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IV.

SOME ACCOUNT OF THE WEIGHT OF ENGLISH AND NORTHERN COINS IN THE TENTH AND ELEVENTH CENTURIES,

AND AN ATTEMPT AT COMPARISON BETWEEN THESE WEIGHTS AND
THE WEIGHT SYSTEM FOR COINS WHICH APPARENTLY
BELONG TO THE SAME PERIOD.

TRANSLATED FROM THE DANISH, BY JOHN EVANS, F.R.S.

PRELIMINARY AND NECESSARY PARTICULARS OF WEIGHTS.

One ounce, Cologne-weight = 451.38 Troy grains¹ = 29.231 French grammes = 512 Norse æs.

One mark, Cologne-weight = 3611.04 Troy grains = 233.85489² French grammes = 4096 Norse æs.

From these data the following results are obtained:—

	Troy grains.	Tower grains.	French grammes.	Æs.
1 Troy grain			= 0.064761091	= 1.13429926
1 Norse æs.	= 0.8816016525		= 0.0570934790	
1 lb. Troy weight	= 5760		= 373.02388408871	= 6533.56373787
1 ounce	= 480		= 81.085323674	= 544.46364482
1 dwt.	= 24		= 1.554264	= 27.2231842
1 French gramme	= 15.44137			= 17.515135133586
1 oz. Tower weight	= 450 =	480 =	29.14249	= 510.434667
1 lb. Tower weight	= 5400 =	5760 =	349.70989	= 6125.21800425
1 mark	= 3600 =	3840 =	233.13993	= 4083.477336
1 grain	= 0.9375		= 0.0607135	= 1.063405555
1 gramme	=	= 16.470795		
1 æs.	=	= 0.940375		
1 penny Tower weight	= 22.5 =	24.0 =	1.4570245	= 25.52178335
1 ounce Cologne weight	=	= 481.472		

¹ Ruding, vol. I., p. 7. See also Luxdorph, vol. ix. of Procs. Copenhagen Soc., p. 618; or p. 6 of the separate copies.

² From information supplied by Professor Holmboe.

³ Hawkins, p. 59. He says that Alfred's later coins, weighing 24 grains, are of good silver; the earlier are, on the contrary, of inferior metal, and lighter in weight.

I.—WEIGHT OF ENGLISH COINS.

	Number of pieces.	Gross weight in Troy grains.	Average weight of each.	French grammes.	Norwegian Æs
Of <i>a</i> , Egbert (802—837) Rud- ing gives	8	159·10	19·837	1·288	22·558
<i>b</i> , Æthelwulf (837—858) „	7	138·6	19·80	1·282	22·459
<i>c</i> , Æthelbert (860—866) „	3	54·75	18·25	1·182	20·70
<i>d</i> , Æthelred I. (866—871) „	6	107·15	17·86	1·156	20·26
<i>e</i> , Alfred (871—901), later and earlier types	14	289·275	20·66	1·338	23·437
Ditto, later, and in good pre- servation, Hawkins	1		24·00	1·554	27·233
<i>f</i> , Edward the Elder (901— 925) Ruding	27	643·05	23·817	1·542	27·015
<i>g</i> , Æthelstan (925—941) Rud- ing	43	969·60	22·55	1·460	25·57
Ditto Hawkins	1		23·0	1·490	26·088
<i>h</i> , Edmund (941—946) „	1		24·0	1·554	27·233
<i>i</i> , Eadred (946—955) Ruding	25	527·60	21·104	1·367	23·938
<i>k</i> , Eadwig (955—959) „	8	169·10	21·137	1·369	23·976
<i>l</i> , Eadgar (959—975) Ruding gives 22, Hildebrand ⁴ 21	43	942·86	21·927	1·420	24·87
<i>m</i> , Æthelred II. (978—1016) Ruding gives 15, Hilde- brand 329, Holmboe 33, ⁵ Schive 58 ⁶	433	9517·048	21·979	1·723	24·93
<i>n</i> , Knut the Great (1016— 1035). In the Roy. Danish, Norwegian University, Stockholm and Bergen Museum Cabinets, all of the oldest types and standard	25	561·715	22·47	1·455	25·486
The same king, of the later standard, and of the types E. G. H. I. K. of Hildebrand, all in good preservation	174	2936·045	16·87	1·093	19·14
<i>o</i> , Harold Harefoot, Knut's son (1035—1040). In the Royal Swedish Coin Cabi- net	100	1659·93	16·6	1·075	18·83
<i>p</i> , Hardeknut (1040—1042). At Stockholm, Copenhagen, and Christiania	45	771·38	17·14	1·11	19·44
<i>q</i> , Edward the Confessor (1042—1066)	127	2126·4	16·74	1·08	18·99
Of the coins which may be considered to belong to the latter part of his reign	17	363·64	21·39	1·385	24·26

⁴ Hildebrand, *Anglosachsiska Mynt i Svenska Kongl. Myntka-
binettet*. Stockholm, 1846.

⁵ Holmboe, *Mynter fra Middelalderen fundne ved Egersund*.
Christiania, 1836.

⁶ Schive. Account of coins found in Haaland Parish in 1866.
Procs. Scientific Society of Christiania for 1869.

3.—WEIGHT OF SWEDISH COINS.

	Number of pieces.	Gross weight in Troy grains.	Average weight of each.	French grammes.	Norwegian Æs.
<p>a, Olaf Scötkonung (995—1021). In the Museums in Sweden and Denmark are to be found</p> <p>This king has not, like other contemporary northern kings, borrowed Æthelred's penny of $\frac{24}{72}$ of the Tower pound; but his coins, on an average, nearly answer to the 96th part of the mark of Gotland, and are nearly twice as heavy as the later English coins of Knut, of Harold Harefoot, and Hardeknut.</p>	50	1648.77	32.97	2.135	37.40
<p>b, Anund Jacob (1021—1050)</p> <p>Average about the same as the English coins of Harold Harefoot and Hardeknut. Until the middle of the twelfth century there is, after the death of Anund Jacob, no record of the weight of Swedish coins.</p>	9	148.11	16.45	1.065	15.66

4.—WEIGHT OF NORWEGIAN COINS.

	Number of pieces.	Gross weight in Troy grains.	Average weight of each.	French grammes.	Norwegian Æs.
<p>a, Olaf Tryggvesson. At an earlier period (in 1770) a single coin of this king was known, the size and type of which corresponded with Æthelred II., type C. Hildebrand. It is now lost.</p>	1	..	21.57	1,397	24.47
<p>b, Erik Jarl (1000—1015) ..</p> <p>c, Haakon Eriksson Jarl (1015)</p> <p>The average weight of these coins corresponds most closely with that of the contemporary coins of Olaf Scötkonung.</p>	6	199.33	33.22	2,151	37.68

WEIGHT OF NORWEGIAN COINS—*continued.*

	Number of pieces.	Gross weight in Troy Grains.	Average weight of each.	French grammes.	Norwegian Æs.
<i>d.</i> Olaf the Holy (1015 – 1030). Of this king there are coins, in part doubtful Besides these there is an undoubted coin on a square piece of metal weighing 47,016 grains Troy, probably struck as a piece of two pennies. The foregoing coins, in classes 3 and 4, are all 14 to 15 lods fine.	4	87.94	21.987	1.424	24.94
<i>e.</i> Of Magnus the Good (1035 – 1047) there are no coins struck in Norway; but of him and his co-regent, Harold Haarderaade, two pieces struck in Denmark, apparently of the West Danish standard and 14 lods fine, weigh on an average		11.205	0.726	12.71
<i>f.</i> Of Harold Haarderaade as sole monarch (1047–1066) Coins of good silver. These are 14 lods fine.	8	104.514	13.065	0.846	14.82
Coins of base silver These are from 10 to 5 lods fine, but mostly 8 lods.	52	13.488	701.358	0.873	15.30

THE COINAGE-WEIGHT IN ENGLAND AND THE NORTH.

1. THE ENGLISH COINAGE-WEIGHT.

The profit to be gained by a royalty on coinage was sought to be retained for themselves by the princes of the Middle Ages. It arose, in part, on account of uncoined silver being much cheaper than coined; and in part because the coins, though at first this was not the case, were eventually of less weight than they should have been; so that a pound of pennies, which for a great length of time were in fact the only coins of the Middle Ages, soon became less than a pound in weight. Already,

from the middle of the tenth century, this may be traced in many countries;⁷ but the result of this was that those, who had no business to do so, encroached on the princes' right, and sought to share it with them, which they in their turn tried to prevent by severe and in part barbarous laws.⁸ In England, however, they kept much longer to the greater and lesser normal weights, which were much more faithfully adhered to than in other countries;⁹ but notwithstanding, the coins were, on the whole, a little less in weight than they should have been. This, however, could hardly have been observed at first in daily business, or in small payments; while, on the contrary, when the question concerned large sums, which were always weighed, it appears, judging from many Northern finds of coins, that the short weight was made good with uncoined silver, or with broken ornaments, rings, bars, &c.

It is altogether improbable that any prince struck coins

⁷ Baron von Koehne *Über die im Russischen Reiche gefundenen Abendländischen Münzen des x., xi., and xii., Jahrhunderts's*, p. 6.

⁸ Suhm, *Danmarks Historie*, III., pp. 347—348. Æthelred II.'s Law for Englishmen and the Danes in England; and Æthelstan's ordinance concerning coins. Hildebrand's *Ang. Sax. Coins*, p. lxxxviii.

⁹ In England they went more honestly to work than elsewhere, and the coins kept their proper weight, except, perhaps, a period of about forty years under Knut the Great, Harold Harefoot, Hardeknut, and the greater part of the reign of Edward the Confessor. As an example, may be adduced the 5,127 pennies found at Tealby, in Lincolnshire, in 1807, which were probably deposited in the ground after the middle of the twelfth century, and weighed 19 lb. 6 oz. 5 dwts. Troy. This gives an average of 21·931 grs. Troy, = 1·420 French grammes, = 24·876 æs. And as the normal penny was 22·5 grs., = 1·457 grs. = 25·52 æs; the difference, which may in part be due to the coins having lain so long in the earth, is only 0·569 grs. = 0·087 grammes, = 0·644 æs.

heavier on an average than the normal weight, for by that means a part of the profit would have been lost, which the right of coinage gave to the prince, and which he sometimes handed over to others, in return for a fixed payment ; but the instruments which were used in coining were imperfect, and there was also some difference in the striking of each separate piece, some being either heavier or lighter than the standard, as is the case with the smaller sorts of coins even to the present day, and this may occasion erroneous results from the weighing of ancient coins.

This may also arise from the fact that, with the good uninjured pieces, there were others current which were clipped ; and this practice, according to Ruding,¹⁰ went to such lengths in the reign of the English king Eadwig (955—959), that the penny was scarcely equal to the half-penny in weight. The circumstance also that coins found in the earth have suffered by oxidization, may contribute to their weight being less than it should be.

As the division into 240 pennies to the *libra*, or pound, was the same among the Anglo-Saxons in the tenth century as among the Franks under Charlemagne,¹¹ it appears not unlikely that at that earlier period this same pound was accepted for the purposes of coinage. In the meantime it is generally believed that from the earliest period the weight used by the Anglo-Saxons for their coinage was the so-called Tower pound, which is found to have contained 5,400 Troy grains¹² (equal 349·70989 French

¹⁰ Ruding, vol. I., p. 130.

¹¹ Nordström, Bidrag till Penning-väsendets Historia i Sverige intill K. Gustav. 1^{stes} Tid. pag 244. Histoire de la Législation des anciens Germains, par Garabed Davoud Oghlou. Berlin, 1845, tome II., p. 288.

¹² Ruding, vol. I., p. 7.

grammes = 6125·21600425 Norwegian æs) ; but the later coins of King Alfred, as well as those of his successors, Edward the Elder, Æthelstan, and Edmund, contain more than the $\frac{1}{4}\frac{1}{8}$ of the Tower pound, which is the normal weight for the Tower penny = 22·5 Troy grains (= 1,457 grammes = 25·52173335 æs). The coins of the English kings after Edmund weigh somewhat less than this penny. That use was made in England of a great pound as well as of the Tower pound is shown by a charter granted by Æthelred II. to the monastery at Ely, in which it is related that the abbot bought certain property of the king for nine pounds of gold after the Norman great weight (presumably the common Frankish weight), and also because, as already observed, it is improbable that the before-mentioned kings, from Alfred to Edmund (871—946), should have struck pennies above the normal weight ; so that it would appear, as far as these kings are concerned, that there was another and greater penny than that of the Tower. The diminution below this, which seems to have taken place under Eadred, Eadwig, and Eadgar (946—975), may be well ascribed to deficiency of money, to a desire for greater profit from the coinage, or most probably to the before-mentioned causes. It may, however, be accepted that the English standard, or normal weight, is, after the middle or towards the end of the tenth century, based on the Tower pound ; for this may, it appears, be deduced from Æthelred's laws on the relation between the Danish Öre and that pound. But inasmuch as certain of that king's coins are heavier than the $\frac{1}{4}\frac{1}{8}$ of the Tower pound, it is in the highest degree probable that the coinage of the great sums which, under him, were paid to the Danes, may have taken place in such great haste, that they were never so accurate as to the weight or number of the

single pennies as to the weight in pounds of the whole great sum, which each time had to be prepared. It is also reasonable to suppose that the covetous Vikings chose the heaviest coins; where, as with small amounts, it was a question, not of weight, but of tale. All this is corroborated by the fact that a certain kind of Æthelred's coins (type D. of Hildebrand), which could not have been struck earlier than some years after A.D. 1000, are the heaviest; and it was doubtless principally of this sort that the 48,000 lbs.¹³ of gold, or 384,000 lbs. of silver, consisted, which had to be paid to Thorkell the Tall in 1010. The coins of type D. weigh, on an average, 25·30 Troy grains = 1·64 grammes = 28·7 æs; or 1·3 grain more than the 240th part of the French lb. (see below); while the coins which are of type E., and were probably struck between 1010 and 1014, only contain 21·158 grains = 1·37 grammes = 24·0 æs, or 1·34 grain under the Tower penny. In the later coinage under Æthelred, or from 1014 to 1016, the weight of the coin was still less, as was clearly shown by a northern find in 1866.

According to Ruding, the pennies of Edward the Elder, and, according to Hawkins, the later pennies of Alfred, Eadmund, and Æthelstan contain more than 22·5 grains, and even as much as 23·8 grains on an average. If these pennies were struck in relation to a normal weight, they would be about the 240th part of the present Troy pound = 5760 grains, which was received from France,¹⁴

¹³ P. A. Munch. *Det Norske Folks Historie*, 1-2, p. 471.

¹⁴ Von Koehne (p. 7) says that the French Carolingian and the English pound were originally alike; but they, like other weights, have been reduced in the course of time, and become rather lighter than formerly; and this leads to the conclusion that the older weights may likewise be the heaviest.

and is still used in the English coinage. The same may have been the case under these kings, and Alfred may have been the first who adopted it as the normal weight for his later coinage. One two hundred and fortieth part of the French or Troy pound, or 1 dwt., contains 24 grains = 1,554 French grammes = 27·22318224 æs; and the later coins of Alfred—those of Edward the Elder and Edmund—are, on an average, 23·942 grains = 1·550 grammes = 27·158 æs. The somewhat less average weight of the coins of the kings after Eadmund's time was, if indeed these kings retained the French pound, probably not at first of great importance, so that the difference was not immediately observed, but might eventually lead to the establishment of a proportion¹⁵ to the previously used normal weight; so that the lighter Tower pound, which perhaps was older and earlier used in England than the French pound, was again adopted as the coining weight even before the time of Æthelred II.¹⁶

In Anglo-Saxon documents it is stated that the Danish mark was, in the tenth century, the same as 100 English pennies.¹⁷ If each of these equalled the 240th of the French pound, the mark would be = 2400 grains = 155·426 grammes = 2722·3 æs. And as this contained 8 öre, 1 öre would equal 300 grains = 19·428 grammes = 340·3 æs. But in Æthelred's "Instituta Lundoniæ,"¹⁸ it is said that

¹⁵ Nordström, p. 212.

¹⁶ It is not impossible that the reduction to the Tower pound first took place when the great contributions to the Norsemen began in the year 991.

¹⁷ Ruding, vol. I., p. 112.

¹⁸ Davoud Oghlou, ii., p. 291. This document is the safest guide to probable results. Nordström says, p. 248, by an error as it seems, that 1 öre = 15 pennies, but it cannot, after the Tower pound, which contained 15 öre and 240 pennies, have

a pound (libra) was 15 öre; and as in that king's time we may reckon by the Tower pound of 5400 grains, so an öre of a 15th part of this, or 16 English pennies, is equal to 360 grains = 23·314 grammes = 408·3477336 æs; and 8 öre = 1 Danish mark = 2880 grains = 186·512 grammes = 3266·7818688 æs, which does not answer to the first result for the mark. The discrepancy between 100 pennies in the mark = 2400 grains Troy, and its second value of 2880 grains, after the "Instituta Lundoniæ" and the Tower pound, corresponds, in the meantime, with the old Northern mode of reckoning, according to which the hundred was often represented by the great or long hundred of 120 pennies; for $120 \times 24^{19} = 2880$ grains = 186·512 grammes = 3266·7818688 æs, and $\frac{1}{3}$ of which, or 1 öre = 360 grains = 23·314 grammes = 408·3477336 æs as before. In like manner, 2880 grains $\times 2 = 5760$ grains = 373·02388 grammes = 6533·5637 æs—*i.e.*, the Danish mark was in the first half of the tenth century the half of the English, which at that time was the same as the French pound.²⁰

been otherwise than 16 pennies. Ruding also, vol. I., p. 115 makes 15 pennies = 1 öre, according to Bircherod; this statement, however, does not refer to the period under consideration, but to the Danish coin system of the sixteenth century. See Holberg's *Danmarks og Norges geistlige og verdslige Stat*, p. 608 and A. Berntsen *Danmarks og Norges frugtbare Herlighed* 4, 1, 556.

¹⁹ That there is ground for receiving this mode of reckoning by the great or long hundred of 120 to the 100, is proved by many Northern documents of an early date, and is besides corroborated by the marriage contract between King Eric II., Magnussön (1280—1299), and Margaret of Scotland, in 1281 (P. A. Munch, *Det Norske Folks Historie*, iv. 2, 25), where it is expressly said that the dowry shall be paid in sterling new and current coins, of which there shall be reckoned five score to the 100 mark. Had there not also been occasionally six score to the 100, such a stipulation would have been needless.

²⁰ Von Kœhne (p. 7) cites the mark weight as having been originally the half of the pound.

In the treaty between Edward the Elder and the Danish Guthrum, in the year 907, 3 half-marks and 30 shillings seem to be the same thing.²¹ If this interpretation be correct, it would appear from the following computation that the mark had the same value as has just been assigned to the Danish mark. In the Saxon provinces in England they reckoned 5 pennies to the shilling, so that there were 48 shillings to the pound. In Mercia there were 4 pennies to the shilling, or 60 shillings to the pound. In Kent, where pennies were not in use, there were $12\frac{1}{2}$ shillings, each of 250 sceattas, to the pound. In Northumberland, it appears they did not reckon by shillings, but by thrymsas, which were there current. At the same time, 80 thrymsas went to the pound, or 3 pennies to the thrymsa. That 3 half-marks = 12 öre, was the same as 30 shillings, is alleged by Davoud Oghlou from the treaty of peace between Edward and Guthrum (chapters 3 and 7), and he reckons what a half-mark amounted to in Saxon shillings. But those 30 shillings may, as it appears, have been Mercian, for the treaty took place with the Danes in East Anglia and Northumberland, which lay near Mercia, and was concluded in Mercia itself.²² This took place at a time when in England the French pound was employed as the coin weight, and if Mercian shillings of 4 pennies are also meant, then 30 shillings = $\frac{1}{2}$ pound = 2880 grains (= 186·512 grammes = 3266·7818688 æs), 1 shilling = 96 grains = 6·217 grammes = 108·892728964 æs), 1 mark = $\frac{1}{3}$ of a pound, or 2 half-marks = $\frac{2}{3} \times 2880$ grains Troy (= $\frac{2}{3} \times 186·512$

²¹ Davoud Oghlou, ii. p. 290, *Suhm, Danmarks Historie*, II. p. 477.

²² *Suhm*, vol. II., 475, 477. Yettingaford, which is also written Thitingaford, Ichyngaford, now perhaps Ickford in Buckinghamshire, which district lay in Mercia.

grammes = $\frac{1}{3} \times 3266.7818688 \text{ æs}$ = 1920 grains (= 124.34 grammes = 2177.854 æs), and 1 öre = $\frac{1}{3}$ mark = 240 grains (= 15.54 grammes = 272.2318 æs). But as Ruding observes, vol. II., p. 115, that the öre in weight was $\frac{1}{3}$ more than the öre in coin, the weight öre would be = 360 grains = 23.314 grammes = 408.3477 æs, and the treaty or convention was concluded in accordance with what was then reckoned for a mark among the Danes, but which was not a mark in weight. Besides the $\frac{1}{240}$ of the weight mark thus discovered (), or 12 grains (= 0.777 grammes = 13.6 æs), agrees fairly well with the weight of the pennies struck in Western Denmark, principally under Hardeknut, but also at a later date, when it is likewise considered that the coins have lain many centuries in the earth. By taking the Saxon shilling at 5 pennies in the above account, the results cannot be made to agree.

At the time of the Norman invasion of England, and even earlier in the eleventh century, or under Æthelred, the Tower pound seems to have been the normal weight for coinage, for the pennies of the later years of the reign of Edward the Confessor approximate closely to the 240th part of the Tower pound, the latest weighing on an average 21.39 grains = 1.385 grammes = 24.26 æs, that is, something less than the weight of the Tower penny. At the time of the invasion, and also probably before, as well as shortly after, the öre was again 16 pennies in weight²³ = $16 \times 22.5 = 360$ grains = 23.314 grammes = 408.3477336 æs. In the same manner 20 öre = 2 marks silver English;²⁴ so that 10 öre = 1 mark = 3600 grains (= 233.14 grammes) = 4083.477336 æs = $\frac{2}{3}$ 5400 grains = $\frac{2}{3}$ of the Tower pound.

²³ Lüxdorph, pp. 637, 638; Nordström, p. 248.

²⁴ Lüxdorph, pp. 637, 638.

Consequently, there was already in use at that time the later so-called sterling mark after the Tower weight. In the same manner, in France, it was, between A.D. 1060 and 1108, ordained that $\frac{3}{4}$ of the *libra* weight,²⁵ or the *poids de marc*, should be applied for the weighing of the gold and silver. At that time, also, 15 öre were still reckoned to the pound in England,²⁶ which is right, for $15 \times 360 = 5400$ grains, or the Tower pound. But already in Domesday Book, or in the register of the royal domains under William the Conqueror, an öre is rated at 20 pennies.²⁷ This is also right, for while the Anglo-Saxon or Tower pound was retained under the new rule, the Norman method of dividing the same into 12 ounces of 20 pennies was adopted. In reckoning money, the pound was divided into 20 solidi of 12 denarii, the mark being then $\frac{3}{4}$ of a pound, that is, 8 ounces or öre = 160 pennies, or 13 solidi (shillings) and 4 pence = 3600 grains; and each öre = $20 \times 22.5 = 450$ grains = 21.142 grammes = 510.434667 æs.²⁸ From this it follows that at the commencement, after the Conquest, they reckoned in England by two sorts of öre—namely, by the lesser or older of 16 pennies, and by the newer and greater of 20 pennies, as is also observed in Sumner's Glossarium.²⁹

²⁵ Nordström, p. 255.

²⁶ Luxdorph, p. 637, 638.

²⁷ Nordström, p. 248. Ruding, vol. I. p. 112, also observes that the mark was divided into 160 pennies after the Conquest, but it is probable that it had already at an earlier period been used in England as two-thirds of the pound.

²⁸ Davoud Oghlou, vol. II. p. 291, agrees with this, as he observes that, according to the laws of Edward the Confessor (Cap. 12) and William the Conqueror's "Lois et Coûtumes," three marks = to 40s. according to the Norman reckoning, for $3 \times \frac{3}{4} \text{ lb} = 270$ grains = $\frac{1}{2} \text{ lb}$ of the Tower pound = 1 shilling and 1 öre or ounce = $2 \frac{1}{2} \text{ lb} = 450$ grains.

²⁹ Luxdorph, Ibid.

From what has been already stated, we arrive at the following results:—That the English weight for coinage may be accepted as having been at the beginning and later on in the tenth century the French pound. Still later on, towards its close, the Tower pound may have been adopted. Secondly, that the Danish mark-weight mentioned in English documents, or 8 Danish öre, contained about 2880 grains Troy, and that on its introduction from Denmark in the same century, or earlier, it was fixed at or taken for the half of the French pound then in use in England. Thirdly, that the öre weight had, in the tenth and a great part of the eleventh century, an invariable value in England, but was eventually, after the Norman Conquest, enhanced to the $\frac{3}{4}$ th of the Tower mark, or the $\frac{12}{100}$ th of the Tower pound. Davoud Oghlou (in his 2nd part, p. 290) makes the following observations as to öre and marks:—“In the English laws there are frequent questions about these denominations which belong to the Danish currency; but it is difficult accurately to determine their value. In the meantime, 8 öre made a mark.” The results arrived at in the foregoing account, either experimentally or by calculation, seem to be reasonable, but they first acquire great certainty from the data of Æthelred’s time, on the presumption that the Tower pound has not undergone any particular alteration. Davoud Oghlou remarks farther,⁸⁰ that it appears as if the Danish mark also had 12 öre. In the treaty between Edward and Guthrum it is stated, as already observed, that three half-marks, or 12 ore = 30 shillings. If now, as Ruding says, the öre of account was two-thirds

⁸⁰ Page 291. See also Rosenringe’s *Grundrids*, 875; and Thorpe’s edition of the *English Laws*—Note on King Ina’s fourteenth law.

of the öre of weight, and the mark of account two-thirds of the weight mark, then 12 öre = 3 half-marks of the former, or 8 öre of the latter; and thus the reckoning of 12 öre to the mark would be perfectly right.

Knut the Great, Æthelred's successor in England, struck coins, both in that country and in Denmark, at a heavier standard in the earlier years of his reign, and at a lighter in his later years. His earlier English pennies, presumably struck between 1016—1020, are, so far as they have been weighed, found to be, on an average, 22·468 grains = 25·486 æs, and the Danish, 22·470 grains = 25·50 æs. Both sorts may therefore be taken as having been struck of the weight of the penny of the Tower pound, which was, as already shown, 22·5 grains = 25·5217335 æs. But probably soon after the last named of those years he departed from his earlier standard, for on comparing the average weights given by Hildebrand³¹ for Knut's own later English and Danish pennies with those of Harold Harefoot, the English coins of Hardeknut and the older coins of Edward the Confessor, we arrive on the whole at the conclusion that all these kings coined according to a standard which was three-quarters of the Tower pound = 4050 grains = 262·28 French grammes = 4593·912 æs; the 240th of this is 16·875 grains = 1·093 French grammes = 19·14 æs for the penny. True it is, that 924 pieces of Knut's pennies only weigh 15·566 grains = 1·008 grammes = 17·657 æs on an average, so that it may be presumed that the English mark, of which the 240th equals 15 grains = 0·97 grammes = 17·014 æs, was taken as the basis of the coinage; but as 750 of this number belong, with few exceptions, to the Egersund find of the year 1836, and have suffered much through lying in the earth, and as the remaining 174 pennies

³¹ Hildebrand, pp. 145, 149, 222, 228, 248, 249, 272, 276.

partly of the same types as those, and partly of Knut's latest types, but all good, had, on an average, a higher weight, which nearly answered to the average weight of the coins of Harold Harefoot, Hardeknut, and the oldest of Edward the Confessor, it seems safest to rely on the average of these 174 pieces as arrived at from Hildebrand's data.³² Knut's son and successor in England, Harold Harefoot, struck coins apparently of the same standard as his father's later coins; 100 are found to weigh on an average 16·6 grains = 1·075 grammes = 18·83 æs. The English coins of Harold's successor, Hardeknut, give on an average of 44 pieces, 17·14 grains = 1·11 grammes = 19·44 æs, while 127 of the earliest pennies of Edward the Confessor give 16·741 grains = 1·084 grammes = 18·99 æs. The average weight of his later coins was, as already observed, 21·39 grains = 1·385 grammes = 24·26 æs, or not far from the value of the Tower penny.

2. THE DANISH COINAGE-WEIGHT.

It has already been stated in an earlier page, that the two coins which are known of Sven Tjageskegg are struck like Æthelred's type C in Hildebrand, and that their average weight, 24·455 grains, about corresponds with that of Æthelred's type D. It has also been remarked that the Danish coins of the earlier years of the reign of Knut the Great are struck of the same weight as those of his English predecessors, so that an average of 23 pieces gives 22·48 grains = 1·456 grammes = 25·50 æs, or very nearly the $\frac{1}{4}\frac{1}{8}$ of the Tower pound. These coins appear

³² Hildebrand, p. 149; the types E, G, H, I, K.

to have been struck before his return to England from Denmark in 1020. After that time, both in Denmark and England, a lighter standard was adopted, and it has been found that 7 pieces of his later coinage weigh on an average about the same as those struck in England, or 17·068 grains = 1·105 grammes = 19·36 æs.

Hardeknut's Danish coins weigh less than his father's, or only 15·555 grains = 1·007 grammes = 17·645 æs, on an average, which is arrived at from 56 pieces struck at Lund, in Scania. Seventeen other pieces, struck in Western Denmark, do not, on an average, weigh more than 11·468 grains = 0·743 grammes = 13·008 æs. Hence it would appear that the normal or mark weight corresponded with that which has already been pointed out for the Danish mark employed at an earlier period in England of 2880 grains, for the $\frac{1}{24}$ of this is 12 grains. The average of Hardeknut's heavier coins approaches, on the contrary, the $\frac{1}{24}$ of the Tower mark. There is nothing singular in another mark weight having been in use in Western from that in Eastern Denmark. Something of the same kind has taken place elsewhere in different other countries nearly down to our own times.

The average of the coins of Magnus the Good, so far as they were struck in Eastern Denmark, approaches that of the coins of Hardeknut, for they contain 15·36 grains = 0·995 grammes = 17·427 æs. Those which belong to Western Denmark are found to weigh 11·04 grains = 0·715 grammes = 12·52 æs.

The average weight of the pennies of Sven Estrithssön is 15·12 grains = 0·979 grammes = 17·15 æs—that is to say, those from Eastern Denmark. Those of the Western portion of the country contain 12·07 grains = 0·782 grammes = 13·69 æs.

It appears that under the two last-named kings the normal weight for the coinage was about the same as under Hardeknut; but the weight of the pennies, particularly those struck in Eastern Denmark, as well as their purity, began to diminish, and under the succeeding Danish kings this was carried to a still greater extent.

3. THE SWEDISH COINAGE WEIGHT.

Whilst the pennies of the Danish and Norwegian kings contemporary with Æthelred II., like his own, about correspond with the weight of the Tower penny, the coins of the Swedish Olaf Scötkonung differ from them, as they contain, on an average 32·97 grains = 2·135 grammes = 37·140 æs. They seem, therefore, struck on another standard, or such as would be about one-half heavier than the Tower pound, provided that in like manner 240 of these pennies were struck from the heavier pound. In Sweden, however, they reckoned already at an early date, not as in Norway and Denmark, 240, but only 192 pennies to the mark, and were this the Stockholm mark, and of the same weight as at a later period (in the fourteenth century)—3221·25 grains = 208·6 grammes = 3563·8666 æs—then its 192nd part would be 16·777 grains = 1·086 grammes = 19·03 æs. The double of this would be 33·554 grains = 2·172 grammes = 38·06 æs, or nearly the average weight of fifty pieces of Olaf Scötkonung's coinage; but as the weight of individual pieces varies between 22·8 grains = 1·480 grammes = 25·92 æs and 50·85 grains = 3·254 grammes = 56·99 æs, it is not impossible that their weight was judged of by the eye alone, and without any fixed standard. The coins of Olaf Scötkonung are also larger in diameter than those of Æthelred II. They are for the

most part struck like that king's type C, but others like his type D, in Hildebrand.

Olaf's son and successor, Anund Jacob, like Knut the Great in the later years of his reign, and following his example, issued pennies which only weigh about half those of Olaf. The pieces which are extant of Anund Jacob thus weigh only 16·45 grains = 1·065 grammes = 18·66 æs on an average, which is much the same as the weight of Knut's later coins and those of his immediate English successors. The types of Anund Jacob's coins are like Æthelred's types A and D.

At a later date in Sweden there appear to have been numerous kinds of weight. Thus there are mentioned: *pondus Suecanum*, *pondus regni nostri*, *pondus legale regis nostri*, *pondus Gotenense sive Gotlandiæ*, *pondus Stockholmense*, *pondus Lydosiense*, and *pondus de Scaris*.⁸³ The Gottland or Wisby mark held, according to Kruse, in his "Necrolivonica," 207·16 grammes = 3,198·8 Troy grains = 3,628·4 æs. The Skara mark contained 214·747 grammes = 3,316 grains = 3,761·33 æs.⁸⁴

4. THE NORWEGIAN COINAGE WEIGHT.

Of Olaf Tryggvesson, the first who struck coins in Norway, there existed in the last century in Sweden a penny, now lost, the size of which, to judge from drawings, was like that of the common coins of Æthelred, Hildebrand's type C. The weight may also be considered to have

⁸³ Nordström, p. 218, with Joh. de Serone and B. de Ortolis *Regnskaber over Indtægter til Pavestolen* in 1827 and 1828. According to these accounts, the Stockholm and Upsala weights were alike.

⁸⁴ Schive *Norges Mynter i Middelalderen*, with introduction by Holmboe, p. lxxiii. Lit. K.

been about the same as that of an English penny of that king; for Olaf had on his Viking expedition an excellent opportunity for such an imitation, and besides, his moneyer was an Englishman. Both the coins, which may with probability be assigned to Erik Haakonssön Jarl, and of which the one weighs 21·57 grains = 1·397 grammes = 24·47 æs, may likewise be considered to have been struck after Æthelred's standard, or at $\frac{1}{16}$ of the Tower pound. The pennies, on the contrary, which may be ascribed to Erik's son, Haakon Jarl the Younger, differ both in size and weight from the English, but closely resemble those of Olaf Scötkonung in both respects;³⁵ for an average of six pieces gives 33·22 grains = 2·151 grammes = 37·68 æs, and it may be considered that they were struck by a Swedish moneyer in Norway or in Sweden on Haakon's account.³⁶

The average of six pennies which may be assigned to Olaf the Holy is 21·987 grains = 1·424 grammes = 24·94 æs, or nearly $\frac{1}{16}$ of the Tower pound. It is true that the weight of the most certain of these pennies, the reverse of which is like Æthelred's type D, is only 19·07 grains = 12·35 grammes = 21·63 æs; but then such a deviation from the Tower penny occurs frequently in the coins of the English kings, and may be ascribed to the imperfection of the preparation of the blanks. The pennies of Olaf the Holy are like Æthelred's type D, as has already been remarked, and besides like A and E of Knut the Great. A few are in imitation of Æthelred's type G. From Olaf's death, in 1030, and until the reign in common

³⁵ They are also principally found in Sweden. See Norges Mynter, pp. 12 and 13.

³⁶ These coins—both Olaf Tryggvesson's and Erik Jarl's—are all of Æthelred's type C.

of his son, Magnus the Good, and the uncle of the latter, Harold Haarderaade, in 1046, there was no Norwegian coinage. The few pieces of the two together which have been discovered have been already cited, and their weight described. Their type is different from the English. As sole monarch from 1047, Harold Haarderaade at first struck good coins, like his predecessors; but this was soon changed, and his pennies coined of bad alloy, as has been already shown where their weight is stated. The average of the coins that are known, good and bad, 60 pieces, is found to be 13·431 grains = 0·869 grammes = 15·235 æs. Harold's pennies are, therefore, as a whole, heavier than the West Danish, and lighter than the East Danish and contemporary English coins, from which also they differ in type. Their weight corresponds nearest to $\frac{1}{16}$ part of what is discovered to be the value of the Norwegian weight mark in the Middle Ages, and concerning which we have the following data:—

1. Two of the so-called payment rings (Betalings ringe) of gold found in Norway in the year 1860, and on each of which there are stamped at the one end three small circles, which in all probability betokened the value of 3 öre, which also agrees with other and foreign weights. Of these

	Grains.	Grammes.	Æs.
the one ring weighed =	1251·874 =	81·086 =	1420
so that the öre is =	417·274 =	27·022 =	473·333
and one mark ³⁷ =	3338·328 =	416·131 =	3786·6666
the other ring weighed =	1247·47 =	80·78 =	1·415
so that the öre is =	415·823 =	26·93 =	471·6666
And the mark =	3326·584 =	215·430 =	3773·3333
2. According to the Papal collector			
Huguitios' reckoning, delivered			
to the Court in 1286, a Norse			
mark ³⁸ =	3333·333 =	215·857 =	3780·9975

³⁷ Forhandler i Videnskabs Selskabet i Christiania, Aar, 1864, pp. 103—106. These rings are supposed to have been deposited in the earth in the last century of heathendom.

³⁸ Introduction to Norges Mynter i Middelalderen, p. 72.

	Grains.	Grammes.	Æs.
3. According to the account of the collectors, Johannes de Serone and Bernard de Ortolis, rendered to the Papal chair in 1327-28 the same mark ³⁹ =	3334·946 =	215·961 =	3782·8266
4. According to the Ny Danske Magasin, 6th vol., p. 329, an old Norse mark = 14 $\frac{2}{3}$ Cologne lod, or	3328·927 =	215·572 =	3776·0000
Together	16662·118 =	1079·001 =	18899·8241
Average	3332·424 =	215·80 =	3780 ⁴⁰
1 öre	416·553 =	26·975 =	472·5
1 örtug = $\frac{1}{2}$ öre	138·851 =	8·992 =	157·5
1 penny = $\frac{1}{10}$ örtug	13·885 =	0·8992 =	15·75

To the last of the above-mentioned values, or that of the penny, the coins of Harold Haarderaade very nearly correspond, and he may have adopted the Norwegian weight mark for purposes of coining. The weights assigned for the mark and öre are corroborated by some weights found in Ringerige in Norway,⁴¹ which, however, by comparison with the foregoing results, seem to have lost by lying in the earth so much, that the öre is 3·964 grains, and the mark 31·708 grains less than these results, being 412·589 grains = 26·718 grammes = 468 æs, and 3300·716 grains = 213·745 grammes = 3744 æs, respectively.

Of all the denominations of weight, the ounce, which may have been introduced among us earlier than Christianity, and here in the North was called the öre, is that which has been most widely disseminated among different nations.⁴² On this was founded the higher

³⁹ Introduction to Norges Mynter i Middelalderen, p. 72.

⁴⁰ With perfect accuracy 8779·96488181 æs., so that the mark is so near to the divisible number 3780 that I have adopted it for this purpose.

⁴¹ See Nordisk Tidsskrift for Oldkyndighed, vol. i., p. 401, and Holmboe Das Älteste Münzwesen Norwegens, in Köhns Zeitschrift für Münz. Siegel und Wappenkunde, vi. Jahrgang. Berlin, 1846.

⁴² Holmboe, On the Origin of the Scandinavian Weight System

denomination of the mark, which was 8 öre, while in Southern and Western Europe 12 ore were called a pound. The öre, or ounce, was somewhat different; not only in different countries, but also in provinces belonging to one and the same country, they might be unlike, and this may likewise partially have been the case in Norway. Still the correspondence between the above given data is in the highest degree remarkable. As the oldest (No. 1) gives, on an average of the two rings, 416·557 grains = 26·975 grammes = 472·5 æs for the öre. Another instance, perhaps as old, but less, in consequence of the weights having lain so many centuries in the earth, 412·589 grains = 26·718 grammes = 468 æs. The latest (No. 4) gives 416·116 grains = 26·948 grammes = 472 æs; and the two (Nos. 2 and 3) which, so far as age goes, stand between the earliest and the latest, show so trifling an amount more for the öre than these, being respectively 416·66 and 416·868 grains, that the difference may be regarded as a vanishing quantity. It seems impossible that the correspondence between so many indications can have been accidental; but it may rather be accepted that the öre has, if not universally, yet still in many parts of the country, remained almost absolutely unaltered through many centuries.⁴³ Another remarkable circumstance in connection with the old Norwegian öre thus discovered is its striking correspondence with the Byzantine or Græco-Roman ounce, which, according to Sabatier, contained⁴⁴

in the Middle Ages; in Christiania Videnskabs Selskabets Forhandlinger for the year 1861, p. 105.

⁴³ An analogous example is cited by Ruding, vol. I. p. 102. According to him, the Cologne ounce of the present day is of the same weight as a standard stamped at Strasburg in the year 1288. Holmboe, l. c., p. 8 (note).

⁴⁴ Revue Numismatique, 1869, p. 20.

27 grammes = 416·917 grains = 472·9 æs. The Græco-Roman pound of 12 ounces would thus contain 324 grammes = 5003 grains = 5674·86 æs, and 8 ounces = 216 grammes = 3335·336 grains = 3783·24 æs. These values of the pound and ounce are deduced by Sabatier from four Byzantine weights of the early Middle Ages, preserved in the Museums of London⁴⁵ and Paris.

There is, therefore, ground to believe that commercial or other relations at an earlier period than the reception of Christianity in the North led to the introduction of the Byzantine ounce into our country, and it is, moreover, probable that Harold Haarderaade also brought with him from Greece the previously known weight for the öre, that he used it in dividing his treasures with Magnus the Good, and established it as a legal standard for a long period, during which it may have undergone small local changes, but has still been preserved in such a manner, in various parts of the country, that it has been possible for its right value to be again ascertained.

C. J. SCHIVE.

⁴⁵ Holmboe, in the *Videnskabs-Selskabets Forhandling* for 1864. The author of the present paper has had occasion to ascertain the weight of thirty-four Byzantine gold solidi, of which six should go to the ounce. On an average each weighed 67·218 grains Troy = 4·853 grammes = 76·248 æs. As the $\frac{1}{8}$ ounce contained 69·486 grains = 4·5 grammes = 78·88 æs, each solidus appears to be 2·268 grains lighter than it should be, which is probable enough, as many of them have lost by wear, or perhaps they were struck a little under weight.