as it embraces fewer points of inquiry, it is beset with more difficulties on account of the want of information. Hitherto, while we have been engaged with the Greeks and Romans, the difficulty has been to choose between results calculated from different data, and to decide which was most probable, where several were plausible: but, in the case of the Hebrews, we labour under a want of data altogether. There is no certain method of obtaining an absolute value of any one element, from which a system of values may be calculated, for the period before the captivity of the Jews. No weights, coins, or measures of that age exist; and we must have recourse to probable inference or conjecture for determining the value of all.

The unit or base of all calculation of the weights and money is the shekel: the weight of which is estimated from the testimony of various ancient writers,

and from some coins of an age later than the captivity : upon this is erected the scheme of all the weights, computed from their proportion to the shekel, the coins, and their values ; which scheme, upon the credit of tradition, is carried back from the captivity, and applied to all the time before that, even to the very beginning of the history, only modified in some slight particulars by other traditions relating to the subject.

Here then, in this sketch, are presented to our view the separate points to be discussed, namely, each one of those which have been mentioned, which are in order, as follows :

1. The testimony of ancient writers.

2. The coins.

3. The tradition of the uniformity of the shekel.

4. The other traditions relating to the subject, which will be considered in treating of the parts of the system in detail.

2. There is a prevailing, though not universal, consent among ancient writers, who speak of the Jewish shekel, either in the early history of the Jews, or after the captivity, to reckon it equal to the Attic tetradrachm. It is described sometimes as four Attic drachmæ, sometimes as the stater, sometimes as half the Roman ounce, that is, four denarii or drachmæ, which were considered equivalent. The most prominent dissentient testimony on this head, is that of the Septuagint version ; which renders the shekel most commonly by the didrachm. This, however, is only a seeming, not a real disagreement ; because the drachma current at Alexandria was double that which was considered the Attic ; and therefore the didrachm of the Seventy and the tetradrachm of Josephus are the same thing. Josephus' statement is positive and precise ; " now the shekel, which is a species of Hebrew money,

contains four Attic drachmæ"[a]: which is confirmed by many expressions of value found in his works: and, although he is not always to be depended upon in these things, he nowhere deliberately or intentionally assigns a different value to the shekel of the standard of the sanctuary. Philo agrees with Josephus, in reckoning the shekel equal to four Attic drachmæ[b]: and both mean to apply this expressly to the ancient shekel. In the lifetime of our Saviour, it is evident that the current shekel was reckoned of the same value: for the stater mentioned in the Gospel of St. Matthew[c] was to pay the didrachm for two persons, which was the half-shekel tax paid to the sanctuary; and by stater we must understand, what was always the meaning of the word in that age, a silver tetradrachm of the current Attic standard. Thus St. Matthew bears witness, to the shekel of his time being the same as that, which Philo and Josephus assign to earlier times.

Among other writers of less authority there is some disagreement. Jerome[d] in one place calls the shekel an ounce, in another, four drachmæ, or a stater. In the first of these places it is probable that he might have made a mistake, merely because he misunderstood the Septuagint version of shekel by didrachm, and in consequence doubled the weight of it. At all events, even if it is an oversight, there is little doubt

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[a] Ὁ δὲ σίκλος νόμισμα Ἐβραίων ὤν, Ἀττικὰς δέχεται δραχμὰς τέσσαρας. Antiq. iii. 8. 2.

[b] Special. Leg. iii. iv. v. cap. i. 8. ed. Richter. But elsewhere Philo follows the Septuagint, and calls the shekel of the sanctuary δίδραχμον, meaning, of course, the Alexandrian didrachm. Rer. Divinar. Her. 38. ed. Richter.

[c] xvii. 27, See Exod. xxx. 13. xxxviii. 26.

[d] Quæst. in Genes. xxiv. 9. In Ezek. iv. 10. Comp. in Ezek. xlv. 10. and in Matth. xvii. 27.

that the later value, the four drachmæ, is the one to be taken on his authority; and he therefore may be added to the list of those, who reckon the shekel equal to four Attic drachmæ. Theodoret, also, who calls the shekel didrachm, states, that some interpreters gave it the name stater [e]. On the other hand, Epiphanius gives three values to the shekel, $\frac{1}{4}$ of an ounce, a drachma, and $\frac{6}{25}$ of an ounce [f]: but the whole of this passage is notoriously corrupt, and so full of absurdities, that the evidence is worth nothing. Isidorus says, that the shekel in the Scriptures is an ounce, in other writers only half that [g]: but he also may be passed over like the last, for the same reasons. Hesychius in one place calls the shekel an Attic tetradrachm, in another, says it contained two Attic drachmæ [h]: and Suidas, unlike all, sets it at five drachmæ [i]. The authority of these last writers is of no weight against those, who agree in reckoning the shekel equal to the Attic tetradrachm, or half ounce; and therefore, if testimony were enough to settle the question by a plurality of voices, we might decide at once upon the weight of the shekel. But what has really been proved is, that the prevailing tradition concerning the ancient shekel, and the actual value of the modern shekel were in unison; and both were represented by the coin which passed for the Attic tetradrachm.

3. The testimony then, must, in the next place, be put to trial by a comparison with the Hebrew coins. It is not necessary here to undertake the defence of

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[e] Quæst. in Levit. 38.   [f] De Ponder.

[g] Etymol. xvi. 25.

[h] In σίκλος, and in σίγλον. Of the two, that for the two drachmæ has the best right to be considered genuine, if either be an interpolation.

[i] In σίκλον.

these coins. It is enough for the present purpose, to
mention that they have been suspected, and charged
with being all forgeries, and that they have found
zealous and able advocates, to maintain the cause of
their genuineness. It would be absurd for me to
enter into the question after Bayer [k], Barthelemy[l], and
Eckhel [m], who have combated the objections brought by
Tychsen and others: and to them I refer my readers,
for fuller information. Meanwhile, I take their con-
clusions on the subject for granted; namely, that the
coins which bear inscriptions in the Chaldee character
are all forgeries, but that those which have the letters
called Samaritan, are as genuine as any other class of
ancient coins; that the fair specimens of these have as
good a right to be examined upon the question of
weights or money, and their evidence to be admitted,
so far as it goes, as any kind of coins [n]. It appears,

[k] De Num. Heb. Sam. and Vindic. Num. Heb. Sam.

[l] At the end of the latter work of Bayer.

[m] Doctr. Num. Vet. in Judæa, at the end of vol. iii. See also
Rasche Lex. Rei Num. for more authorities on both sides.

[n] Mionnet gives thirteen impressions of silver shekels of Simon,
vol. v. p. 555. But, that imitations of these have been forged is
well known. Among the forgeries must be reckoned the two in the
Bodleian Library at Oxford: one of them has been described by Wise,
and is mentioned by Greaves, who speaks in favour of the antiquity
of it, but supposes it to have been filed down, and so to have lost
weight: this, however, is certainly not the case with the other, which
is still lighter. In my judgment, the letters of the inscription in
both are too large and clumsy ; nor can the deficiency in weight be
accounted for, they being but, the first 148 grains, the second 140,
though both are inscribed with the word shekel. Moreover, the
second of them has notches cut irregularly round the edge, in imi-
tation of the splitting of the metal in stamping, as is often seen in
ancient coins; which is a certain proof that it is spurious. And it
is remarkable, that this last agrees exactly with the coin engraved
in Bayer's work, (De Num. Heb. Sam. (1781.) in No. I. plate I,) in
the impression and letters, the weight, and even *the notches in the*

then, from the weight of the silver money of the coinage of Simon Maccabæus, that the shekel was about equal to 218 grains, that is, very nearly the same as half our avoirdupois ounce, or half the ancient Roman ounce. The earliest experiment on record by weighing the coins, is that made by Moses Gerundensis, in the twelfth century[o]; at which time if it be said, that there might have been ignorance and inaccuracy on such subjects, yet at least there could not have been so much inducement to forge, nor facility for doing it, as in later ages; and therefore, what the report loses from distrust of the reporter, it gains from confidence in the genuineness of the coin. The result was, that the shekel was found to weigh half an ounce. Nearly the same weight, that is, from 218 to 220 grs. (English) is given by Montanus[p], Villalpando[q], Greaves[r], Mersennus[s], and Eisenschmidt[t], all deduced from the examination of coins. Barthelemy[u] weighed seven coins of from 211.5 to 222.8 grs.; of which the mean weight was 217.43[x]. There are three shekels

edge. I cannot but suspect that it is the same coin : if not, it must be a counterpart of Bayer's, from the same hand. On either supposition, it seems a strong indication that Bayer could not detect a counterfeit.

[o] Arias Montanus Antiquit. Judaic. De Siclo p. 126.

[p] De Siclo ibid.   [q] In Ezek. De Pond. et Num. ii. iv. 28.

[r] On the Denarius.   [s] Mens. et Pond. prop. vi.

[t] Pond. et Mens. i. iv.

[u] In a letter at the end of Bayer Vindic. Num. Heb. Sam.

[x] Bernard alone gives a weight to the shekel different from all these authorities: he says, he found it to be 288 grains: (Mens. et Pond. p. 128.) on what grounds I do not know. But I suspect he might have rated a forged shekel of about 140 grs. weight, as a " profane shekel ;" that is, half the weight of the sanctuary standard. Basnage, Republ. des Hebr. xvi. computed the shekel to weigh 262.4 grs. (troy): this was from the Jewish tradition of the weight of the gerah in grains of barley; Basnage then ascertained

in the collection belonging to the library of Christ Church ; of which two have the inscription " Shekel Israel," א, and the pot of manna, on one side ; Aaron's rod budding, and "Jerusalem kodsha," on the other; and weigh 219 grains each : the third has " Shekel Israel," שב, and the pot of manna, on one side ; Aaron's rod, and " Jerusalem hakedusha," on the other, and weighs 217.4 grs. One of the first two is evidently a forgery : the last is as free from suspicion as any of the Samaritan coins can be. The other has something dubious in its look, but still may be reckoned genuine : for the impressions on the two sides are not exactly opposite to each other ; one of them does not cover the whole face of the coin, but is put on uneven, so that some of the letters are much within the edge, and some are lost by being beyond it ; which is a strong argument against its being a forgery. Both this and the other genuine one are legitimately split at the edges in stamping. The one in the British Museum (which has more of a suspicious look about it than either of these two) bears the name of Simon, and weighs 213.5 grs.

Now the ancient Roman ounce was, according to our former calculations, 433.6 grs., and the half, therefore, 216.8. The English avoirdupois ounce is 437.75 grs., of which the half would be 218.87 grs. Since the shekel is so very near this last amount, we may,

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the weight of that number of grains of barley, and thence inferred the weight of the shekel.   It is really surprising, that any one can seriously have recourse to so deceitful an experiment, as weighing a few small seeds in one country, in order to calculate from them a system of weights used in a different country. If proof be wanted of the utter worthlessness of such methods, it is enough to mention, that other inquirers have from the same process, namely, weighing *beans* to find the weight of the gerah, deduced the weight 78.72 grs. (troy) for the shekel. See Winer Lex. in שקל.

for convenience sake, reckon them equal, for the difference between half our own avoirdupois ounce, and half the ancient Roman, which was reckoned equivalent to the shekel, is but two grains ; and so small a quantity is of little importance in this calculation. Let the shekel, therefore, be considered the same weight as the half of an avoirdupois ounce, or 218.87 grs.: and then occurs the seeming difficulty, arising from the disagreement between this weight and that of the Attic tetradrachm.

For the full weight of the Attic tetradrachm was, as was shewn above, 266 grs. ; and many coins of a comparatively late age might be produced, weighing as much as 260 ; indeed, 250 would be a low weight, but yet it exceeds the shekel by above 30 grs. But the truth is, that the standard, which all the writers quoted above took for the Attic, was not the true weight of the Attic coinage in the best days of it, but the low rate at which it passed afterwards, when the drachma was reckoned equal to the denarius ; and that too, not the early denarius, but the reduced coin, of 96 to the pound. Many writers have remarked this disagreement, and endeavoured in various ways, to reconcile the statements of Josephus and the other authors with the weight of the coins. Some reject Josephus' testimony altogether, and consider his authority worth nothing [y] : others suppose him to have spoken on this point vaguely, without examination, or upon the credit of others [z]. But though Josephus is both inconsistent

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[y] Villalpando passim.

[z] Greaves. Barthelemy supposed that he might have *seen a light* Attic tetradrachm, and set the shekel down as equal to it : a curious apology from a man who had been so much practically engaged in examining coins as Barthelemy. Basnage casts out all the authorities at once, with " Sauf le respect que je leur dois, j'ose dire qu'ils se trompent." Republ. d. Hebr. xvi.

and inaccurate, occasionally, on these points [a], and though his authority has been, on the whole, oftener overrated than underrated [b], still it can be by no means cast out on this question: for he wrote as the people of his own times thought, and it is impossible that the shekel then current could have been thought equivalent to the Attic tetradrachm, if it was worth but $\frac{11}{13}$ths of it; and, if Josephus were given up, all the other testimony to the same effect must be given up too; and the stater in St. Matthew explained, to mean something different from the common stater, or else a different value assigned to the shekel. But, in fact, this is only one of many inconsistencies, which will follow, from interpreting the Attic standard, as mentioned in writers out of Greece of the age of which we are now speaking, to mean the high standard of the money of Pericles' or Xenophon's time. The Roman writers generally mean their own denarius when they speak of the Attic drachma; and the writers after Augustus' time mean the denarius of the reduced weight which circulated then. Thus, the talent of Alexandria, that is, the money talent, is called double the Attic, and the drachma double the Attic drachma; and upon this supposition the didrachm in the Septuagint is considered to be the same as the tetradrachm of Josephus, and others. But the money of Egypt, as has been shewn in a former chapter [c], is not of a standard double the Attic; but only double the late Roman, or imperial denarius. In the same way, the standard of Tyre is said to have been equal to the

a Antiq. ii. 2. 3. vii. 8. 5. viii. 7. 4. ix. 4. 4. xix. 4. 2, compared with Sueton. Claud. 10.

b Bishop Hooper followed the statements of Philo and Josephus, understanding them of the highest Attic standard, and rejected the evidence of the coins. Enquir. Anc. Meas. iv. 2.

c ii. 5.

Attic: Josephus says expressly, that the Tyrian money (coin) is equivalent to the Attic tetradrachm [d]: which proves what the standard which he considered Attic was. For the coins of Tyre are of the very same weight as those of Egypt, and the shekels which have been described, namely, about 218 grains for the larger pieces, and half that for the smaller; which are thus just equal to four, and two denarii of the imperial or reduced standard; and they might be reckoned either the same as the Attic at the low rate, if you call the large coins tetradrachms, (which is the valuation of Heron,) or double the Attic at the low rate, if you call the same coins didrachms [f]; which last is the manner in which the Alexandrian money was valued. Josephus also says, that the maneh was equal in weight to two pounds and a half [g]; that is, Roman pounds, for $\lambda i \tau \rho a$ means nothing else. But the maneh contained 60 shekels, and $2\frac{1}{2}$ lbs. contained 30 ounces: so that he asserts, that the shekel was equal to half the Roman ounce; and thus, by consequence, that the Attic tetradrachm weighed but half the ounce, or about 217 grs. It is ridiculous after this to quote his authority, for the shekel having been equal to the Attic tetradrachm of the old and true standard [h].

It may perhaps seem strange, that when there are so many coins of the original Attic standard, or very near it, preserved to this very day, it should have been

[d] Bell. Jud. ii. 21. 2.   [e] See above, ii. 6.

[f] It is to be observed, that Josephus does not settle which is right: for $\nu \acute{o} \mu \iota \sigma \mu a$ means only a species of current coin; it might be a didrachm, or a tetradrachm.

[g] Antiq. xiv. 7. 1.

[h] Reland, De Num. Samar. Dissert. v., quotes Maimonides, and other Jewish writers, who say, that the shekel was equal to four denarii.

the general opinion that it was so much lower, and
money of so much less value should have passed for
the Attic drachma. Something must be allowed for
the reduction of the standard of weight, since it was
first introduced into these countries by the successors
of Alexander; something to wear, which diminished
the value of each coin in circulation : something, per-
haps, to the dishonesty of the money-changers, who
would generally be the persons who determined the
rate of exchange. But, probably, it is to be ascribed
in great part to the circulation of the Roman denarius.
The denarius, as has been shewn above[h], was originally
not much below the weight of the Attic drachma,
when the latter had been reduced about three grains in
the second century before Christ ; and they passed
everywhere for equal to each other. But afterwards
the denarius was much reduced, and fell more than ten
grains in weight; and with this diminished value cir-
culated very widely. But still it was nominally the
same, and was still reckoned, as before, equal to the
Attic drachma. Thus, as the Roman coinage in-
creased, and the independent Greek was diminished
in quantity, the error (if it may be called error) was
more widely spread, and the Attic standard was uni-
versally rated, like the denarius, at 96 drachmæ to the
pound ; partly because the Attic drachma had always
been used to pass for the denarius ; and partly be-
cause, as the denarius came more into circulation, it
was convenient to reckon it by that computation
which was well known, namely, the drachma. The dena-
rius was commonly current in Judæa in our Saviour's
life-time, as is evident from the manner in which men-
tion of it occurs in the Gospels[i] ; and Selden has

[h] x. 5.   [i] The name occurs fourteen times in the Gospels.

shewn that this was the Roman money, not a coinage
struck by the princes of Judæa in imitation of the
Roman [k].   As then the shekel was about equal to four
denarii, and the denarius was reckoned equal to the
Attic drachma, the shekel, by consequence, was reck-
oned equal to the Attic tetradrachma; and thus it is,
that we find St. Matthew speaking of the half-shekel
temple-due as the didrachm, or half of the stater.
These arguments seem so conclusive for determining
the weight of the shekel, that, so far from there being
any ground, on which to contend for the higher weight
of the old Attic tetradrachm, in opposition to the
coins, it is much more reasonable to say, that the lower
weight can be proved without the evidence of the
coins.   The testimony of Josephus, and with him all
the other writers quoted, has been shewn by independ-
ent arguments, to assign the latter, lower, weight to
the shekel: and therefore, though the coins confirm
the conclusion with great authority, yet it would still
hold good, though they were given up.

4. But after it has been proved, that from the time
of Simon Maccabæus to the destruction of Jerusalem,
the standard weight of the shekel was half an avoir-
dupois ounce, the question is asked, "What con-
nexion is there between this, and the shekel before the
captivity, that of the early kings, or Moses?" and it
must be confessed, that it is not easy to answer the
question satisfactorily: at least there are no means of
proving with certainty the truth of the answer given.
Some indeed have quite given the point up, and judged,
that a link was wanting in the chain of argument,
which nothing could replace.   If this be so, we must
abandon the attempt, to determine any of the weights

[k] De Jur. Gent. p. 224.

or money of the early history, and make the inquiry give place to pure speculation. But rather than do this, it will be better to see, whether there are not some grounds for supposing, that there may have been a constant tradition, and acquiescing, at least, in a probable conclusion on the subject. The first point to be noticed connected with tradition, is the traditions of the Jews themselves concerning the weight of the shekel : these however will give no help, but rather embarrass the question. For the rabbinical writers assert, that there was an increase of all the weights after the captivity, to the amount of $\frac{1}{5}$th ; so that the modern standard was to the ancient as 6 to 5. But this opinion is entirely without foundation ; it seems to be of late origin, and to be due to nothing but an attempt to explain the well-known passage in Ezekiel relating to the weights, which will be noticed further on [1]. We may therefore set the traditions of the Talmudists aside ; and indeed, their authority can hardly be taken for any thing in the whole of this question [m]. What we have to consider then is, whether the Jews, during the seventy years' captivity at Babylon, are likely to have lost all their ancient standards, and adopted those of the country where they lived, and then on their return to have introduced these, or any other foreign ones, such as the Tyrian or Egyptian ; or, whether they may be thought to have preserved the ancient weights with tolerable accuracy, and to have restored them on their return, nearly the same as they were used before. Let us see, then, what was

[1] Bishop Hooper iv. 2, 4.

[m] This, perhaps, will partly appear as we go on. But one instance may be referred to here : Montanus (De Siclo p. 131.) quotes Solomon Jarchi, as saying, that *all the shekels in the prophets meant minæ!*

the condition of the Jews at this time. They had migrated with their whole population, among which the artisans in particular are named [n] : they formed a kind of community of their own : they were treated usually with no severity ; they were not household or menial slaves [o], but lived in large numbers in towns of their own [p], and in villages [q] in the country : and there was, probably, at all times among them, a hope that they should some day return to their own land again[r]. There really is nothing in this to make us suppose such a total forgetfulness of their own usages, as some have imagined : they might well have kept many of their own standards of weight and measure, as they did their own language, sacred and historical books, and genealogical records [s]. Thus, from a general view of their circumstances, it would be highly probable, that they might have brought back, at least, the standard weight of the shekel. There are, however, other more particular reasons for thinking that they did so. At their return, Cyrus restored to them 5400 of the gold and silver vessels which had been used in the temple [t]; and there is great reason for thinking that some, if not all of these, were of a known weight, according to the standard of the sanctuary. Certainly, when Moses first furnished the tabernacle with utensils of the same kind, the weight of each was specified with great nicety [u]. And David also measured out

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[n] 2 Kings xxiv. 14, 16.

[o] Esth. vii. 4. The queen says, " but if we had been sold for bondmen and bondwomen, I had held my tongue," &c.

[p] Esth. ix. 2.   [q] Esth. ix. 19.

[r] They who invented the story told in 2 Maccab. i. 18, &c. certainly thought that this hope was entertained from the first day of the captivity.

[s] Ezra ii. 62.   [t] Ezra i. 11.

[u] Numb. vii. &c.

the metal for all the gold and silver vessels by weight[x]: and, even although the temple might have been plundered of all the ancient plate, in the many pillagings which it suffered afterwards, still it is most probable, that the loss would have been supplied by new, regulated in the same way by weight, if not a copy of the old. Thus, it must have been easy to restore the standard of the shekel, from the weight of some of these many vessels, even had it been otherwise forgotten. The weights in general, and all payments made to the temple, would have been nearly the same in amount as they were before : and, although the Jews did not yet coin money, the standard would have been reestablished by the shekel of the sanctuary ; so that when Simon first coined shekels, he would have taken this standard for the money which he stamped with that title.

For these reasons then, we may conclude, that it is very probable, that the ancient standard was nearly the same as the modern; and that we are justified in transferring the calculations of the value of the latter to the former ; and by these means computing the value of all the ancient weights and money. For it is evidently impossible to determine the amount of change due to any other causes, than those which have been considered. The shekel of Moses may have varied in that gradual manner, in which standards are found to alter in course of time, from inaccurate keeping, or accident : but no new standard could have been introduced, to supersede that of Moses. Therefore, if we were sure, that we had found the true standard for the times of the later kings, we should have no reason to doubt, that we came pretty near the original one of Moses. But nothing can get a step beyond this.

[x] 1 Chron. xxviii. 14, &c. Comp. also Ezra viii. 25.

What the shekel of Abraham was, can be calculated on
no ground, except the assumption, that there was
then, and for a long time afterwards, but one standard
used all over that country, and that this was the one
which Moses established among the Israelites.

5. Let it be supposed, therefore, that the calculation
of the ancient weights, from the weight of the shekel
after the captivity, may be allowed, as an approxima-
tion towards the truth. The discussion of the Hebrew
weights in general will then follow: after which the
shekel will be considered in another point of view,
namely, as a species of money.

The Hebrew system of weights seems to have been
constructed on nearly the same principle, as that which
pervaded all Greece, namely, a combination of three
principal denominations, the shekel, maneh, and kik-
kar, corresponding to the drachma, mina, and talent.
It is probable, that some system of this kind was very
ancient, and both Greeks and Hebrews might have de-
rived their own from a common source: the latter are
generally supposed to have been indebted to the Phœ-
nicians for their weights and measures[y]; and it is well
known how much the Greeks borrowed from the same
quarter. Shekel (שֶׁקֶל) signifies "weight;" Maneh
(מָנֶה) "number;" and Kikkar (כִּכָּר) "a round num-
ber," or sum total. Hence we see how the system
arose. Shekel was the unit of weight, and quantities
were expressed by adding numerals to the term, or
saying, "so many weights." But as this method could
not be continued to a very great extent, a certain mul-
tiple was fixed on for a higher denomination, which,

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[y] It was a tradition of the rabbins, that all the silver mentioned
in the law was to be referred to the Tyrian standard. Hottinger
Append. Cipp. Hebr. x. &c.

instead of " so many weights," was called simply " a number," or Maneh. And, lastly, for the largest quantities, a still higher limit was taken, and called not " so many numbers" (manehs) in distinct numerals, but " a roundness" or round sum, Kikkar [z].

The subdivisions of the shekel were, the beka (בֶּקַע)[a], or " half," which was used for the half-shekel ; the reba (רֶבַע), or " quarter," used for the quarter-shekel; which last is called by the Talmudists, zuz or zuza[b]; and the gerah (גֵרָה), which signifies a kind of bean, and was the twentieth part of the shekel, or fifth of the reba ; being so used originally, as we may suppose, from the weight of the bean, like grain or siliqua.

The kikkar of Moses' scale contained 3000 shekels[c]: but Moses does not name the maneh, so that it is not quite certain what proportion that bore to the other weights. It is mentioned, for the first time in the Bible, in 1 Kings x. 17 ; from which place, compared with the parallel passage in 2 Chronicles ix. 16, it would appear by the text, that the maneh contained 100 shekels. But if the place be explained according to the common opinion of the Jews, namely, that the shekels here named are but the half of the shekels of the sanctuary, the maneh would contain but 50 shekels : this question, however, will be discussed further on : for the present it may be set aside, to make way for the passage in Ezekiel xlv. 12, where the maneh is ordered to contain 60 shekels. It is true that some have taken the words of this place in a different sense ;

[z] Horace's " Mille talenta rotundentur" would be paraphrased in Hebrew by, " mille *rotunda* rotundentur."

[a] Genes. xxiv. 22. Exod. xxxviii. 26, &c.

[b] Hottinger App. Cip. Heb. v. &c.

[c] Exod. xxxviii. 25.

but so much the greater weight of authority, both in number and credit, seems to lie on the side of the meaning now given, namely, that the maneh should be equal to 60 shekels, that this may be assumed to be the true interpretation without further discussion. Since, then, Ezekiel's authority can admit no dispute, and there is no proof of any other division of the maneh, than into 60 shekels, having ever been used in the scale of the sanctuary ; and, since Ezekiel identifies the shekel, of which he speaks, with that of Moses, by dividing it into the same number of gerahs, namely, 20, we may pass over the passage in the Book of Kings, (and for other reasons also, which will be given,) and set down the proportion of the maneh to the other weights, according to Ezekiel's statement. Therefore the kikkar contained 50 manehs, and the maneh 60 shekels.

The maneh was evidently the same word as the Greek $\mu\nu\hat{\alpha}$, and the root of it : for, that the Greek came from the Oriental word, not this from the Greek, is very plain, because the word has a meaning in Hebrew, but none in Greek [d]. The shekel corresponds to the Greek $\sigma\tau\alpha\tau\grave{\eta}\rho$, which is a translation of it : and both hold the same place in the scale of weight ; for the stater was, as has been said above, either the didrachm or the tetradrachm ; and the didrachm was the $\frac{1}{3000}$th part of the talent, as the shekel was of the kikkar. But the two systems differ in this, that the Hebrews took their stater or shekel for the unit of weight, the Greeks took a fraction of it, the drachma [e].

[d] This seems to be the root of many words in other languages also signifying money, as *mina, moneta, monnoie, money,* perhaps even *münze,* (for the *z* is no difficulty,) and *mint.* The Latin derivation of " moneta, quia monet neque fraus fiat," is worthy of a Roman etymologist.

[e] Bishop Hooper connects the Greek system with the East in

Beside these well-known weights, there is another either weight or coin, or perhaps both, mentioned in the Bible under the name adarkon (אֲדַרְכּוֹן), or darkemon (דַּרְכְּמוֹן), which seems to be used of gold only [f]. It is found in the later books only, the Chronicles, Ezra, and Nehemiah [g]; and some have thought, that it is no more than the Hebrew form of the name of the Persian gold coin, the daricus; and, accordingly, that it is a late word, which was inserted by Ezra for the first time, when he arranged the historical books. It is not easy to understand why Ezra, in compiling the history of David's reign, should have suppressed the original word, in which the weight of the gold described was expressed, to substitute the name of the daricus; or why, if he had calculated the weight from other terms and given his own result, he should not still have used the terms of weight found everywhere else in the Bible [h]. In short, it may be supposed that the word is as old as the age, in the history of which it is found, namely, the reign of David: and therefore, we may infer, that there was in use at this time a distinct denomination of weight or coin in gold, so called. But there are no means of calculating the value of it, except that it may be conjectured to have

the word τάλαντον also, which, with the root ταλάω, he derives from the Arabic word *Tsalang*, " weight." Anc. Meas. iv. 5. 3.

[f] See Winer Lex. in אדרכון.

[g] 1 Chron. xxix. 7. Ezr. viii. 27. ii. 69. Nehem. vii. 70. 72. Our version renders it " drams." The Septuagint in most cases χρυσοῖ: one various reading is δραχμῶν.

[h] Supposing Darius to have invented the name, it would seem very strange, that in about fifty years it should have been so widely circulated, as, even in Judæa, to supersede and obliterate other names, to such a degree that Ezra could find no other word than that, to express a value of an age five hundred years back.

been less than $\frac{3}{10}$ths of the shekel; since 10,000 adarkons seem to be mentioned as a less sum than a kikkar, or 3000 shekels [i].

Many writers on the subject have remarked the likeness of darkemon, (which is considered the same word originally as the other, adarkon,) to δραχμὴ, and thence inferred the probability of a connexion between them: and a possible connexion between the root of these words and daricus, has been hinted above, in speaking of that coin. It is, however, a question whether darkemon is derived from drachma [k], or drachma from darkemon, and opinions are divided on the point. It is certain, that a word very like this was taken by the Arabians, in later times, into their language from the Greek drachma, namely, *darchimi*, or *darchimia*: and this, according to Serapion, as quoted by Massarius, was used often for a gold coin [l]. But this really does not at all concern the question about the word in the Bible, nor furnish any reason against supposing, that drachma might have come from the East originally. Hottinger affirmed, that there was a similar word in Persian and Arabic, signifying generally *nummus*; and supposed, that both the Hebrew darkemon and Greek drachma were derived from the Persian [m]. Salmasius thought the Greek word to be derived either from the Hebrew or Persian [n]: Arias Montanus from the Arabic [o]; and Villalpando from the Hebrew [p]. All these agree in the opinion, that the drachma was derived from the East.

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[i] 1 Chron. xxix. 7. And this is another reason, why the adarkon should not be the daricus, for that, we know, was two Attic drachmæ, or about $\frac{1}{17}$ of the shekel.

[k] See Waserius De Num. ii. 15. Hostus Hist. Rei Num. v. 8.

[l] Domenic. Massarius De Pond. et Mens. Medicinal. ii. 1, 23, 46.

[m] App. Cip. Heb. v.   [n] De Usur. xv. p. 426.

[o] Antiquit. Judaic. p. 136.   [p] Apparat. Urb. et Templ. ii. iii. 17.

The common etymology of the word is very unsatisfactory, not to say absurd ; namely, that it is formed from δράττω, and signifies a handful: for it is said, that before silver money was used in Greece, ὀβελοὶ, little spikes or nails of iron and copper, passed for money, that six of these made a handful, which was called δραχμή ; and hence the two names *obolus* and *drachma* were derived for the money[q]. The Greeks were bad etymologists, not much better than the Romans, and the authority for this derivation goes no further back than Plutarch ; so that we are not bound to think very highly of it. But there are moreover two objections to it. First, it supposes a currency of copper or iron in Greece, of which there is no trace: had there been this supposed circulation of spikes in these metals, they would probably have been the first coined into money, like the copper money of Italy. But the earliest money in Greece was silver[r]. Secondly, Aristotle, in assigning a root to the word ὀβολὸς, says nothing about ὀβελοὶ, but casts out the story about the hobnails altogether, by deriving *obolus* from ὀφέλλω, " to increase[s] :" whether rightly or wrongly is no matter ; but, at least, his suggesting such an origin, shews that there was no truth in the opinion, that the name of the money was derived from the " spike ;" and consequently the other part of the theory, that drachma was a handful of spikes, falls to the ground

[q] Plutarch. Lysand. 17. Repeated by some grammarians, as Eustath. Iliad a′. 467. (p. 136.) &c. See Pollux ix. 6. and the commentators.

[r] See above, ch. viii.

[s] Pollux ix. 6. Salmasius, whose comments on this derivation are curious, supposed obolus to come from a Syriac word, *pheles*, which he imagined to be the root of *follis* also. De Usur. xv. p. 426.

also.   It remains then, that we may consider the word *drachma* also, like other words in the Greek system of weights, to be derived from some one of the Oriental tongues ; and that the Hebrew *darkemon* and *adarkon* are forms of words from a common root with it ; and stand for denominations of weight corresponding to the drachma.

6. Hitherto the shekel has been considered as a constant quantity.   But it has always been a common opinion, that there were more than one standard of weight for the shekel.   The universal tradition among the Jewish writers is, that there were two standards, that of the sanctuary, and the royal, or, as it is called in opposition to the former, " the profane ;" and that the former of these was just double the latter.   Michälis thought a third standard might be perceived, which he called that of the " trade standard[t]."   But several writers of high authority[u] have strongly opposed these opinions, and maintained, that there was but one standard in use, namely, that of the " sanctuary."   Now certainly any unprejudiced reader, who found epithets joined with the shekel weight in the Bible, such as, " of the sanctuary[x]," or, " after the king's weight[y]," would naturally suppose, that they were added in each case, to distinguish different kinds of weight ; for otherwise, they would be unmeaning appendages : and it would not be easy to shake off this impression, by any calculation of the system of weights.   For indeed no calculation can prove, that there were not many stand-

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[t] Abhandlung v. d. Hebräischen Seckel. Göttingische Zeitungen von gelehrten Sachen 1752. No. 27 : continued in the Anzeigen No. 93.

[u] Villalpando, Greaves, Hottinger, Bernard, Cumberland, Morinus, Eisenschmidt, &c.

[x] Exod. xxx. 13, &c.   [y] 2 Sam. xiv. 26.

ards, and many systems in use; and it is a bold attempt, when there is confessedly a very great dearth of information concerning all the weights of the Hebrews, to discover the actual value of one standard, to which all expressions in the Bible may be reduced [z]. Many other countries, both modern and ancient, had more than one standard of weight, and most probably the Jews had also; although by the law of Moses but one was allowed to be used for payment of dues to the sanctuary. After all, one chief reason, why the supposition of more than one standard has been so much disputed, seems to be, an unwillingness to acknowledge ignorance. For there is but one system of Hebrew weights, of which we have any means of finding the value; if we admit more, we must leave them undetermined, or guess at them. But reducing all to one, has at least the appearance of understanding all; and by adopting one comprehensive system we seem to exhaust the subject.

We will follow the Jewish traditions then, so far as to suppose, that there was, at least, one other standard in use, beside that of the sanctuary; not "established," as Waser [a] speaks, as if the two rested on equal authority, but allowed, recognised, and used. The proportion between them was assumed by the rabbins, as was said before, to be that of 2 to 1: and, upon this assumption, many places in Scripture, where the shekel

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[z] Villalpando's arguments from the coins fall to the ground with them, since the coins are spurious. But even if it were not so, his reasoning is only, that because we think we can calculate the value of one standard, therefore there can be no other. The argument, that the half-shekel of the sanctuary is not used for the profane shekel, might perhaps be good for proving that the two standards were not in the ratio of 2 to 1; but cannot prove there were not more than one standard. App. Urb. et Temp. ii. iv. 28—30.

[a] De Num. iii. 3. p. 58.

occurs, have been understood to mean, half the weight of the shekel of the sanctuary [b]. Wherever a weight of gold is expressed in shekels, this lower standard has been applied : and thus it is, that the Septuagint renders 600 shekels of gold [c] by " 300 gold pieces ;" and Josephus, the shekel of gold [d] by " daricus." It has been supposed too, that there was a separate standard for other metals also ; so that, when " shekels of brass," or " shekels of iron [e] " are named, a different kind of weight is to be understood in each case. It may be so ; but this is all conjecture. If the gold weight was half the standard of the sanctuary, the kikkar of gold would weigh nearly 42 lbs. avoirdupois. It certainly was a considerable weight in Moses' time, for the candlestick with all its ornaments, in the tabernacle, was to weigh exactly so much [f].

[b] See 2 Sam. xiv. 26. and the Septuagint version. 1 Maccab. x. 42. compared with Josephus Antiq. xiii. 2. 3.

[c] 1 Kings x. 16.   The Septuagint, however, is not consistent. See Josh. vii. 21.

[d] Antiq. iii. 8. 10.   [e] 1 Sam. xvii. 5. 7.   Petr. Mart. ad l.

[f] Exod. xxiv. 39. xxxvii. 24.   Therefore we may not attempt to evade the difficulty of explaining the passage in 2 Sam. xii. 30, where it is said, that the crown which David took from the king of the Ammonites (Josephus adds, that David wore it ever after, vii. 7. 5.) weighed a talent of gold, by having recourse to the small Homeric talent ; which is so often named in expressions like this in profane writers, where the weight or value of a crown is spoken of. See above, ch. ii. 10. and Böckh Econ. Ath. i. 5.   Some commentators indeed have said, that the word translated " weight" (מִשְׁקָל) may signify " value ;" (Comp. 1 Kings xx. 39.).   See Patrick, &c. I leave this question of verbal criticism to those better able to judge of it, and will content myself with quoting, in illustration of the meaning commonly given to the passage,

magnæque coronæ

Tantum orbem quanto cervix non sufficit ulla, JUVEN. x. 39.

Rosenmüller thought, that the proportion between the shekel and maneh laid down by Ezekiel, namely, 60 to 1, was a new one [g] : which would imply, either that the old shekel of the sanctuary had been lessened, or the maneh raised.　The tradition of the rabbins was, that all the ancient weights were raised after the captivity by $\frac{1}{5}$th ; so that 60 shekels of the old scale would equal 50 selas of the new ; for *sela* was the name then given to the denomination which answered to the *shekel* [h].　And some have supposed that this change had begun in Ezekiel's time, and thus attempted to explain his proportion [i].　But there seems to be no kind of authority for this tradition ; which probably arose merely from the conjectures of commentators on this very passage in Ezekiel [k].

Michälis [l] preferred deducing the proportion of the " shekel of the sanctuary" to the " profane shekel," from a comparison of the place in Ezekiel with that in the Book of Kings.　From which, since the former reckons 60 shekels to the maneh, and the latter 100, it would follow that the standards were as 5 to 3.　He objected to reckoning the weight of the first of these two by that of the Attic tetradrachm, on account of the enormous amount which would result from it in many expressions ; and gravely proposed, that, in order to ascertain more correctly the true weight of the shekel, an experiment should be made by weighing the hair of a man's head after a year's growth ; which, he thought, would give the real value of 200 royal

to shew that heavy crowns were used elsewhere than among the Ammonites.

[g] On Ezek. xlv. 12.

[h] Bishop Hooper Anc. Meas. iv. 1. and 4.　Reland De Num. Samar. Diss. v.

[i] Hooper Ibid.　　[k] Ibid.　　[l] Göttingisch. Zeit. as above.

shekels, the weight of Absalom's hair [m]. He also imagined a third standard of shekel, used in trade, larger than either of the others : and his inquiry ended, in fixing the largest shekel at about $\frac{1}{3}$rd of the weight commonly assigned to that of the sanctuary standard, and the smallest at $\frac{1}{10}$th of the same : the other he called the Mosaic, and rated somewhere between the two. It has been already proved, that the real Attic tetradrachm was never the weight of the shekel, but only four denarii : of the other values it can only be said, that they are utterly without proof.

Another difference supposed to have been made in the standard, was in the weight of the maneh [n] : namely, that when the maneh meant a sum of money, it contained 60 shekels, or, more properly speaking, the weight of 60 shekels of silver was called a *maneh* of money : but that when a weight of any other thing was meant, 50 shekels were called a *maneh*. This also is a Jewish tradition, and without any authority. There is nothing impossible in it ; but there seems to be this objection, that it makes the standard, by which the money was computed, exceed that of the weight

[m] His words are as follows (*risum teneatis amici*) : "The hair of Absalom weighed yearly 200 royal shekels. Take then the yearly growth of the hair of a man who has strong and long hair, and cut it off every year ; weigh it ; and, since Absalom had usually long hair, let the weight of this be doubled : then $\frac{1}{200}$th part of this hair will be about a royal shekel. But care must be taken, that on the day from which the growth of the hair is to be computed, all the hair be cut entirely off the head, and then none of the last year will come into the computation. Since time is needed for this experiment, it is not possible to make it yet : meantime it is worth while for foreigners also to engage in the trial, and inquire whether one kind, at least, of the Hebrew shekel cannot be ascertained more correctly than appears yet to have been done." Translated from the Zeitungen.

[n] Bishop Hooper Anc. Meas. iv. 1.

for other substances: for the shekel is supposed to be the same, but 60 go to the former maneh, and 50 to the latter. Whereas the tendency is always found to be towards the other side: the money falls below the standard weight; or, if two standards are allowed, that of the money is the least of the two; as in the commercial and silver weights at Athens, and the pound weight, and pound of money among us.

Where there are so few means of determining the value of the second standard of weight, nothing which can possibly contribute to the amount of the data for solving the question, should be left out. It is therefore worth while to mention the σίγλος which Xenophon found current in Syria, and which has always been reckoned a kind of shekel[o]. This contained $7\frac{1}{2}$ Attic obols; and therefore, compared with the Attic drachma of Xenophon's time, would have weighed about 82 grains. Now if this were an ancient shekel, and one of those current in Palestine, it would fall much below the least weight assigned to the shekel of the Hebrews in the common scale. For according to the traditionary computation, the " profane shekel," the least of the two, would be the half of that of the " sanctuary," or 109 grains. And, since the difficulty in most cases arises from the greatness of the weights, it is all in favour of a result calculated on other grounds, that it reduces them. If the shekel were 82.5 grs., the kekkar of 3000 shekels would weigh but about $35\frac{1}{4}$ lbs. avoirdupois. This conjecture, therefore, may be allowed to stand on, at least, as probable ground as many others upon the subject.

7. When all the foregoing arguments are brought together and fairly considered, they lead to the following probable conclusions:

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o See above, ii. 4. and iv. 10.

First, that the Hebrews, before the captivity, had more than one standard of weight. The standard of the sanctuary was established by authority; a model of the weight was deposited in the sacred building, and all payments made to that place were required by law to be regulated by it. And, since these payments would have been in the coin of the realm, the coinage, whenever it was first introduced, would have been regulated by it also: and all other weights would have been measured by a reference to the same. But still, enforcing the authority of this standard for some things, did not prohibit the use of others for other things. The royal standard might have been one distinct kind of weight from that of the sanctuary, and there might have been others of which we know nothing.

Secondly, that the proportion between the standard shekel of the sanctuary and any other is uncertain. That commonly assigned, namely, 2 to 1, rests on no certain authority. It is probable enough; for some countries in that part of the world are said to have had similar systems, bearing that ratio to each other, as Tyre and Alexandria; and two such are described as having been used in Egypt alone[p]: but it wants proof. The conjecture of a second standard of 82 grains, or about $\frac{4}{11}$ths of that of the sanctuary, is also probable, but nothing more. Michälis' proportions are for the most part pure speculation: but that of 5 to 3 between the sacred and the royal shekel, may be allowed, as a most probable deduction from the text of Scripture.

Thirdly, that there is reason for thinking, that the ancient standard of the shekel was preserved after the captivity; and, that calculations of the value of the

p See above, ii. 5, 6.

latter, from the statements of writers who lived when the shekel was current, confirmed by the weights of coins, may be applied to the former, as an approximation to the real value.

Fourthly, that there are no satisfactory means of calculating the value of any other standard : since different proportions are assigned, each with some degree of probability; and, that, therefore, we must be content to confess, that in all the expressions of weight or value, where other shekels are used than those of the sanctuary, we can only conjecture their real value.

Table of Hebrew Weights before the Captivity, according to the standard of the Sanctuary, reckoning the Maneh at 60 Shekels, as given by Ezekiel.

						Avoirdupois weight.		
						lb.	oz.	grains.
Gerah								10.94
5	Zuza							54.71
10	2	Beka						109.43
20	4	2	Shekel				½	
1200	240	120	60	Maneh		1	14	
60000	12000	6000	3000	50	Kikkar (or Talent)	93	12	

CHAP. XII.

HEBREW MONEY.

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Εἰ δὲ δεῖ μεμψάμενον γνώμας τὰς προκειμένας, αὐτὸν περὶ τῶν ἀφανέων
γνώμην ἀποδέξασθαι, φράσω—   HERODOT. ii. 24.

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IT is uncertain when or whence money was first
brought into Palestine. It is mentioned in Scripture,
for the first time, in the history of Abraham ; and, ac-
cording to the Jewish accounts, he first introduced it
from Assyria, or Chaldæa[a]. But it would be wasting
time, to collect all the stories which have been told
about the origin of money, from the traditions of the
rabbins to the Voluspa of the Anglo-Saxons[b]. The
Jewish writers pretend, that the posterity of Abraham
preserved the art of coining ever after him[c] ; and
forged coins have been produced for antiques, with
figures and inscriptions, professing to relate, not only
to Mordecai, David, or Solomon, but even to Isaac and
Rebecca, Sarah and Abraham : nay, so impudent were
the dealers in such imposture, that some are actually
to be seen, with figures on them intended to represent

[a] Isidor. Etymol. xvi. 25. Epiphanius De Pond.

[b] Which runs thus: " The Asæ met on the fields of Ida—They
created money," &c. Turner Anglo-Sax. Append. to book ii. p. 242.

[c] Hottinger App. Cip. Heb. vii. viii. Morinus De Ling. Prim. ix.
Lewis Antiq. Heb. Rep. vi. 46. Eckhel Doct. N. V. Princ.
Jud. ii.

Adam and Eve[d]. These idle tales have long been exploded : and although the early writers on Hebrew money were slow to give up their faith in the antiquity of the few coins, to which they could appeal as authorities, it would now be thought ridiculous, to hint that there could be any in existence so old as the captivity. But it has been made in some degree a question, what sort of money that was, which passed in Abraham's time.   The Jews say, it was the first standard coined shekel[e] : but modern writers have treated the idea of any coined money at this time as fabulous.   The dispute, if it may be called a dispute, is in part about words : for it depends on determining what makes money *coin*. If our ideas of a coin are limited to the even-shaped, delicately-stamped counters of modern currencies, no one would say that Abraham's money had any pretensions to be called coin.   But if the shapeless pellets indented with a coarse stamp, of the earliest specimens of Greek money, and the large masses of copper rudely flattened, or even cast, of the oldest Roman and Hetruscan, be called coins, it would be hard to refuse the name to the shekels of Abraham's time.   The pieces of silver which he paid to Ephron were to all intents and purposes money : they were representatives of value of a known standard, and they had some kind of mark, or some peculiar shape, to authenticate that value ; for there can be no other meaning in the words " current with (Heb. passing to) the merchant."   If, therefore, being stamped is the essence of a coin, we must be prepared to shew, in what manner Abraham's pieces of silver were marked, before we can prove that they were not coins. But, after all, the

[d] Frölich Prolegom. Annal. Reg. Syr.
[e] Isidorus, as above.

question is of no importance: for so soon as a currency
in the precious metals in pieces of a fixed value is once
brought into use, it is an easy and short step to the
working of these pieces into the forms which we call
coins. All that need be remarked is, that in Abraham's
time exchanges were not made by means of masses of
unwrought metal, like Homer's lumps of iron[f]; but in
a manner which shews a much higher degree of civili-
sation, by an established commercial currency in silver,
all of which had been submitted to a process of testing,
measuring, and marking, answering to that of the mo-
dern mint. What may be inferred from the weighing
of the shekels, will be considered further on.

2. In the history of Jacob we find another word
used to signify some kind of money[g]; that is, kesitah
(קְשִׂיטָה); which some have interpreted, not only so as
to countenance the opinion, that money was coined in
this age, but even to prove what was the impression
on the coins. For the Septuagint version (following
the Chaldee Paraphrase, as Arias Montanus says[h],) has
translated the word by " lambs[i];" and hence it has
been supposed to signify coins bearing the impression
of a lamb or sheep[k]. But the real meaning of kesitah
seems to be " a portion[l];" and it is explained to sig-
nify a certain weight of silver: whatever it was, it is
evident that it was a fixed quantity, since, like the
shekels of Abraham, it was measured by number. It
is said to be an Arabian word[m], and is traced to a root

f Iliad. ψ'. 826. η'. 473. Odyss. a'. 184.
g Genes. xxxiii. 19. h Antiq. Judaic. De Siclo p. 133.
i One cannot help following Eugubinus in the conjecture, that
μνῶν should be read for ἀμνῶν, in spite of Villalpando's denunciation
of the attempt to amend the text of the Vulgate. Villalp. Ap. U. T.
ii. iv. 25.
k See Arias Montanus, Waser De Num. &c.
l See Winer Lex. v. m Arias Montanus, as above.

in that language: which is confirmed by the fact, that the only other place in the Bible where it is found, except with a reference to Jacob's purchase, is in the Book of Job[n].

3. The currency of the earliest ages was silver. There is no mention of brass money in the Bible[o]; nor of gold for many centuries after the first appearance of money. The language indicates the same thing: for the word *silver*, like ἀργυρίον in Greek, is the common Hebrew name for money. But although gold was not used for money, it was reckoned among valuable property, in the form of utensils or trinkets. Abraham was rich in silver and gold[p]; jewels (literally *supellex*) of silver and gold are mentioned[q]; Job's friends contributed each a golden earring[r] to help repair his losses; and among the spoils of Jericho we find a piece (Heb. *tongue*) of gold bullion, fifty shekels in weight, with two hundred shekels of silver[s]; shewing that gold was not yet coined, in the middle of the fifteenth century before Christ. The first notice of gold money in the Bible is in David's reign; where that king is said to have bought the threshing-floor of Ornan, for 600 shekels of gold by weight[t]. The

[n] xlii. 1.   The other place is Josh. xxiv. 32.

[o] At least before Ezekiel.   For נחשת, in Ezek. xvi. 36, is understood by many critics to signify brass money.   See the commentators, and Winer Lex. v.

[p] Genes. xiii. 2.   xxiv. 35.

[q] Genes. xxiv. 52.   Exod. iii. 22, &c.

[r] Job xlii. 11.   Golden earrings were common.   See Genes. xxiv. 22.   xxxv. 2.   Exod. xxxii. 2, &c.

[s] Josh. vii. 21.   Villalpando's interpretation of this is amusing. He thought the tongue of gold was a scymitar, which the people of Jericho worshipped, as the Scythians did their iron sword (Herod. iv. 62.) : and that the rich garment and 200 shekels were offerings to this idol : as above, c. 23.

[t] 1 Chron. xxi. 25.

shekels of gold, which are mentioned in the description of the shields of Solomon, are generally understood, as was seen in the last chapter, to signify weight, not money. But by the time of Isaiah, gold money seems not to have been uncommon at Jerusalem[u]. It does not appear what was the proportion of value between gold and silver, in the early part of the Jewish history. If Bochart's explanation of the two different values, assigned to the payment which David made to Araunah or Ornan, be adopted; namely, that the 50 shekels in the Book of Samuel[x], and the 600 in the Chronicles, signify the same sum, but the former expressed according to the computation in gold, the latter according to that in silver; gold would be twelve times the value of silver; which is the proportion given in the Hipparchus of Plato[xx]. But this interpretation is very uncertain; and most commentators prefer another. In Hezekiah's reign, we might conjecture that the proportion was 10 to 1; for the tribute, laid on that king by Sennacherib, was 300 talents of silver and 30 of gold[y]; and it is not improbable, that the payment might have been made in equal parts, half silver and half gold. This was the proportion in Greece after the age of Alexander the Great; and, as Solomon's large importations of gold had much lowered the price of it[z], it might easily have been so low as ten times the value of silver in Hezekiah's time. In the Book of Ezra there is mention of "fine bright copper precious (or desirable) as gold[a]." Josephus (in his usual way) outdoes this, and describes a kind of

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[u] Isai. xlvi. 6. See also 2 Chron. xxiv. 14, which is earlier; and 2 Kings xviii. 14.

[x] 2 Sam. xxiv. 24.

[xx] Ch. 6, if it be Plato's. Herodotus sets it at 13 to 1, iii. 95, which is the highest mentioned in that age. See above, ch. vii. 3, 4, 11. and x. 10.   [y] 2 Kings xviii. 14.

[z] 1 Kings x. 21. 27. 2 Chron. ix. 20. 27.   [a] viii. 27.

copper (or brass) *more* precious than gold[b], of which Solomon made the brasen vessels in the temple. This is in accordance with an opinion very prevalent at one time, that there was some compound of metals more valuable than any single metal; a property attributed sometimes to electrum, sometimes to orichalcus[c].

4. But it is time to notice a grave question, which has been raised on this subject. It has been maintained, that the Hebrews never coined any money before the captivity, and that all which passed in the country was foreign coin. The arguments in support of this opinion[d] are, first, the fact that money was constantly weighed among the Hebrews; as is evident from the frequent mention of the scales, in connexion with money payments, in the Bible : secondly, the absence of any statement or expression, to signify that the money in circulation was a national coinage. And, in answer to the *a priori* objection, of the improbability that so large and wealthy a nation should have remained many centuries without a coinage, the case of China is quoted; which country is said never to have had any money of its own.

[b] Antiq. vii. 5. 3. xi. 5. 2.

[c] So Cicero, writing at random, reckons orichalcus a thousand times the worth of gold, Offic. iii. 23. The χαλκολίβανον of the Revelations (i. 15. ii. 18.), which is translated " fine brass," seems intended to mean some compound of copper more valuable than common brass. It is illustrated by the *æs Livianum* (λιβίανον) of Pliny. See the commentators. Savot thought that orichalcus was a compound of copper and gold. ii. 16, 17.

[d] See Frölich Proleg. Ann. Reg. Syr. Reland Dissert. De Num. Samar. i. Meyer, the German translator of Adams' Roman Antiquities, in a note *on the Roman money*, (in which by the way he informs us also, that the Euboic talent contained 4000 drachmæ,) pronounces, that the shekel was first coined after the time of the Maccabees.

The practice of weighing money does not prove that there was no Jewish money, but only that there was some foreign in circulation. In the earliest ages all money was measured by weight alone; and hence were derived terms expressive of weight, which continued to be used in money dealings; as the verb " to weigh" signified *to pay,* in Hebrew as well as in Latin. It does not appear how soon after money began to be coined, the different currencies became so exact and well regulated, that the scales could be dispensed with altogether, and money reckoned by tale only : but, probably, the use of them was kept up longest where foreign coin circulated most : and although the situation of Palestine, between the opulent countries of Assyria and Persia, Arabia, Egypt, and Phœnicia, would be likely to bring a large proportion of foreign money into circulation there, we have no reason to infer from this, that there was none coined at home. It might be readily admitted too, that although the Jewish kings did coin money, their coinage might not have been of the best quality ; it might have been occasionally depreciated, and subject to alteration, during some of those calamitous periods, which befell the nation after the separation of the ten tribes [e] : and, if any such thing had ever happened, it might be enough to account for the use of the scales ; which might have been retained, for certain purposes, long after money was coined ; as they were for the reckoning in *æs grave* at Rome, while the silver was universally current [f].

[e] I think this consideration should keep us from trusting too much in the certainty of our conclusions about the standard, either of weight or money.

[f] " Per trutinam solvi solitum, vestigium etiam nunc manet in æde Saturni, quod ea etiam nunc propter pensuram, trutinam habet positam." Varro L. L. iv. ad fin.

The traditions of the Talmud would not be allowed, in evidence that the Hebrews coined money; since they, as has been said before, speak quite at random on these points : nor can any positive and trustworthy testimony in favour of it be produced. But what is the objection to the general belief which has always prevailed on the subject, namely, that the Hebrews coined their own money like other civilised nations ? If they had no money, it must have been either because they did not feel the want of it, or could not make it. But they were well acquainted with the use of it from the earliest times. Abraham had used money; and during the two centuries in Egypt, his posterity must have become familiar with it. Their descendants would not have been without it in Palestine; and it is not likely, that they would have forborne to coin it for themselves, so soon as they united in an organized government, if it was in their power to do so. And it is evident that they had the power; for they certainly did not want the necessary skill in the arts: at the very first going out of Egypt, their workmen were skilful enough not only to make the golden calf for Aaron, but also to execute all the furniture of the tabernacle, which was full of rich and elaborate ornamental work; and therefore it is absurd to imagine them too rude and uncivilised to stamp coins. And it is probable, that the plunder of the cities of Canaan would have supplied them with the precious metals enough for money : or, at all events, under the kings there was no want of silver or gold; as is plain from the abundance which David collected for the temple. So that we may affirm, that they had the means of coining money, if they wished it. It appears, then, unnecessary and hypercritical scepticism, to deny that the Hebrews had a coinage of their own before the captivity. There is

much more probability in the common opinion, that
they coined money at least as early as the age of their
greatest prosperity. And therefore, taking this for
granted, I will now go on to speak of their money.

5. The smallest piece of money named in the Old Tes-
tament is called agurah (אֲגוֹרָה[g]), but it is not known
what proportion it bore to the shekel. Some suppose
it to be the same as the gerah, the twentieth of the
shekel: but there is no proof of this being true. It is
more probably to be understood, according to the ety-
mology of the word, as signifying generally any very
small denomination of money, like *stips* in Latin. It
is called " silver" in the text; and our version renders
it " a piece of silver."

The gerah[h] was the lowest known division of the
shekel, namely, one twentieth: the Septuagint renders
it by ὀβολός. It is not expressly named anywhere as
a coin.

The next was the reba, or quarter shekel, which
is mentioned once as money[i]: but the name given it
by the rabbins, zuz or zuza, is not in the Bible.

The third part of the shekel is mentioned also
once[k]; but it is uncertain whether there was any such
coin in use.

The beka was the half shekel; which was the offer-
ing or poll-tax levied on every Israelite for the sanc-
tuary, whenever a census was taken[l].

The shekel appears to have been the largest coin
which the Hebrews had; at least there is no notice
of any larger, nor of any denomination between the
shekel and the maneh, unless the passage in Ezekiel

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[g] 1 Sam. ii. 36. Hotting. App. Cip. Heb. v. p. 102. Winer
Lex v.

[h] Levit. xxvii. 25. Exod. xxx. 13, &c.   [i] 1 Sam. ix. 8.
[k] Nehem. x. 32.   [l] Exod. xxx. 15.

so often referred to be understood to that effect. It is an old interpretation of the rabbins, and has been received by many later critics[m], that the three parts of the maneh there expressed, namely, 15 shekels, 20 shekels, and 25 shekels, related to three species of coin of these values respectively. If so, they were, of course, gold coins; and, reckoning gold to have been 10 times the value of the silver, they must have weighed, the first $1\frac{1}{2}$ shekel, the second 2 shekels, the third $2\frac{1}{2}$ shekels; all of which would be very large pieces for gold money, above the largest which the Hebrews, or indeed any people of those times, can be thought to have usually coined.

The maneh was money of account, like the mina: but we do not find accounts of payments made by it, except in Ezra and Nehemiah.

The kikkar, or talent, is often named: it is first mentioned in the Book of Exodus[n]. In the time of Elisha we find it described with some particularity[o]: a talent of silver, or, a quantity of coin equivalent to 3000 shekels, is tied up in a bag; and one talent so packed, with one change of clothes beside, makes a load for a man.

The two copper coins mentioned in the Gospel, which passed in our Saviour's time, the κοδράντης [p] or quadrans, and the λέπτον, are rather to be referred to Roman than Jewish money; since the quadrans was the fourth part of the Roman as. But they may both be valued according to the Jewish standard: for the denarius was equivalent to the fourth part of the shekel, or the reba; and the quadrans (since 16 asses went to the denarius) was the sixty-fourth of the denarius, that is, the sixty-fourth of the reba, or $\frac{1}{256}$th

[m] See Rosenmüller ad Ezek. xlv. 12, &c.   [n] xxv. 39.
[o] 2 Kings v. 23.   [p] Matth. v. 26. Mark xii. 42.

of the shekel : and, consequently, the λέπτον or mite was $\frac{1}{312}$th of the shekel.

6. The calculation would seem to be unfinished, if I were to leave off without attempting to do with the Hebrew money, what has been done in all cases in the former part of the work, namely, to find the value of it in terms of our own money. And therefore the inquiry shall end with this step : although, whatever doubt has attended the progress of it into that remote antiquity and scanty history which we have last considered, must be increased when it is attempted to compute the fineness as well as the weight of these coins. It is evident, that the quality of the silver of the shekel of the Maccabees can give no sort of test, for that of the kings before the captivity ; nor can we pretend to estimate the amount of skill in the art of refining, which the mint might have possessed in those times ; nor determine with certainty, whether or not it was intended to make the coinage quite fine metal. Nothing remains but to assume a quality, which may give a probable value. Let it be that of the Roman money ; namely, let the shekel be supposed to contain $\frac{1}{36}$th of the weight alloy. Then, since the weight was fixed at 218.87 grains, or half an avoirdupois ounce, it would be equivalent to 210.983 grs. of pure silver, or $\frac{210.983}{80.7}$ of a shilling. This amounts to 2s. 7d. 1.49 farthings; and hence the values of the other species may be computed.

Table of Hebrew Money before the Captivity.

						L.	s.	d.	farthings
Gerah								1	2.27
5	Reba							7	3.36
10	2	Beka					1	3	2.72
20	4	2	Shekel				2	7	1.49
1200	240	120	60	Maneh		7	16	10	0.8
60000	12000	6000	3000	50	Kikkar (or Talent)	396	5	10	

Copper coins current in our Saviour's time:

		L.	s.	d.	farthings
	Lepton or mite				0.244
2	Quadrans or farthing				0.488

CHAPTER XIII.

ROMAN AND GREEK LIQUID MEA-SURES.

—— Amphora cepit

Institui.   HORAT. EP. AD PISON. 21.

1. THE ancient measures for liquids have been cal-culated in two ways; either, from the measures of length, of which calculation the Romam amphora is the basis, for that is the cube of the Roman foot; or, from the weight; the weight of many of the measures of liquids being given by ancient writers [a].

But the first of these is not to be trusted, be-cause the least possible error in the length of the foot would make a sensible difference in the content of the vessel: and the variation in the different measure-ments of the Roman foot is too great [b] to admit so nice a calculation to be made from it, as taking the cube for the standard measure of content.

The other method is simple and easy where it can be applied. But it is often uncertain what standard of weight is meant; as for instance, what drachma is meant by the " Attic" in late writers; and there is sometimes room to doubt what is the liquid [c] with

[a] As Plin. N. H. xxi. 109. (34.) &c.   [b] See Appendix.
[c] See Arbuthnot p. 91.

which the measure is supposed to be filled when the weight is described; as, whether it be wine, or water, or oil. Moreover, all former calculations have proceeded by making use of some computed weight of a given solid of liquid, as the cubic inch or foot of water, for the measure of modern vessels of capacity, they being regulated by cubic measure; in which also there is the chance of error.

But now, that by a late alteration [d] our liquid measures are adjusted not by proportions of their cubic capacity, but by their weight when filled with water, a direct and ready way is offered, to compare them with the Roman by means of the congius, which was regulated likewise by weight.

2. The congius of Vespasian, described in a former chapter [e], was proved by Dr. Hase's experiment to hold 52037.692 grains of distilled water by weight. By the act of parliament of 1824 [f] it was ordered that the standard gallon measure should hold 10 lbs. avoirdupois, or 70000 grs. of distilled water by weight. Hence the congius was equal to 5.9471 pints, or, .0529 of a pint less than 6 pints: the amphora, or 8 congii, to 47.577 pints, or 5 gallons, 7.577 pints. From these two all the other measures for liquids may be calculated.

The congius is here reckoned in pints of the present standard, which are the same for all kinds of liquid, namely, the eighth part of the gallon of 10 lbs.

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[d] 5°. Georg. IV. c. 74.   [e] ix. 5.

[f] By this act the pound avoirdupois is fixed at 7000 grains, which is the weight used in the following calculations. In the former part of the work, ch. i. 3, the avoirdupois pound was reckoned at 7004 grs.; which was the weight of the brass standard belonging to the Royal Society. See Philos. Trans. xlii. p. 187. The difference is not enough to be of importance.

avoirdupois weight. According to the old method it might be reckoned by cubic measure of capacity thus. A cubic inch of distilled water weighs 252.458 grains[g]: therefore the congius contained 206.1241 cubic inches. And hence, if the old wine pint contained 28.875[h] cubic inches, the congius would have held 7.138 pints, wine measure. In the same way the capacity of it in ale or beer measure, at 35.25[i] inches to the pint, might be calculated.

3. The Roman measures for liquids were nearly the same as the Greek, so far as we find them described by ancient writers. The smaller measures especially were throughout common to both : in the larger there is some difference. Greek words are found among the Roman measures, and Latin among the Greek : yet we may not infer from this, that all our information on the subject relates only to late ages, when neither Greek nor Roman were distinctive national names : for certainly the Romans used some Greek names in their most flourishing times, as cyathus ; and some were common to both at all times that we know of, as amphora. There is very great disagreement between different writers who give the proportions of the smaller measures. Although there seem to have been two sizes of most of them, a larger and a smaller, this will not explain the differences. It is most likely that there were many varieties of usage in different places [k]. But indeed they are so small as to be of but little importance in any case, except for medicinal purposes ;

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[g] See the same act of parliament.

[h] Rees' Cyclopæd. Measures.   [i] Ibid.

[k] Measures of a different *kind* must not be confounded ; as, for instance, those at the end of fragment 8 in vol. xii. of Stephens' Thesaurus are corn measures : the writer begins them with ἐν δὲ τοῖς γεωργικοῖς εὗρον, &c.

and especially in the present instance; because the names of them seldom occur in the best classical writers; they are scarcely to be found except in works connected with medicine. They will however be mentioned in order, beginning with the smallest, and the various proportions assigned them given, with their authorities, where there is any difference. The capacity in our own measures will be given in the table at the end of the chapter.

Cochlear, cochleare, or cochlearium, a spoonful, according to Rhemnius Fannius was the smallest measure, being $\frac{1}{24}$th of the cyathus.

Cheme of Remnius Fannius, 2 cochlearia.

Mystrum of Rhemnius Fannius, or cheme of fragment 14 in vol. xii. of Stephens' Thesaurus, or (perhaps) ligula of Columella[1], 3 chemæ,

Small cheme, or small mystrum of fragment 12 Steph. Thes., or small concha of fragment 8, 2 mystra.

Cyathus, 4 mystra. The cyathus was the uncia, or twelfth of the sextarius, and was a measure much in use, being that of the common drinking glass. But it may be doubted whether the name always means this measure exactly, wherever it occurs. If Martial's limit for drinking, " si plus quam decies, Sextiliane, bibis[m]," means ten cyathi, it may well be supposed that the cyathus sometimes held more than not quite one twelfth of a pint. As the cyathus was the uncia of the sextarius, it is often understood in the names of the fractional parts, according to the common duodecimal division; as sextans, the sixth of the sextarius, signifies, two unciæ or cyathi; quincunx, a cup holding five cyathi[n], &c.

Acetabulum, or oxybaphum in Greek, (but which

[1] Re Rustic. xii. 21.   [m] i. 27. 10.
[n] Martial i. 28. 2. See also Arbuthnot p. 86.

name Rhemnius Fannius uses as Latin,) or large
concha of fragment 8. Steph. Thes., a cyathus and a
half.

Quartarius, the fourth part of the sextarius, or 3
cyathi.

Cotyle, or hemina, (ἡμίμνα,) the half-sextarius, or
6 cyathi.

Sextarius, 12 cyathi, or the sixth of the congius.
The sextarius was considered as the as, or whole, with
regard to the uncial division into cyathi, above men-
tioned.

Rhemnius Fannius mentions also the χοῖνιξ among
the Roman measures, saying it is equal to 4 sextarii.
This will be considered among the Greek measures.

Congius, 6 sextarii, or the eighth of the amphora.

Urna, 4 congii, or half the amphora.

Amphora, 8 congii.

Culeus, 20 amphoræ : which Remnius Fannius says,
was the largest liquid measure among the Romans.

4. All of these measures which have been described,
from the cochlear to the congius, may be considered
Greek as well as Roman, except two ; namely, the
ligula, for that is a Latin name, although the same
quantity with a different name appears in the Greek
table, and the quartarius, which seems peculiar to the
Romans both in name and in thing. There is there-
fore no need to repeat what has been said concerning
them. It should be understood that the following
summary does not take any account of different stand-
ards among the Greek measures. Perhaps some of
the disagreements and contradictions between writers,
concerning the smaller measures, may be explained by
supposing a difference in usage in different places : but
we can hardly talk about different *standards* in di-

viding twelfths of a pint into tea-spoonfuls; and in the larger measures there is a general agreement. These calculations are intended for the standard called specifically *the Attic standard;* which was that in most general use in Greece while the Romans governed it, and probably for some time before : although there certainly were other known standards of measure, and it cannot be proved either how far these were in use, nor, that all the measures given here have a right to the name *Attic.* But in most cases where the Romans speak in general terms of Greek measures, it is probable that the standard called *Attic* is meant [n]. If any shall object, that the writers quoted, as authorities for Attic usages, are all of an age too late for Athenian history, the answer is, that these writers themselves refer in some cases to earlier times; and, if this be given up, we have no other testimony on the subject.

The Greek names of the measures described above were κοχλιάριον, χήμη, μύστρον, κόγχη, κύαθος, ὀξύβαφον, (which Heron calls ὀξόβαθον,) κοτύλη, which last was also called τρυβλίον [o] and ἡμίνα. But Suidas seems, on comparing two places together, to make the κοτύλη but half the quantity given above : for he says, the χοῦς is 8 κότυλαι, or 2 ξέσται; which makes the κοτύλη but $\frac{1}{4}$th of the ξέστης, instead of half; Suidas, however, is opposed by so many writers on this point, that we cannot follow his authority. The next measure was the ξέστης, or Roman sextarius. After which comes the χοῖνιξ, which was peculiar to the Greeks : this is given differently by different writers : Heron makes it equal to 4 cotylæ [p]; Rhemnius Fan-

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[n] See Plin. xxi. 109. (34.)

[o] Fragment 8 in Stephens' Thes. vol. xii. says the τρυβλίον was equal to the ὀξύβαφον : but these were corn measures.

[p] Excerpt. Paris. 1688.

nius to 8 : but Pollux [q], and the fragments attributed to Galen and Cleopatra [r], to 3 only. If it were certain, that this Rhemnius Fannius was Remmius Palæmon, the great grammarian in the time of Tiberius and Claudius [s], as some have thought, his authority might perhaps claim the preference. But this is very doubtful ; and the poem is intended to describe the Roman measures, touching on the Greek by the way only : and therefore the agreement of the other writers concerning Greek measures ought to prevail against him ; and also against Heron, who did not write before the tenth century [t]: and the χοῖνιξ may be reckoned to have held 3 cotylæ.

The next measure was the χοῦς, or congius, which is the same thing, although the word κόγγιον is found [u].

There is so general a consent among the writers on measures, in making the χοῦς equal to the congius, that there can be no doubt that they were equal in the times when these persons respectively lived, that is to say, under the Roman empire [x]. But still it must be admitted as quite certain, that in the early and flourishing age of Athens, the name χοῦς was used to signify a much smaller measure than this : or, more pro-

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[q] iv. 23.   [r] Steph. Thes. vol. xii.

[s] Sueton. Illustr. Grammat. 23. Plin. xiv. 5. (4.) Juvenal, vi. 452. vii. 215. The poem is printed in Grævii Thesaur. Antiq. Roman. vol. ix. col. 1693. after several other works on like subjects.

[t] See Appendix.

[u] Fragmm. 13, 14. Steph. Thes.

[x] Arbuthnot's method, of computing the χοῦς by the weight in drachmæ, is founded upon an arbitrary assumption of the weight of the drachma, for which he has no authority, and which is quite at variance with his own calculations concerning the weight of the coins.

bably, it was a general name for a flagon or jug, perhaps of indefinite size, as well as a particular kind of measure, as it has been seen was the case with the cyathus at Rome. For it was commonly used at supper parties at Athens, where each guest sometimes brought his own χοῦς. Dicæopolis in the Acharnians[y] is invited to come to supper, " τὴν κίστην λαβὼν καὶ τὸν χοᾶ." And the legend of the origin of the festival called χόες at Athens relates, how Pandion set a χοῦς before each one of his guests at the feast which he gave [z]. Now it is incredible that a measure of nearly three quarts should be understood in such cases. Yet, on the other hand, it can hardly be denied, that there was a large measure of the same name, which, for want of other testimony, we ought to reckon at the amount ascribed to it by the writers which have been quoted. For the Athenian prisoners at Syracuse were allowed but two cotylæ of flour, and a cotyle of water a day, to live on for eight months [a]. According to the above calculations, reckoning the χοῦς equal to the congius, and that to 12 cotylæ, this quantity would be nearly a pint of flour and half a pint of water; which is a very small daily allowance of food. And if the cotyle be reduced in proportion to the supposed diminution of the χοῦς, for the sake of bringing down the latter to a convenient size for the wine measure, it would not be enough to support life for many days. Hence we may infer, as was said before, that there were two sizes of χοῦς used at Athens: and this being admitted, the place in Suidas, which has been often accused of error, not only receives a very probable explanation, but even throws a new light on the subject. Suidas alone names two measures, the χοῦς and the χοεύς; the former of which he sets at 2 sextarii; that is, one third

of the common reckoning; the latter he makes the same as the χοῦς is commonly reckoned, namely, the congius [b]. Now if we suppose, that by the former he means the wine measure of the common flagon, the χοῦς mentioned by Aristophanes and others; by the latter the large measure equal to the congius, of which the cotyle mentioned by Thucydides was one twelfth [c], all difficulty vanishes, except what is merely verbal. The two *names* might perhaps have been often confounded : or even Suidas might have been mistaken in distinguishing them thus : but the *measures* are distinct. The smaller was $\frac{1}{3}$rd of the other, and was therefore about a quart of our measure; which is a reasonable quantity for the places where the χοῦς is named. The larger was the same as the congius, or nearly 3 quarts of our measure.

The next measure was that equal to the Roman amphora or quadrantal, which was called by the Greeks κεράμιον [d].

The largest measure was the ἀμφορεὺς, or Attic amphora; which was half as large again as the Roman amphora, for it held three urnæ [e]. It was called ἀμφορεὺς, μετρητὴς, or κάδος [f]; or those three measures were equal to each other. But Pollux quotes one author [g] who seemed, contrary to the ancient practice, to make a difference between the ἀμφορεὺς and κάδος.

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[b] χοῦς γὰρ δύο ξέσται, χοεὺς δὲ ἕξ. Suid. χοός.

[c] Suidas, in χοῦς, says that the χοῦς contained 8 κότυλαι. But even thus his (small) χοῦς cannot be applied to the place in Thucydides. For the cotyle will then have held about a quarter of a pint of our measure, which is too small a quantity. Therefore there must have been two sizes of the χοῦς.

[d] Fragmm. Steph. Thes. vol. xii.   [e] Rhem. Fan.

[f] Pollux x. 20.

[g] Namely, Epicharmus. Pollux says, that Philochorus expressly asserted, that these two were formerly equal.

Table of Roman Measures for liquids, according to different authorities.

Cochlear Rhem. Fan.	Cheme R. F.	Mystrum R. F. Cheme fr. 14.ª Ligula Columella (?)	Small Cheme or small Mystrum fr. 12. Small Concha fr. 8.	Cyathus	Acetabulum (or Oxybaphum). Large Concha fr. 8	Large Mystrum fr. 12.	Quartarius	Cotyle or Hemina	Sextarius	Congius	Urna	Amphora	Culeus	Gallons	Pints.
															.0034
2															.0068
6	3														.0206
12	6	2													.0412
24	12	4	2												.0825
36	18	6	3	1½											.1238
48	24	8	4	2	1⅓										.1651
72	36	12	6	3	2	1½									.2477
144	72	24	12	6	4	3	2								.4955
288	144	48	24	12	8	6	4	2							.9911
				72	48	36	24	12	6						5.9471
				288	192	144	96	48	24	4				2	7.788
				576	384	288	192	96	48	8	2			5	7.577
									960	160		20		118	7.546

ª In Steph. Thes. vol. xii.

Table of Greek Measures for Liquids.

Measure	κοχλιάριον	χήμη	μύστρον	κόγχη	κύαθος	ὀξύβαφον	μύστρον	κοτύλη	ξέστης	χοῖνιξ	χοῦς (sm.)	χοῦς (lg.)	κεράμιον	Gallons	Pints.
κοχλιάριον															.0034
χήμη	2														.0068
μύστρον. χήμη	6	3													.0206
χήμη. μύστρον. κόγχη.	12	6	2												.0412
κύαθος	24	12	4	2											.0825
ὀξύβαφον. κόγχη	36	18	6	3	1½										.1238
μύστρον	48	24	8	4	2	1⅓									.1651
κοτύλη. τρυβλίον. ἡμίνα	144	72	24	12	6	4	3								.4955
ξέστης	288	144	48	24	12	8	6	2							.9911
χοῖνιξ	432	216	72	36	18	12	9	3	1½						1.4867
χοῦς, smaller, of Suidas, &c.	576	288	96	48	24	16	12	4	2	1⅓					1.9823
χοῦς, larger, or κόγγιον			288	144	72	48	36	12	6	4	3				5.9471
κεράμιον, or Roman amphora					576	384	288	96	48	32	24	8		5	7.577
ἀμφορεὺς, μετρητὴς, or κάδος					864	576	432	144	72	48	36	12	1½	8	7.365

APPENDIX.

THE ROMAN AND GREEK FOOT.

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Jam *pedum* visa est via.
TERENT. PHORM. ii. 2. 12.

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1. THE differences between the results of separate calculations of the ancient measures of length are less, in proportion to the whole values, than in the case of the weights and money. The values assigned by the best writers on the subject to the Roman foot, (which is really the base of all the calculations,) do not differ by more than about three French lines, or, a little above one fourth of an inch. Perhaps in some cases this might be called an unimportant difference ; but it is obvious that no tables of measures could be calculated without settling the length of the foot more exactly than this : indeed, it would commonly be very inconvenient to allow so loose an estimate wherever the ancient writers describe dimensions of any kind. We must therefore attempt to determine some positive, or at least probable, fixed value for a measure of length as a standard. Nor is it any objection to the inquiry, that the ancients themselves do not seem to have had any certain fixed standards in use for any great length of time, to which we could refer as author-

ities.　Their measures seem to have been always liable to fluctuation : and it is probable, that if we could recover any number that we pleased of ancient measures, we should be nearly as much at a loss as we are now, to settle which was the true standard or model of any one system, to which all the rest must conform.　If therefore the inquiry had no end in view, but the determining with certainty one absolute value of a standard as a fixed point, it might be truly called " playing with numbers [a]."　But, if the concurrence of probabilities may approach indefinitely near to truth, the result obtained from the comparison of many probable calculations, may pass for certainty enough to fix the real values of the ancient measures of length, with as much exactness as can be needed.

2. The methods by which the ancient measures of length have been calculated are the following :

1. The content of certain measures of capacity.

2. Ancient measures of length, especially the foot measure.

3. Measurements of buildings.

4. The distances of places, measured by roads.

5. Astronomical measurements of a degree, or parts of a degree, on the earth's surface.

Of these, the first two are applicable to Roman measures only : for there are no models known to exist either of length or capacity belonging to the Greeks.　The third has been used in some few cases only for the Greek measures.　The fourth likewise is

a See the Baron de Zach, Correspondance Astronomique, vol. i. p. 333. " Après tous les efforts que les érudits de plusieurs siècles ont fait ; après tant de recherches doctes sur les poids et mesures des anciens, on est finalement parvenu au resultat que toutes ces savantes perquisitions n'ont été, ne sont, ne seront qu'une espère de jeu d'arithmétique," &c.

chiefly for Roman measures. But the last belongs
more to the Greek than the Roman. Since the Greek
measures are best obtained by deducing the Greek
foot from a proportion to the Roman, the plan fol-
lowed here will be, first to examine and compare the
calculations which have been made of the Roman foot:
and then to go on to the Greek.

3. The first method, the calculation from the mea-
sure of capacity, was a favourite one with some of the
early writers on the subject. It was upon this prin-
ciple that Villalpando founded the whole of his elabo-
rate system of ancient measures. He computed the
length of a side of the cube, whose solid content was
equal to eight times that of the congius of Vespasian,
and reckoned this the true standard of the Roman
foot. But it is obvious that this calculation involves
many uncertain elements. We might well doubt
whether the Romans had skill enough for so nice a
process, as originally fixing the measure of content from
the measure of length with accuracy: to say nothing
of the chance of error in reversing the process by the
moderns, and computing the foot from the content of
the congius which is now preserved. Therefore Vil-
lalpando's method has been generally abandoned, and
the congius seldom referred to by later writers in order
to discover the foot measure. And, indeed, those who
have attempted to make use of it, have differed so
greatly in their results, that Greaves, one of the most
careful of all inquirers, had no way to account for the
contradictions, but supposing that the assigned rela-
tion between the congius and foot was a vulgar
error [b].

[b] On the Romane Foot. (vol. i. p. 228. of the edition of his
works in 1737.)

4. The existing specimens of ancient measures have been the subjects of more examination than any thing else belonging to the question, and nothing has furnished more matter for doubt. It might have been thought, that a number of foot-measures acknowledged to be genuine would have settled the standard, if any thing could have done so. But not only have separate specimens been constantly found to differ, but even the same measure, when examined by different persons, has been reported of different lengths. Celsius, who examined the ancient measures at Rome in 1734, affirmed that he never found any two agreeing together exactly [c]. Greaves, Revillas, Barthelemy, and others, differed in the measurement of the feet marked on the tombs now preserved in the Capitol at Rome [d]. Greaves made the foot on the tomb of Statilius longer than that on the tomb of Cossutius. Barthelemy made them equal. Barthelemy made the Capponian foot $\frac{1}{213}$th part longer than Revillas had made it. Again, Greaves made the Cossutian foot exactly equal to the model of a foot which was engraved under the direction of Lucas Pætus ; Barthelemy made it about $\frac{1}{107}$th part less [e]. When such differences appear in simple measurements, it is not wonderful that there should be different results from calculations. But it is of more

[c] Zach Monathliche Correspondenz. Gotha 1806. vol. xiii. p. 108.

[d] Greaves on the Romane Foot. Acad. des Inscr. xxviii. p. 579. See also Zach Correspondance Astronomique vol. i. p. 337. Revillas, Saggi di Diss. Acad. di Cortona iii. p. 117.

[e] Folkes reported the foot of Pætus the same as Greaves; though his measurement fell $\frac{1}{1000}$th part short ; but he supposed that a little might have been lost by wear or decay from the original length. It is probable Greaves' measure was a little too short. See below, sect. 8. When Folkes was at Rome, in 1734, the Cossutian foot was lost. Philos. Trans. 1736. No. 442. p. 262.

importance to remark, that these measures in the Capitol, which have been mentioned, are by no means so accurate as to be depended upon for fixing the standard. They are four foot-measures rudely cut on grave-stones; and though not all equally carelessly done, no one has any pretensions to great accuracy. It would seem absurd to look for a correct standard measure in such a place; and it is proved that these are incorrect by their being unequal. Barthelemy's measurements gave two lengths; making two out of the four equal to each length[f]. And for this reason Ideler gave up altogether the authority of these celebrated monuments of antiquity, and allowed that of the brass measures only. It is indeed reasonable to suppose that the latter would be more likely to be correct; since many of them were intended to be used as measures, which the former were not. But still the perpetual disagreement found between them forbids our determining the standard of the foot from them, with more certainty than from the others. Greaves was confirmed in fixing upon that length which he chose for the Roman foot, namely, the Cossutian, by finding that more of the brass measures agreed with it than with any other. Four brass foot measures, preserved at Naples among the reliques of Herculaneum and Pompeii, together with several fragments of measures

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[f] They appeared to me, when I examined them in 1834, to contain three varieties of length. Barthelemy's experiments seem to have been faulty in this, that he measured the feet not from end to end, but by taking the length of the divisions marked within them. For the divisions are roughly cut, and not all equal; so that they would give a length different from the whole foot. He did this to prevent error from loss by wear at the ends of the feet; but all the four specimens seemed to me fresh enough to be measured accurately.

in ivory, were examined by the Academicians there [g] ; and the standard of the foot computed from them was rather above that given by some other calculations, and sensibly above that assigned by Greaves. From measuring the space between many marks of feet engraved on the rocks near Terracina, where a passage had been cut for the Appian road, Scaccia deduced a length for the foot agreeing with the mean length among the various results [h].

5. The calculation from the measuring of buildings is seldom an independent one. It is for the most part a method of verification of values computed by other means. For it seldom happens that there is certain evidence of the dimensions of the places measured, in terms of ancient feet, as there is in the case of the Parthenon at Athens, which was called Hecatompedon from the length. The plan generally followed with ancient buildings is, to try the dimensions of the parts which have been measured, by dividing them by the number of feet which they are conjectured to have contained, and the number which results is then inferred to be the true measure of the foot. Or, the length of any part measured is divided by the supposed length of the ancient foot, and if the quotient is not a whole number, the length of the foot is so corrected as to make it give a whole number. In either way a value of the foot is first assumed, and then rectified by the measure taken from the building. But there are reasons for distrusting this method also. It cannot be used, except on the supposition, that the dimensions of buildings were adjusted in whole numbers of feet, or in very few and simple fractions: and it must, of

[g] Zach Correspondance Astronomique vol. i. p. 335.
[h] Zach ibid.

course, suppose that the plans were worked out with great exactness in all their parts. But in the smaller parts it is very probable, that the proper proportions might often have required fractions of feet: and in the larger it is very uncertain, whether the workmen would have been so exact as not often to have exceeded or fallen short of the scale designed. Raper has shewn, by comparing the details of some buildings described by Desgodetz, that great inequalities were sometimes allowed[i]: and different measurements have given different values to the foot[k]. Raper, indeed, inferred from the examination of buildings, that a change had been made in the standard of the foot about the time of the emperor Titus. Modern architects do not allow that such calculations could be depended on in modern buildings, for determining the true length of the measures by which they were planned. Nor are the dimensions of the parts of buildings of the middle ages in our own country, as Gothic churches and cathedrals, found to agree exactly, so as to give whole numbers of the standard measure[l]. Stuart[m] endeavoured to rest his conclusions on the appearance of positive testimony, when he calculated the foot from the measurement of the obelisk in the Piazza del Popolo at Rome upon this principle; comparing it with the place in which Pliny describes that obelisk. To make an agreement, he found it necessary to alter the text of Pliny from cxxv to xxcii. And certainly he supported his opinion by very probable arguments, and made out a remarkable coincidence in numbers. He also

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[i] Philosoph. Trans. 1760. p. 795, &c.

[k] Raper ibid. Acad. des Sciences 1714. p. 396. Acad. des Inscr. xxiv. p. 488.

[l] This I am assured of on good authority.

[m] Bandini De Obelisco Cæsar. Augusti Epist. xiii. p. 73.

confirmed this, by comparing another place in Pliny (corrected likewise) with the dimensions of another obelisk at Rome, as given by Mercatus and Kircher; and brought forward some passages from other authors for the same purpose. All of which were ingeniously, and with much probability, applied to the proof of his conclusion concerning the length of the Roman foot. But where it is necessary to correct the text of ancient writers by conjecture in this way, their words cannot be taken in evidence for settling the length of the measures. The calculations of the Roman foot upon other grounds hold good for correcting the text indeed; but we may not argue in a circle, and conversely use the text, when thus corrected, as testimony from which to calculate the foot.

6. The itinerary distances between places would seem to be as likely a method for discovering the true value of the foot, as any that could be used, if we were certain that we could follow the exact direction of the ancient roads. When these have changed at all, the measurement is doubtful. Another cause of error is, the uncertainty of the precise spot, from which the measuring is to begin [n]. But neither of these affect those calculations which have been made from single miles, measured between various milestones on a line of ancient road. The latter mode was used by Cassini, between Aix and Arles [o]: the former by Cassini, when he measured the distance from Nîmes to Nar-

[n] Revillas brought this objection against the calculations made by Riccioli and Grimaldi, who measured the distance between Bologna and Modena from the towers in each town, that it was not certain that the reckoning had originally begun from these points. Saggi di Diss. Acad. di Cortona iii. p. 121. See also Raper, as above.

[o] And by Astruch and Maffei between Nîmes and Ugernum. Revillas p. 122.

bonne [p], and by Riccioli and Grimaldi for the distance between Modena and Bologna ; and by others in other places.   But, on the other hand, it has been objected to this method, that distances on roads are never laid down with care enough for determining the standard by them ; and therefore no trust can be placed in them.   But admitting this to be true, the excesses and defects in each measurement would be likely to counterbalance one another, and the average, deduced from the whole, would probably come very near the truth.

7. The Astronomical method, by measuring a degree on the surface of the earth, was applied in the first place and chiefly to the Greek measures ; but as the Roman also have been calculated by these means, it may properly be mentioned here.   The French geographers of the last century, upon examining some geographical measurements given by ancient writers, found that they much exceeded the true distances, as these had been determined by the moderns.   De l'Isle upon these grounds asserted that the received calculations of the length of the ancient measures were false, and attempted to correct them.   Freret and others engaged in the same design [q].   Paucton seems to have been the first who endeavoured to reduce the measures to a system founded on the measurement of the earth's circumference [r].   Others of his countrymen have taken up this idea after him, and made deep researches into the geographical measurements of the ancients.   Of

[p] Acad. des Sciences 1702. p. 80.   But Revillas, as above, p. 122, questions the correctness of the number of miles assigned to this distance on the authority of a passage in Strabo.

[q] Acad. des Inscr. xxiv. p. 432.

[r] De Romé de l'Isle Metrolog. pref. p. xxx. &c.

whom, the last, who has carried the system farthest, is M. Gosselin, whose work appeared in 1822 [s].

His theory is, that the ancient astronomers were at one time well acquainted with the exact measure of a great circle of the earth ; that they divided this in various ways, into 300, 360, or 400 degrees ; and that the subdivisions of these degrees gave rise to all the varieties of stades and other measures corresponding to them. M. Gosselin did not indeed deny, that all the measures of length had their first origin from parts of the human body, as the primitive names foot, cubit, &c. in all languages prove [t]; but he supposed, that " they who composed the metrical systems neglected these uncertain and changeable standards, they regarded them so little that they substituted for them successively other standards to which they gave the same names [u]." The confusion and variety of measures actually found to exist among the ancients, he thought arose from a later intermixture of nations by conquest and migrations and such accidents [x]. But he has forborne to specify, when or how the uniform system was first established, so as to supersede the older and simpler measures [y]; nor has he named particularly any of the conquests, or other events, which

[s] Mem. de l'Instit. vi. p. 44.

[t] Vitruv. iii. 1. 11, &c. What then may be inferred from the name of an elementary measure derived from a part of *the dress,* as to the habits of the people using it? In the south of Germany a foot-measure is called a *schuh.* Does this indicate that *measures* were introduced there very late, or *shoes* very early?

[u] Mem. de l'Inst. vi. p. 54.   [x] Ibid. p. 75.

[y] Paucton supposed that the authentic standard of the universal measure was preserved in Egypt. Where, if we are to believe De Romé de l'Isle, the pyramids were built for this purpose. See De Romé de l'Isle Metrol. pref. p. xxxiii. xxxvii.

confused the system after it had been established. In applying his principles to the Roman measures, he considers that a change was made in that country in the standard mile, about the time of Polybius; when a mile founded on a smaller stade was, as he supposed, introduced. But he calculates both this, and all the other measures used at Rome, from subdivisions of a great circle of the earth. It would be foreign to the purpose now in hand, to enter into the merits of this ingenious system. It is certainly remarkable, that the author deduces from it a scale of measures agreeing well with each of the most important systems of ancient measures, so far as they can be discovered by other means. But it needs more than this to convince us, that there was in very early ages among the Greeks and Romans, and nearly all the civilized nations with whom they had intercourse, an unanimity of design, and means of concert, sufficient for carrying into effect the establishment of an universal metrical system on scientific principles, such as the minds of men had perhaps never imagined in those days, although it might seem quite natural to a French Academician of the 19th century [z]. And it is a strong argument against it, that none of the ancients themselves mention such a system. It would be strange, if such had ever been known, that Strabo, when he was constantly describing and examining the measurements

[z] M. Gosselin thus delivers his opinion, p. 49. " Dès l'instant ou les Grecs se sont occupés de géographie astronomique, on les voit rapporter et comparer la valeur de toutes les distances itinéraires qu'ils recueilloient, a l'étendue de la circonférence du globe ; et cet usage atteste que d'après une tradition constante, les modules des stades et ceux des milles etoient regardés comme des parties aliquotes de cette circonférence, et par conséquent comme des résultats positifs d'une mesure de la terre."

of geographers and astronomers, and often remarked their disagreement, should not have attempted ever to explain seeming contradictions, by referring them to these different divisions of the elementary circle of the earth.

8. It appears from this slight review of the methods used for calculating the length of the Roman foot, that each one, considered singly, is open to some objections. But this is no more than often happens with collections of evidence of different kinds. Each thread of the argument, taken apart from the rest, seems somewhat doubtful ; but all united make one strong chain. And thus in this case, separate inquirers may cavil at each branch of the inquiry when taken alone, and shew that there is no certainty either in the ancient foot-measures, or the measurements of buildings, or any other one method[a] ; but yet when all are compared, and found to agree very nearly, the conclusion is irresistible. The mistake to which writers have been sometimes liable, is, making choice of some one of all the methods, and insisting so much on the worth of that, as to set aside all the others. The methods which are most to be trusted seem to be, first the examination of the ancient foot-measures, and then the measurement of buildings. The calculation from the content of the congius, and the astronomical measurements, are the least certain in their results : but all are worth considering.

The next step therefore is, to bring together and

[a] But Revillas had not ground for saying " Multi perciò hanno di esse dottissimamente ragionato. Ma la varietà de' loro pareri, anzi che illustrar l' argomento, in piu dense tenebre sembra l'abbia involto." Saggi di Diss. Acad. di Cortona iii. p. 111. Raper, too, complained in the same tone, that all methods used before him would upon examination be found " unsatisfactory."

compare the values which the best authorities have given to the Roman foot, by any of these methods, and then to deduce from them a mean quantity to be taken as the standard length. And the most convenient mode of comparing them will be, to classify them according to the methods which each has used for obtaining his own result.

1. From ancient foot-measures.

Greaves [b] computed the Roman foot to be in decimal parts of the English foot ... .965

Barthelemy and Jacquier [c], 130.6 French lines, ... .9671

[b] Greaves gives the proportion .967 ; but I have reduced it .002, because it seems that Greaves used a measure of the foot shorter by this quantity than the standard of later times. See Raper, as above.

[c] Acad. des Inscr. xxviii. as above. As calculations in French measures often occur here, it will be well to state at once the proportion between the French and English. The English foot is to the French as 10000 to 10659. This is deduced from Mem. de l'Institut, Base du Système Metrique, vol. iii. p. 470, where the English foot is compared with the metre, and the latter is proved to be equal to 39.3827 English inches, or 3.2818916, &c. English feet. In the same vol. p. 557, the metre is reckoned equal to 443.32 lines, the line being the $\frac{1}{144}$th part of a French foot. Hence the metre is equal to 3.07861 &c. French feet ; from which the proportion above given follows. Eisenschmidt (p. 94.) gives the proportion 1000 to 1066 : De Romé de l'Isle 10000 to 10646. In 1742 a comparison between the two feet was made, and the proportion settled as 10000 to 10654. See Philosoph. Trans. 1742. p. 105. But in 1768. Maskelyne (then Astronomer Royal) entertaining some doubts about the correctness of this proportion, caused a new comparison to be made : and the result was, that the toise was found to be equal to 76.734 inches of the brass standard of the Royal Society, at the temperature 62° Fahrenheit. This gives the proportion between the feet 10000 to 10657 ; differing but .0002 from that of the French calculators, which is taken here. See Philosoph. Trans. 1768. p. 326.

Scaccia [d], 131 lines, ... .9696

The Academicians at Naples [e], 132.3 lines, .9792

Twenty-eight foot-measures, summed by
  Zach [f], give an average value, 130.8
  lines, ... .9681

2. From buildings.

Fabretti [g] allowed the foot which had been
  engraved by Pætus in the Capitol,
  which he found to be the true measure
  of a great many ancient buildings at
  Rome, and which was in length equal
  to Greaves' .... .965

Revillas [h], from distances measured in the
  streets and neighbourhood of Rome,
  130.8 lines, ... .9681

De la Hire [i], 132 lines, ... .977

Raper [k], more than .... .97

Ideler [l], 131 lines, ... .9696.

3. From itinerary measurements :

Cassini [m], from the distance between Nar-

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[d] Zach Correspondance Astronomique i. p. 335.

[e] Zach ibid.   [f] Ibid.

[g] De Aquis et Aquæd. 126. in vol. iv. of Græv. Antiq. Rom. col.
1715.

[h] Saggi di Diss. Acad. di Cortona, as above.

[i] Acad. des Sciences 1714. p. 394.

[k] Philos. Tr. 1760, as above. I omit Raper's second measure of
the length of the foot after the reign of Titus, because I wish to
keep these calculations as much as possible to the same age as
those concerning the money. Although I am aware that many of
the measures described must belong to later times.

[l] Abhandl. d. K. Acad. Berlin. 1812-1813, as above.

[m] Acad. des Sciences 1702. p. 80.

　　bonne and Nîmes, a mile of 767 toises,
　　　which gives the foot .... .9807
　　Cassini [n], from single miles, a mile of 754
　　　toises 10 inches, ... .9644

　　Riccioli [o], a mile of 766 toises, ... .9785

　　Astruch [p], 130.2 lines, ... .9637

　　Maffei [q], 130.6 lines, ... .9671

4. From the content of the congius:

　Villalpando [r] .... .986

　Eisenschmidt [s] .... .9804.

5. From astronomical measurements:

　Gosselin [t], .296296 metres, ... .9724.

6. To these may be added the values as-
　signed by
　　Freret [u], after examining the calculations
　　　of many writers, 130.7 lines, ... .9628

　　Muti [x], upon comparison of some Spanish
　　　measures with the Roman, 133.9 lines, .991

　　Cagnazzi, as quoted by Niebuhr [y], 29624
　　　metres, ... .9722.

[n] Zach Corr. Astron. as above.
[o] Revillas, as above.　　　　　　[p] Ibid.
[q] Ibid.
[r] Apparat. Urb. et Templ. Zach Monathliche Correspondenz
1804, vol. x. p. 525.
[s] Pond. et Mens.
[t] Mem. de l'Institut. vi. p. 44. as above.
[u] Acad. des Inscr. xxiv. as above.
[x] Zach Monathliche Correspondenz, as above.
[y] Roman History, Art. on the Censorship, vol. ii. p. 404. of the
last English translation. I have not been able to learn any thing

The result of these is, that the average value from the

$$
\begin{array}{ll}
\text{1st, is} & .9718 \\
\text{2nd} & .96994 \\
\text{3rd} & .97082 \\
\text{4th} & .9832 \\
\text{6th} & .9753.
\end{array}
$$

Of which, the first three are most to be depended on; the others being more uncertain, for reasons given above. And therefore, since the third in order is the mean value, between the other two, it will be advisable to fix upon that as nearest to the truth. Or, if the average be taken, by adding these three together, and dividing the sum by three, the result will give for the length of the Roman foot .9708 of an English foot, which reduced to inches, is 11.6496 inches, or $11\frac{1}{2}$.1496 inches.

9. The Romans divided the foot into either 12 parts, or 16; the former was in unison with their general practice, by which every whole was regarded as the as, and divided into 12 unciæ. From uncia in the sense of the twelfth part of the foot, comes our word *inch*. The sixteenths were called *digiti*, finger-breadths [z], which was probably taken from the Greek,

about Cagnazzi's researches into the Roman measures. Mr. Bunsen, Beschreib. d. Stadt Rom. B. i. Hauptst. i. c. Anhang, p. 41. follows Revillas' measurements.

[z] This must be distinguished from the word used with reference to numbers only, as, " ut protinus mundi quoque ipsius mensura veniat ad digitos," Plin. N. H. ii. 21. " si tuos digitos novi," Cic. Ep. Att. v. 21, &c. The fingers were used to measure both space and number: the *latter* use may be traced in the πεμπάζομαι " to count," of Homer, Odyss. δ'. 412, and in the decimal notation of numbers, which also probably arose from counting on the fingers: the *former* seems to have been original among the Greeks, and borrowed by the Latins. In Mr. Riddle's translation of Scheller's

δάκτυλος. The breadth of the thumb also was some-times taken as a measure of length. Pliny uses " pol-licaris" in this way; meaning probably the length of an inch [a]. *Palmus*, the hand-breadth, was the next measure above this; it was measured both by the digi-tus and the uncia, being 4 digiti, or 3 unciæ, that is, the fourth part of the foot. It is sometimes called palmus minor; because it is supposed that there was a larger palmus of 12 digiti, or 9 inches. This belief rests on a passage where Pliny calls that a *palmus*[b], which Dioscorides calls a σπιθαμὴ, at the same time that elsewhere Pliny calls the σπιθαμὴ *dodrans*[c], that is, 9 inches: and it is in some degree confirmed by the large palm (*palmo*) now used by builders at Rome, which is more than $8\frac{1}{2}$ inches in English measure [d]. But the palmus *major* is not found noticed in ancient writers. Above the foot-measure the palmipes was sometimes used, that is, a foot and a hand-breath, or 15 inches. The cubit, which was 3 inches more than this, or $1\frac{1}{2}$ feet, was not in common use among the Romans [e], although it is named among the measures [f].

The mile corresponding to this foot, that is, 5000 feet, is equal to 1618 yards in English measure; so that the Roman mile was exactly 142 yards less than the English statute mile.

10. The length of the Roman foot being thus fixed, it is easy to find that of the Greek: for the proportion

Latin Lexicon *digitus* is often rendered " inch," which *literally* is not correct. See Digitus and Palmus.

[a] xv. 26. (24.) Arbuthnot.   [b] xxi. 26. (8.)

[c] vii. 2. See Philander on Vitruv. iii. 1. 14. ed. Stratico.

[d] Greaves' Works, p. 233. ed. 1737. Mr. Bunsen, as above, p. 42, seems to consider this the genuine ancient palmus: for he says, the old palmo was ¾ths of the foot.

[e] Ideler, as above.   [f] Vitruv. iii. 1. 14.

always assigned between them by the earliest writers who compare them is, 24 to 25. Eight stades, of 600 Greek feet each, are constantly reckoned equal to a mile of 5000 Roman feet ; and the stade is said also separately to be equal to 625 Roman feet [g]. Therefore, if the Roman foot was equal to .9708 of the English foot, the Greek was equal to 1.01125 English feet, or 12.135 inches exactly.

It was said above, that there are very few means of verifying the length of the Greek foot by actual measurement of ancient monuments. One of these is that building which was then mentioned, the Parthenon at Athens : of which the dimensions are found to agree in an extraordinary way with this value. Stuart[h] measured the upper step of the basement of the Parthenon, which is the platform on which the pillars stand, and is exactly that part of the building where we should expect that the measure would have been taken, if the name Hecatompedon was really given it on account of the dimensions. He found the width of the front to be 101 feet 1.7 inches, the length of the side 227 feet 7.05 inches ; and since these two quantities are very nearly in the ratio 100 to 225, he inferred that the two sides really contained these two numbers of feet. Which inference seems indisputable, when it is considered that the building bore the name of " the Hundred feet." From this he calculated the value of the foot, from the front 12.137 inches, from the side 12.138 inches. Of which the greatest exceeds the value given above by only .003 of an inch. The interpretation put upon the name Hecatompedon by some lexicographers, and other comparatively late authors, is hardly worth noticing [i]. Writers of this

[g] Plin. ii. 21, &c.   [h] Antiq. of Athens vol. ii. p. 8.
[i] See Ideler, as above.

class did not trouble themselves to examine minutely
into such details, as to inquire whether the size of the
temple really agreed with the name ; they would rather
have exercised their philological acuteness, by finding a
meaning for the word from parallel places in Homer,
such as Hecatompylos applied to Thebes, and the like,
than have had recourse to the homely method of view-
ing and measuring.   The agreement of the numbers
would have been worth considering had it been found
by accident in any other building, and might fairly
have furnished an argument in favour of the calcu-
lated values of the two feet ; but when backed by the
testimony of the name given to the Parthenon, it can-
not be thought less than a certain fact, that a hundred
Greek feet are found to have the assigned proportion
to the Roman [k].

One more remark may be made.   There were at
different times and places different standards of length
used by the Greeks ; and sometimes perhaps a doubt
might arise, whether the proportion described between
the Greek and Roman was applicable to all Greek
feet, or, if not, to the feet of which state in Greece.
This example then, of the Parthenon at Athens, proves,
that the ratio was the true one for the Roman foot

[k] Diodorus gives the size of the great temple of Jupiter Olym-
pius at Agrigentum, xiii. 82. (p. 607.)   But this does not agree
with the researches of modern travellers.   M. De Quincy gives an
account of his examination and measurement of it, Mem. de l'Inst.
Hist. et Littér., vol. ii. p. 289.   The conclusion to which he came
about the dimensions was, that Diodorus had given them wrongly.
He would correct the number of feet in the width, from 160 to
190.   And if the length was rightly given, it would seem, accord-
ing to his measurements, that the foot was one of 140.6 lines
French, or 12.488 inches English.   This would amount to a differ-
ence of 10 feet English on the whole length of the temple, which
was 340 feet.

and the Greek foot of Athens in her best days. And, since there can be no doubt that the same ratio obtained generally throughout Greece in later times, for it is then especially that we find it noticed, this example proves further, that the common Greek foot used in most places, when the Greeks and Romans had most intercourse, was the same as that used at Athens in early times when the Parthenon was built[1].

This then may be called the common Greek foot; or, the Olympic foot; for it was that by which the race-course at Olympia was measured, the stadium there being 600 feet in length : which distance, it has been supposed, might have served as a kind of standard for all Greece. For, since inhabitants of all the states came thither every fourth year, they would have had the means of constantly regulating their measures by that scale, if required. Whenever feet are named as a common measure, without any particular standard being specified, and seldom is any such specified, in ancient Greek authors, we may suppose that this is the foot meant : and this is the foot which Hyginus says was called Ptolemeius, in the province of Cyrene[m].

11. The parts of the foot were, the δάκτυλος, finger-breadth, of which 16 made a foot : this was the small-

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[1] Le Roy found the measurement of the stadium of Herodes Atticus at Athens to give a foot something larger than the above. The whole length of that space was 591 French feet ; which, if it were equal to 600 Greek feet, would make the foot equal to 12.5989 inches English measure. But Le Roy accounted for the excess (of 22 French feet, according to his calculation of the length of the Greek foot) by supposing, that the course itself, that is, the actual stadium, was measured from points within the limits which he took for his measurement. Ruines des plus beaux Monumens de la Grèce xxiii.

[m] De Condit. Agror. ad fin. p. 210. of the Rei Agr. Auctor. of Guesius, 1674.

est measure of length [n].   The κόνδυλος, knuckle, which
was 2 finger-breadths [o].   The δοχμὴ, δακτυλοδόχμη, πα-
λαιστὴ, παλαιστῆς [p], or δῶρον [q], which was a hand-
breadth, or 4 finger-breadths.   The ὀρθόδωρον, which
was the whole length of the open hand [r].   The λιχὰς,
which was a span from the thumb to the fore-finger [s].
The σπιθαμὴ, which was a span from the thumb to the
little finger [t].

Between the foot and the cubit came two measures,
the πυγμὴ and the πυγών.   The pygme was the dis-
tance from the elbow to the knuckle joints, with the
fist closed ; the pygon the distance from the elbow to
the first joint in the finger, the fingers being bent [u].
The cubit was the distance from the elbow to the
finger tips, with the fingers straight.

The cubit was a measure much used by the Greeks,
as well as the foot.   There were two sizes of it, the
middling (μέτριος), and the royal cubit ; the latter of
which was three finger-breadths longer than the other [x].
The cubit was one foot and a half [y], which according
to the foregoing value of the foot, would be equal to
18.205 inches in English measure.   If 3 finger-
breadths be added to this, since the finger-breadth is
equal to .7584375 inches, the length of the royal cubit
will be 20.4802825 inches, or very nearly $20\frac{1}{2}$ inches
in English measure [z].   The βῆμα, or step, was $2\frac{1}{2}$

[n] Heron De Mens.   [o] Ibid.   [p] Pollux ii. 4. 157.
[q] Suidas δῶρον.   [r] Pollux ibid.
[s] Ibid.   This is printed διχὰς in the edition of Heron De Mens.
in the Excerpt. Paris. 1688, which must be a mistake of some
copyist.
[t] Ibid.   [u] Hesych. in πυγμὴ and πυγών. Pollux ii. 4. 158.
[x] Herodot. i. 178.   [y] Herodot. ii. 149.
[z] There is an Egyptian measure of red stone in the Museum at
Turin, which is said to be a cubit, very nearly of this length.
Measuring it roughly without instruments, in 1834, I made it out
to be exactly 20½ inches.

feet. The ὀργυιὰ 6 feet. The κάλαμος, or ἄκαινα [a], 10 feet. The ἄμμα [b] 60 feet. The πλέθρον 100 feet. The στάδιον 6 plethra, or 600 feet [c]. There were also some longer measures, multiples of the stade; which were taken from the courses, where these distances were fixed for the races. As, the δίαυλον, which was 2 stades, the ἱππικὸν, which was 4 stades [d], the δόλιχος, which was 6 and more, even up to 24 [e]. The σχοῖνος, lastly, is given as equal to the Persian parasang, or 30 stades [f]. The regular Olympic stade, of 600 common or Olympic feet, was 606 feet 9 inches, or 202 yards 9 inches in English measure. The English statute mile, therefore, would contain very nearly $8\frac{3}{4}$ Olympic stades, wanting only 29 feet $2\frac{1}{4}$ inches.

12. The measures described so far may be called those of the common scale, founded on the common standard of foot, both Roman and Greek. But there were some other standards in use, which, though less common in those countries with the history of which we are most concerned, are yet mentioned now and then by ancient writers. Some of these are but little known, being found named only in comparatively late works of writers on measures or measuring: and therefore the learned have held different opinions about some of them. What can be considered as certain respecting them, as well as the most important of the theories about them, shall be mentioned; what relates to the foot-measures first, and then the larger measures.

The Samians had a peculiar foot-measure, which was of the same length as the Egyptian foot. This was less than the common or Olympic foot, as we learn from the Egyptian cubit, of which the length is known.

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[a] Heron, as above. Phavorinus ἄκαινα.   [b] Heron.
[c] Herodot. ii. 149.   [d] Plutarch. Solon 23.
[e] Ideler, as above, p. 177.   [f] Heron.

The cubit of the Nilometer, the Mekyas of the island of Raouddah, was found by Le Pere, from the mean length of sixteen marked on that monument, to be 239.7 lines in French measure[d], or 17.74278576 inches in English, which is very nearly $17\frac{3}{4}$ inches. Two thirds of this will give the foot of the system, since the cubit was a foot and a half. Hence, the Egyptian or Samian foot was equal to 11.82852384 inches, or more than $11\frac{3}{4}$ inches in English measure.

It seems probable that a larger foot than the common standard was used in Asia Minor. Smith measured the stadium at Laodicea about the year 1670, and reported it 729 feet long[e]. If we can trust his measurement, which had no pretensions to accuracy by his own account, this would give a foot equal to 1 foot 2.58 inches English measure, or more than $14\frac{1}{2}$ inches.

The Royal, or Philetærian, foot and the Italian foot are named by Heron[f], as two standards; the former being 16 finger-breadths, the latter $13\frac{1}{3}$. In the same table of measures is found another term, which seems to contain a third standard of foot, namely, the mile, μίλιον; which is said by Heron to be equal to 5400 Italian, or 4500 royal or philetærian feet. As the Roman mile contained 5000 feet, there seems here to be three separate standards of foot in the ratio of 5400, 5000, and 4500, or very nearly 6, $5\frac{1}{2}$, and 5. The difficulty is, to decide to what system any one of them belongs: for if one were known the rest might be found. Some have supposed the largest, the philetærian, to be the Egyptian foot; the smallest, or Italian,

[d] Mémoires sur l'Egypte pendant les Campagnes du General Buonaparte, vol. ii. p. 32. 279. Paris An x.

[e] Septem Asiæ Ecclesiarum Notitia p. 40, of which the date is 1672.

[f] As above, p. 308.

the common Greek; the middling one to be that which
was called the foot of Drusus, which will be noticed
presently [g]. But there are several objections to this;
indeed each one supposition is untenable on its own
grounds. The Egyptian foot was not larger than the
common Greek, but smaller, as has just been proved;
the common Greek foot is not likely to have had the
name Italian given it; and nothing is less likely, than
that the foot of Drusus, which was a standard used on
the Rhine, should have been conveyed into the country
where Heron lived, which seems to have been in the
East. Ideler's explanation is much more probable;
which is, that the " Italian foot" meant the Roman [h];
and the " philetærian" a Greek foot of a larger stand-
ard, belonging to the stade of seven to the mile, which
had been introduced before the tenth century, the
age in which Heron lived [i]. After all, however, unless
some violent conjecture be started to explain the place,
we are driven to confess, that it probably relates to
measures of which we know little or nothing. Some
have supposed, that Heron has made some mistake [k];
those, on the other hand, who have made out a theory
to their own satisfaction, call him an exact and well-
informed writer. But having recourse to the supposi-
tion of changes in the older standards is rather evading
the question, than solving it. As the matter stands
now, the place is rather one to receive light from

[g] Freret Acad. des Inscr. xxiv. p. 450.

[h] Ἰταλικὸς is often used for " Roman" by the writers on weights
and measures. See the fragments in Stephan. Thesaur. vol. xii.

[i] See Ideler, as above, p. 170.

[k] Ideler, p. 194, supposes that Heron has confounded the two
stades, of $7\frac{1}{2}$ and 7 to the Roman mile, which in the tenth century
had come into the place of the older Olympic stade. The name,
" philetærian," Ideler thought, with much probability, might have
come from Philetærus the founder of the kingdom of Pergamus;

other inquiries into the subject of the measures, than to give it; and therefore may be dismissed for the present.

The foot of Drusus, *pes Drusianus*, was a variety of Roman measure, used out of Italy for measuring land: it was the standard among the Tungri in Lower Germany, and contained $13\frac{1}{2}$ Roman inches [1]: it therefore was equal to 13.1058 inches in English measure.

There are some other seeming varieties of foot-measure, which have been attributed to the Greeks. But they are really only deduced from expressions used concerning different stades; and will be noticed in speaking of them.

13. The varieties which have been assigned to the stade are very great. And as every stade (that is, originally " race-course") was properly 600 feet long[m], it might be inferred that there were as many standards of foot as there were stades; but these varieties of foot are not found in use. It has been computed that the Greeks had a different scale of measurement for geographical or itinerary distances, from that used for other things. Major Rennell affirmed, that there was no trace of the regular Olympic stade having ever been used for the measurement of roads, but always one much less[n]. This conclusion he came to from observing how much the distances laid down by ancient writers exceeded the truth, if computed by the common stade. From a comparison of the measurements of eight authors, from Herodotus to Arrian, Rennell calculated, that the mean value of the itinerary

which agrees very well with the idea, that these larger measures came from Asia.

[1] Hygin. De Condit. Agror. as above.
[m] Aul. Gell. N. A. i. 1.   [n] Geogr. of Herod. sect. ii.

stade was not more than 505.5 feet, instead of 606 feet 9 inches. And he supposed, that all these writers intended to use the same standard of stade, although their distances do not always agree. The *greatest* difference in distance which he found, between those whom he examined, was $\frac{1}{14}$th part; but the average was not more than $\frac{1}{24}$th; and this he accounted for, by supposing, that the distances laid down were in almost all cases *reckoned*, not *measured;* and therefore were liable to error.

A stade of $8\frac{1}{3}$ to the Roman mile, or $\frac{1}{24}$th less than the common one, is said by Strabo [o] to have been used by Polybius. But since Polybius reckons the mile at 8 stades in his extant works [p], it has been supposed that Strabo might have made a mistake. It is however not improbable that there might have been a stade of this proportion in use. Plutarch, on the contrary, goes the other way, when he says that 8 stades are a little more than a mile [q].

A passage in Censorinus [r] seems to assign two different lengths of stade to the courses at Olympia and at Delphi, and to make them both different from the common measurement, of 625 Roman feet. But all who have noticed this place agree in thinking that there is some mistake in it. It is quite certain that the common stade, which was the Olympic, was equal to 625 Roman feet : nor is there any doubt that every stade was 600 feet long, according to the original standard of measurement. And of the different race-courses in Greece it seems that the Pythian [t], to which

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[o] vii. 7.   [p] iii. 39. 8.   [q] C. Gracch. 7.

[r] De Die Nat. xiii. Stadium—quod Italicum vocant, pedum DCXXV. Nam sunt et alia, longitudine discrepantia; ut Olympicum, quod est pedum DC ; item Pythicam, pedum M.

[t] Gosselin quotes, in confirmation of this, the fact, that *boys* ran

Censorinus attributes 1000 feet, was less than the Olympic. Some have supposed that he has inverted the proportions, and given, for the dimensions of each course, the number expressing the ratio which the feet of that course bore to the common standard. But neither is this borne out when examined. There is no reason for thinking that the Delphic course was so short as to be but $\frac{6}{10}$ths of the Olympic. In short, as Freret observed [u], nothing seems certain in Censorinus' statement but his first words, that there were some stades of different lengths ; which does not, alone, give much light to the inquiry.

The astronomical calculations of the French writers on this subject, which have been alluded to above [x], make out many more kinds of stade. These are all less than the common or Olympic ; for, since it seems that the geographical distances given by the ancient writers are always too great, never too small, the result of the modern calculations for determining the measures by their means, has always been to diminish the standard. In this way Freret reckoned three different stades shorter than the Olympic, De Romé de l'Isle five, and Gosselin eight. The least of all is that assigned to Aristotle's expression of the measure of the earth's circumference, namely, 400,000 stades. To make this number agree with the true distance, the length of the stade must be 100 French metres, or 328.18916, &c. feet.

If it were certain that there were no errors in the measurements of distances on the earth's surface, which are reported to us by the ancients, there would be no reason to dispute the certainty of all these standards,

in the Delphic course ; as Pausanias states, Phocic. vii. 5.   Gosselin, as above, p. 60.

[u] Acad. des Inscr. p. 453.   [x] Sect. 7.

deduced from comparison of the statements of the an-
cients with the true distances. But exactly so far as we
can doubt the correctness of the old writers, either from
mistakes of their own, or their copyists, we must ques-
tion the truth of the systems which have been de-
scribed.

M. Gosselin, as was said above, set out on the posi-
tion, that in very early times the ancients had an exact
knowledge of the true measurement of the earth's cir-
cumference. But, if so, they seem to have lost it
afterwards. And, although it cannot be doubted, that
they made some correct measurements and observa-
tions, the differences between their statements, and the
inaccuracies sometimes discernible [y], forbid us to trust
a theory founded on the belief of universal accuracy
under every variety of expression. Such a theory, in-
deed, seems rather an ingenious display of the power
of combining numbers so as to produce the results
wished for, than historical truth.

The stades longer than the Olympic belong to a
different epoch from that supposed to have given birth
to the last mentioned. They came into use after the
classical ages; at which time there is frequent notice
of those of $7\frac{1}{2}$ and 7 to the Roman mile, instead of the
old proportion 8. Ideler [z] says, that the first trace of

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[y] One instance of this, in simple linear measurements, may be
quoted from the description of the Great Pyramid. The length of
the side of this is given variously, as 600 feet by Strabo, 700 feet
by Diodorus, 800 feet by Herodotus, 883 feet by Pliny. Yet De
Romé de l'Isle fancied that the pyramids were built to serve as the
standard of an universal system of measures upon scientific prin-
ciples: and in Pliny's time they had been described by no less than
thirteen writers : with how much accuracy, we may judge from
comparing the accounts which we have. See Plin. xxxvi. 17.
(12.) &c.

[z] Abhandl. &c. as above.

the stade of $7\frac{1}{2}$ to the mile is to be found in the third century. He quotes Dio Cassius and Julius Ascalonita for it ; and supposes that it came into use among the Greeks from Asia ; where, as has been already said, there are some indications of a larger standard having been used in early times. The lexicographers describe three stades, as if they were the commonest in their time. Suidas [a] says, that the mile contains $7\frac{1}{2}$ stades ; Hesychius [b] 7, but he mentions also that some reckon it at nearly 8.

The stade of $7\frac{1}{2}$ to the Roman mile was equal to 647 feet 2.4 inches, or 215 yards, 2 feet, 2.4 inches ; that of 7 to the Roman mile, was equal to 693 feet 5.124 inches, or 231 yards, 5.124 inches in English measure.

[a] Suidas στάδιον and μίλιον. But the text is inconsistent : in the former place he says, the mile contains 4500 feet, in the latter 4200.

[b] Hesychius μίλιον. See also the other authorities quoted by Ideler, namely, Epiphanius and Photius.

Table of supposed varieties of itinerary or geographical measures of length.

	Yds.	Ft.	Inch.
Stade assigned to Aristotle's measurement of the earth's surface	109	1	2.26992
Mean geographical stade computed by Major Rennell	168	1	6
Olympic stade	202	0	9
Stade of $7\frac{1}{2}$ to the Roman mile	215	2	2.4
Stade of 7 to the Roman mile	231	0	5.124.

σχοῖνος, or Persian parasang, reckoned at 30 stades of the common or Olympic standard, 3 miles 787 yards 1 foot 6 inches.

Table of common Roman Measures of Length.

									Yards	Feet	Inches
Digitus											.7281
1⅓	Uncia, or Pollex										.9708
4	3	Palmus									2.9124
12	9	3	Palmus major								8.7372
16	12	4	1⅓	Pes							11.6496
20	15	5	1⅔	1¼	Palmipes					1	2.563
24	18	6	2	1½	1⅕	Cubitus				1	5.4744
80	60	20	6⅔	5	4	3⅓	Passus			4	10.248
				5000	4000	3333⅓	1000	Mille passus, or Milliarium	1618		

N. B. The other parts of the foot are expressed in inches by the common words signifying the divisions of the as into unciæ, as sextans, quincunx, &c.

Table of common Greek Measures of Length.

Measure	δάκτυλος	κόνδυλος	παλαιστή	λιχάς	ὀρθόδωρον	σπιθαμή	πούς	πυγμή	πυγών	πῆχυς	βῆμα	ξύλον	ὀργυιά	κάλαμος	ἄμμα	πλέθρον	στάδιον	Yards	Feet	Inches
δάκτυλος																				.7584
κόνδυλος	2																			1.5168
παλαιστὴ, παλαιστής, δῶρον, δοχμὴ, or δακτυλοδόχμη	4	2																		3.0336
λιχάς	8	4	2																	6.0672
ὀρθόδωρον	10	5	2½	1¼																7.584
σπιθαμή	12	6	3	1½	1⅕															9.1008
πούς	16	8	4	2	1⅗	1⅓													1	0.135
πυγμή	18	9	4½	2¼	1⅘	1½	1⅛												1	1.6512
πυγών	20	10	5	2½	2	1⅔	1¼	1⅑											1	3.168
πῆχυς	24	12	6	3	2⅖	2	1½	1⅓	1⅕										1	6.2016
βῆμα	40	20	10	5	4	3⅓	2½	2 2/9	2	1⅔									2	6.336
ξύλον	72	36	18	9	7⅕	6	4½	4	3⅗	3	1⅘								4	6.6048
ὀργυιά	96	48	24	12	9⅗	8	6	5⅓	4⅘	4	2⅖	1⅓							6	0.81
κάλαμος, ἄκενα, or ἄκαινα							10	8 8/9	8	6⅔	4	2 2/9	1⅔						10	1.35
ἄμμα							60	53⅓	48	40	24	13⅓	10	6				20		8.1
πλέθρον							100	88 8/9	80	66⅔	40	22 2/9	16⅔	10	1⅔			33	2	1.5
στάδιον, or στάδιος							600	533⅓	480	400	240	133⅓	100	60	10	6		202		9
δίαυλον, or δίαυλος							1200	1066⅔	960	800	480	266⅔	200	120	20	12	2	404	1	6

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