

Appendix 1: The Tonnage of Goods Shipped in Continental Trade

To calculate the level of demand for shipping generated by Bristol's declared Continental trade, it was necessary to translate the quantities of goods provided in the customs accounts into tonnage estimates. By the late Middle Ages, the ton of shipping capacity had become established as the long-ton of 2,240 lbs. or 40 cubic foot of shipping capacity.¹ If a ton-weight of cargo occupied 40 cubic foot or less it was rated by weight, if it occupied more than this it was rated by volume. The following appendix provides the tonnage estimates of all the goods transported by ships trading between Bristol and the Continent over the three year period covered by the surviving customs accounts of the 1540s. Although the list is a long one, most of the items detailed here are only mentioned a few times and accounted for a tiny proportion of total tonnages shipped. The reality of the Bristol shipping industry of the sixteenth century, like that of the English shipping industry of the seventeenth to eighteenth centuries, was that it was dominated by the shipment of a very narrow range of heavy and bulky commodities.² For the present study this is an advantage, since it means that any errors made in estimating the tonnage of the more obscure items which appear on the list would have a negligible impact on the total level of demand.

The descriptions are laid out as follows:

Commodity name (*name as it appears in the customs accounts*) – Commodity unit
Discussion of tonnage of goods.
Tonnage per unit; number of entries in customs account; total tons laded.

Almonds (*almonds*) – C

Assumed 'C' refers to cwt.

Unit = 0.05 tons; Number entries = 1; Total = 0.025 tons

Alum (*alam*) - C

Assumed 'C' refers to cwt.

Unit = 0.05 tons; Number entries = 14; Total = 9.58747 tons

Anchor (*anker*) - piece

Valued at 5s in the customs account. Since iron was valued at 50s. per ton, it was assumed that a piece weighed 0.1 tons.

Unit = 0.1 tons; Number entries = 1; Total = 0.1 tons

¹ F. C. Lane, 'Tonnages, Medieval and Modern', *Economic History Review*, XVII (1964), pp. 219-20.

² R. Davis, *The Rise of the English Shipping Industry* (Newton Abbot, 1962), p. 181.

Aniseed (*annes / annes sede*) – doz

Assumed a ‘doz’ refers to 12 lbs.

Unit = 0.00536 tons; Number entries = 14; Total = 6.71868 tons

Beans (*fabar*) – quarter (48 bushels = 6 quarters = 1wey)

Contemporary estimates suggest that 5 quarters of wheat were equivalent to one tun of Bordeaux wine for shipping purposes.³

Unit = 0.2 tons; Number entries = 1; Total = 6 tons

Bells (*campanam*) - piece

Valued at £1.

Unit = 0.25 tons; Number entries = 1; Total = 0.25 tons

Box-wood for combs (*box pro pecten*) – C pieces

Valued at 2s. per hundred pieces. Assumed 0.2 cubic foot per hundred pieces.

Unit = 0.005 tons; Number entries = 1; Total = 0.02999 tons

‘Bomy Candarn’ - C

Unidentified commodity, assumed ‘C’ refers to cwt.

Unit = 0.05 tons; Number entries = 1; Total = 0.75 tons

Canes (*canes*) - C

These were probably wooden drinking-vessels, sold by the piece.⁴ Assumed a hundred occupied 5 cubic foot.

Unit = 0.125 tons; Number entries = 4; Total = 8.5 tons

Capers (*capers*) – doz

Assumed a ‘doz’ refers to 12 lbs.

Unit = 0.00536 tons; Number entries = 1; Total = 2.144 tons

Cassia Fistula (*cassa fystula*) - doz

A senna derived laxative. Assumed that a ‘doz’ refers to a 12 lbs.

Unit = 0.00536 tons; Number entries = 1; Total = 0.64319 tons

Cloth

The best figures on the weights of sixteenth century cloths come from a 1551 ‘Acte for the makeing of wollen clothe’.⁵ This legislation throws considerable light on the size and weight of the fabrics that accounted for the vast majority of Bristol’s cloth trade. However, the Act does not mention all the cloths listed in the customs accounts. In those cases where better information about the size or weights of cloths is unavailable, it has been necessary to adopt certain default assumptions about the cloth. These assumptions are that cloths paying poundage were 1 yard wide and weighed 1.5 lbs. per square yard. This roughly tallies with the figures of weights and widths provided in the Act of 1551 for other cloths paying poundage. If there is no information about the length of given cloths, the default assumption is that they were 25 yards long. Although these assumptions provide only rough estimates of the weight of the given cloths, they are accurate enough for present purposes

³ D. Burwash, *English Merchant Shipping 1460-1540*, p. 94.

⁴ T. S. Willan (ed.), *A Tudor Book of Rates* (Manchester, 1962), p. 13.

⁵ *Statutes of the Realm*, Vol. IV, i, (London, 1819), pp. 136-7.

since such cloths accounted for only a minute proportion of the total cloth shipped into or out of Bristol.

Once the weight of cloth has been estimated it is necessary to calculate how many tons burden a ton of cloth would have occupied. This is necessary because a ton-weight of cloth would have occupied more than 40 cubic feet of shipping space. Although this issue is difficult to determine precisely, the information available on broadcloths suggest that a ton of broadcloth probably occupied around 2.5 tons burden. In the following analysis the same multiplier is adopted for all cloth. This should be roughly accurate, given that before the introduction of bale-presses in the 18th century a ton-weight of raw cotton occupied three tons of shipping capacity.⁶

Cloth, Canvas (*canvas*) – bolt

Valued at 13s. 4d. per piece. The price suggests this was 53 ells long – see below.

Unit = 0.05088 tons; Number entries = 2; Total = 1.2211 tons

Cloth, Canvas (*canvas*) – ell

Valued at 3d. per ell. The Tudor *Book of Rates* notes that 2,600 ells of canvas weighed one ton.⁷ This implies one ell weighed 0.86 lbs.

Unit = 0.00096 tons; Number entries = 13; Total = 6.66806 tons

Cloth, Canvas (*canvas*) – fardel

Valued at £2 per fardel. The price suggests this was 160 ells long – see above.

Unit = 0.1536 tons; Number entries = 1; Total = 0.15360 tons

Cloth, Canvas: Finer (*fyner canvas*) – ell

Valued at 4d. per ell. It was assumed that this was the same weight as ordinary canvas.

Unit = 0.00096 tons; Number entries = 2; Total = 0.92159 tons

Cloth, Canvas: Breton White (*whyte bryttyshe*) – ell

Valued c. 5d. per ell. It was assumed that this was the same weight as ordinary canvas.

Unit = 0.00096 tons; Number entries = 1; Total = 0.01439 tons

Cloth, Canvas: Holland (*holen'*) – ell

Valued at 3.33d. per ell. It was assumed that this was the same weight as ordinary canvas.

Unit = 0.00096 tons; Number entries = 1; Total = 0.04608 tons

Cloth, Canvas: Oleron (*olron*) – piece

Valued at 6s. 8d. per piece. In the 1558 *Book of Rates*, it is noted that 100 ‘Oulderons’ weighed one ton, implying that each weighed 22.4 lbs.⁸

Unit = 0.025 tons; Number entries = 1; Total = 0.2 tons

⁶ R. Davis, *The Rise of the English Shipping Industry* (Newton Abbot, 1962) p. 179.

⁷ Willan (ed.), *A Tudor Book of Rates*, pp. 84-85.

⁸ Willan (ed.), *A Tudor Book of Rates*, pp. 84-85.

Cloth, Canvas: Poldavis (*poldavy*) – piece

Valued at 10s. per piece. In the 1582 *Book of Rates*, it is noted that 100 Poldavis weighed one ton, implying that each weighed 22.4 lbs.⁹

Unit = 0.025 tons; Number entries = 6; Total = 3.075 tons

Cloth, Canvas: Vitry (*viteri canvas*) – bale

Valued at 30s. per bale. Based on the price, it was assumed this was 120 ells long.

Unit = 0.0052; Number entries = 1; 0.0416 tons

Cloth, Linen Irish (*pan' linen hiben'*) – yard

Valued c. 2d. per yard. This item is listed here because it was carried on a ship that appears to have stopped-off in Ireland on-route between the Continent and Bristol – See Appendix 4. It was assumed that it weighed the same as an ell of canvas.

Unit = 0.00096 tons; Number entries = 1; Total = 0.1728 tons

Cloth, Linen Scottish (*pan' linei scot'*) – yard

It was assumed that that it weighed roughly the same as an ell of canvas.

Unit = 0.00096 tons; Number entries = 1; Total = 0.048 tons

Cloth, Lining Narrow (*narrow lynnyng*) – piece

Valued 4s. 2d. and 10s. a piece. The default assumptions for cloth weights were adopted.

Unit = 0.04185 tons; Number entries = 2; Total = 0.7533 tons

Cloth, Lining (*lynnyng*) – piece

Valued £1 a piece. The default assumptions for cloth weights were adopted.

Unit = 0.04185 tons; Number entries = 1; Total = 0.29295 tons

Cloth, Lining Yellow (*yellow lynnyng*) – piece

Valued 13s. 4d. a piece. The default assumptions for cloth weights were adopted.

Unit = 0.04185 tons; Number entries = 1; Total = 0.20925 tons

Cloth, Lining Yellow (*yellow lynnyng*) – yard

Valued 7 d. per yard. The default assumptions for cloth weights were adopted.

Unit = 0.00167 tons; Number entries = 1; Total = 0.02008 tons

Cloth, Tissue (*cloth de tyssewe*) - yard

Valued at £2 per yard. The default assumptions for cloth weights were adopted.

Unit = 0.00167 tons; Number entries = 1; Total = 0.03757 tons

Cloth, Woollen - Cloth of Assize

The vast majority of Bristol's cloth trade consisted of the export of English woollen cloth. Since English woollens took many shapes and forms, most were rendered in the customs accounts in terms of nominal cloths of assize. Such nominal cloths paid the ancient custom of 14d. for each cloth exported by indigenous merchants. Cloths of assize were normally described as '*pann' sine grano*'. However, they were also sometimes listed as '*dozens*' and '*straits*'. *Dozens* were half the length of a full cloth, *straits* were half the width. The Bristol customs accounts indicate that the cloth of assize was 24 yards long. This tallies with the figures given in the *Noumbre of Weyghts* that a finished broadcloth was 24 yards long and 2

⁹ Willan (ed.), *A Tudor Book of Rates*, pp. 84-85.

yards wide. The weight of such a cloth can be determined from the 1551 'Acte for the makinge of wollen clothe'.¹⁰ The full broadcloths listed in the Act weighed between 68 and 90 lbs. Assuming that a cloth of assize was about midway between these extremes would make a cloth of assize about 80 lbs.¹¹ The number of ship tons this would have occupied can be determined by working backwards from what knowledge exists about the thickness of English Broadcloth. The best indicator of this comes from a merchant contact of 1458 which has three fragments of well-preserved English broadcloth pinned to it as samples. These fragments are between 1.5 and 2.0 mm. thick, indicating that broadcloth was, by modern standards, a very heavy and exceptionally dense cloth.¹² If it is assumed that the typical broadcloth was 2 mm. thick, the volume of a cloth of assize, weighing 80 lbs. (0.0357 tons), would have been 2.83 cubic foot (0.708 tons). This would indicate that one ton of cloth occupied two ships-tons. However, since space would have been lost in packing and stowage, it seems fairer to assume that one ton-weight of broadcloth occupied 2.5 ship-tons.

Cloth, Woollen: Cloth of Assize, standard size (*pann' sine grano, pan' s' g'*) – piece

This is the standard woollen cloth discussed above.

Unit = 0.08929 tons; Number entries = 332; Total = 507.29271 tons

Cloth, Woollen: Cloth of Assize, Dozen (*doz s' g'*) – piece

This was half the length of the standard cloth.

Unit = 0.04465 tons; Number entries = 2; Total = 0.26788 tons

Cloth, Woollen: Cloth of Assize, Dozen Straight (*doz strait s' g'*) – piece

This was half the length and half the width of the standard cloth.

Unit = 0.02232 tons; Number entries = 16; Total = 2.47745 tons

Cloth, Woollen: Cloth of Assize, Dozen Northern (*doz northern*) – piece

Since it paid the same custom as the standard Dozen it was assumed to be the same size. Unit = 0.04465 tons; Number entries = 2; Total = 0.53578 tons

Cloth, Woollen: Cloth of Assize, Long (*pan' sine g'no longos*) – piece

It was assumed to be 30% longer than the standard cloth.

Unit = 0.11608 tons; Number entries = 1; Total = 0.23216 tons

Cloth, Woollen: Cloth of Assize, Straight Northern (*streit northern*) – piece

Since it paid custom of 7d. per piece, it was assumed to be the same size as the standard straight cloth.

Unit = 0.04465 tons; Number entries = 4; Total = 3.39337 tons

Cloth, Woollen: Brecon (*pan' Brecknock*) – piece

Valued at £1 per cloth. The default assumptions for cloth weights were adopted.

Unit = 0.04185 tons; Number entries = 4; Total = 0.5859 tons

¹⁰ *Statutes of the Realm*, Vol. IV, i, (London, 1819), pp. 136-7.

¹¹ The finished weights of full broadcloths in the Act are: Kent / Sussex / Reading - 90 lbs.; Long Worcester / Coventry - 84 lbs.; Coloured Worcester / Coventry - 80 lbs.; Suffolk / Norfolk / Essex Long cloths - 80 lbs.; Broad Wiltshire Coloureds- 68 lbs.; Wiltshire, Somerset and Gloucestershire Whites - 68 lbs. : *ibid* Although the Act also specifies the length and breadth of the cloths, these should be treated with care, since the dimensions mentioned concern un-finished cloths.

¹² P. Wolff, 'Three samples of English fifteenth-century cloth', in N. B. Harte and K. G. Ponting (eds.), *Cloth and Clothing in Medieval Europe* (London, 1983), pp. 120-25.

Cloth, Woollen: Bristol White (*Bristol white*) – piece
The default assumptions for cloth weights were adopted.
Unit = 0.04185 tons; Number entries = 1; Total = 0.04185 tons

Cloth, Woollen: Check (*chek, chekers*) – yard
An Irish product that is included here because it is listed on two ships that appear to have stopped in Ireland on-route between the Continent and Bristol – see Appendix 4. The default assumptions for cloth weights were adopted;
Unit = 0.00167 tons; Number entries = 7; Total = 1.12387 tons

Cloth, Woollen: Cotton Manchester (*manchester cotten, manchesturs*) – piece
Valued 10s. a piece. This was by far the most common cloth among cloths paying poundage. The Act of 1551 stipulated that Manchester / Lancashire / Cheshire Cottons should be 22 yards long, a yard wide and weigh 30 lbs., making them 1.36 lbs. per square yard.¹³
Unit = 0.03348 tons; Number entries = 72; Total = 130.40436 tons

Cloth, Woollen: Cotton Northern (*northen cotten*) – piece
Valued 4s. 2d. a piece. It was assumed that it was the same weight as a Manchester Cotton.
Unit = 0.03348 tons; Number entries = 17; Total = 13.49241 tons

Cloth, Woollen, Dozen Straight Welsh (*doz strait welsh*) – piece
The name suggests this was 12 yards long and 1 yard wide. The default assumptions for cloth weights were adopted on this basis.
Unit = 0.02004 tons; Number entries = 7; Total = 0.92180 tons

Cloth, Woollen, Dozen Western (*doz western*) – piece
The name suggests this was 12 yards long and 1 yard wide. The default assumptions for cloth weights were adopted on this basis.
Unit = 0.02004 tons; Number entries = 3; Total = 1.68333 tons

Cloth, Woollen: Dunster (*dunster*) – piece
Valued at 10 s. per cloth. The default assumptions for cloth weights were adopted.
Unit = 0.04185 tons; Number entries = 20; Total = 7.86776 tons

Cloth, Woollen, Flannel (*flannel*) – yard
Valued at 6 d. per yard. The default assumptions for cloth weights were adopted.
Unit = 0.00167 tons; Number entries = 1; Total = 0.5009 tons

Cloth, Woollen, Flannel (*flannel*) – ell
Valued at 6 d. per yard. Assuming 1.25 yards to the English ell, the default assumptions for cloth weights were adopted.
Unit = 0.00209 tons; Number entries = 1; Total = 0.05225 tons

Cloth, Woollen: Frieze (*fryse*) – yard
Valued 4 d. per yard. The default assumptions for cloth weights were adopted.
Unit = 0.00167 tons; Number entries = 1; Total = 0.02003 tons

¹³ *Statutes of the Realm*, Vol. IV, i, (London, 1819), p. 137.

Cloth, Woollen: Frieze Bristol (*Brystol fryse*) – piece
Valued 13s. 4d. per yard. The default assumptions for cloth weights were adopted.
Unit = 0.04185 tons; Number entries = 36; Total = 7.99331 tons

Cloth, Woollen: Frieze Double (*doble fryse*) – piece
Valued £2 a piece. The default assumptions for cloth weights were adopted.
Unit = 0.04185 tons; Number entries = 1; Total = 0.2511 tons

Cloth, Woollen: Frieze Fletchers (*Fletchers fryshe*) - ell
The default assumptions for cloth weights were adopted.
Unit = 0.00209 tons; Number entries = 1; Total = 0.00209 tons

Cloth, Woollen: Molton (*molton*) – piece
Valued at 4s. 2d. a piece. The default assumptions for cloth weights were adopted.
Unit = 0.04185 tons; Number entries = 3; Total = 0.7533 tons

Cloth, Woollen: Molton and Tavestock (*tavestock & molton*) - piece
Valued at 4s. 2d. a piece. The default assumptions for cloth weights were adopted.
Unit = 0.04185 tons; Number entries = 1; Total = 13.392 tons

Cloth, Woollen: Motley (*motley*) – piece
Valued at £1 a piece. The default assumptions for cloth weights were adopted.
Unit = 0.04185 tons; Number entries = 1; Total = 0.1674 tons

Cloth, Woollen: Stolorn (*pan' stolorn*) – piece
Valued at 10s. 4d. a piece. The default assumptions for cloth weights were adopted.
Unit = 0.04185 tons; Number entries = 1; Total = 0.04185 tons

Cloth, Woollen: Tavestock (*tavestock*) – piece
Valued once at 2s. 2d. and once at 4s. 2d. The default assumptions for cloth weights were adopted.
Unit = 0.04185 tons; Number entries = 2; Total = 1.71585 tons

Cloth, Woollen: Welsh (*pan' wall', walsh*) – piece
Valued at £1 a piece. The default assumptions for cloth weights were adopted.
Unit = 0.04185 tons; Number entries = 45; Total = 9.71228 tons

Cloth, Woollen: Wodnall (*wodnoll*) – piece
Valued at between 10s. and 15s. a piece. The default assumptions for cloth weights were adopted.
Unit = 0.04185 tons; Number entries = 3; Total = 0.54405 tons

Cloth, Woollen: Wodnall & Flannel (*wodnoll & flannel*) – ell
Valued at 4d. per ell. Assuming 1.25 yards to the ell, the default assumptions for cloth weights were adopted.
Unit = 0.00209 tons; Number entries = 1; Total = 0.08359 tons

Cloth, Woollen: Wodnall & Flannel (*wodnoll & flannel*) – piece

Valued at 12s. 6d. and 20s. 9d. a piece. The default assumptions for cloth weights were adopted.

Unit = 0.04185 tons; Number entries = 2; Total = 0.69052 tons

Cloth, Woollen: Worsted (*worsted*) - piece

Valued at £1 per piece. The default assumptions for cloth weights were adopted.

Unit = 0.04185 tons; Number entries = 2; Total = 0.10462 tons

Coal (*carbon*) – wey (4weys = 1 last)

Valued at 3s. 4d. per wey. The wey of coal employed by the Bristol customs officers was roughly one ton.¹⁴

Unit = 1 ton; Number entries = 22; Total = 384.5 tons

Conserves (*consewes*) – C

Assumed 'C' refers to cwt.

Unit = 0.05 tons; Number entries = 1; Total = 0.025 tons.

Cork (*corke*) - doz

It was assumed a 'doz' refers to 12 lb. Since a ton of cork occupies the same space as 8-10 tons of water, this was assumed to occupy 0.05 tons.¹⁵

Unit = 0.05 tons; Number entries = 1; Total = 2.5 tons

Dates (*dats*) – C

Assume 'C' refers to cwt.

Unit = 0.05 tons; Number entries = 1; Total = 0.05 tons

Feathers, Down (*plumar*) – C

Valued 13s. 4d. per C. It was assumed 'C' refers to cwt. Since down-feathers would be very bulky commodity it was assumed a cwt. of down occupied 10 cubic foot.

Unit = 0.25 tons; Number entries = 1; Total = 1.25 tons

Feathers (*fethers*) – bag

Valued 13s. 4d. Since a cwt. of feathers is valued 10s. per cwt., this was assumed to occupy 13.33 cubic foot.

Unit = 0.33333 tons; Number entries = 1; Total = 0.33333 tons

Feathers (*fethers*) – C

Valued 10s. per C. It was assumed a 'C' refers to cwt. and that a cwt. of feathers occupied 10 cubic foot.

Unit = 0.25 tons; Number entries = 1; Total = 2.25 tons

Figs (*fyggs*) - ton (1 ton = 40 pieces)

Unit = 1 ton; Number entries = 5; Total = 40.75 tons

Figs and Raisins (*fyggs & resyngs*) – ton

Unit = 1 ton; Number entries = 2; Total = 0.60829 tons

¹⁴ J. U. Nef, *The Rise of the British Coal Industry*, Vol. II (London, 1932), p. 373.

¹⁵ R. Davis, *The Rise of the English Shipping Industry* (Newton Abbot, 1962), p. 179.

Fish, Newfoundland (*pisc' de nova terra*) - hundred pieces

Stockfish was sold by the long hundred of 120 fish. In the mid-18th century the mean size of live Newfoundland Cod was 10 lbs.¹⁶ At that time Newfoundland fish were still line-caught (as they had been in the sixteenth century) and the Grand Banks had yet to experience the over-fishing that led to a reduction in mean fish sizes during the twentieth century. It therefore seems reasonable to assume that the mean size of sixteenth century Newfoundland fish was also about 10 lbs. The fish listed in the Bristol accounts generally came on French ships, which then dominated the Newfoundland fisheries. They would probably have been transported to France as 'green' fish and then dried there before being exported to England.¹⁷ The weight ratio of dried stockfish to live fish is 4.8:1.¹⁸ The mean weight of the Newfoundland fish appearing in the accounts would thus have been about 2 lbs. and a long-hundred would thus have weighed 240 lbs.

Unit = 0.10714 tons; Number entries = 4; Total = 82.2835 tons

Fish, Salmon (*salmon*) – pipe

An export from Bristol to the Continent. The pipe of salmon was 84 gallons.

Unit = 0.333 tons; Number entries = 1; Total = 2.33333 tons

Flax (*flaxe*) – doz

It was assumed a 'doz' refers to 12 lbs.

Unit = 0.00536 tons; Number entries = 1; Total = 0.01339 tons

Frankincense (*frankensens*) - doz

It was assumed a 'doz' refers to 12 lbs.

Unit = 0.00536 tons; Number entries = 2; Total = 0.29478 tons

Fruit (*fructe*) – ton

Unit = 1 ton; Number entries = 28; Total = 260.41316 tons

Ginger (*gynger*) - lb.

Unit = 0.00045 tons; Number entries = 2; Total = 0.02339 tons

Graynes – lb.

This was a red dye.

Unit = 0.00045 tons; Number entries = 1; Total = 0.0675 tons

Hides, Kip (*kypp*) – dicker (1 dicker = 10 hides)

These are tanned hides from juvenile cattle. Since they were taxed at half the rate of the normal hides, it was assumed they were half the weight.

Unit = 0.08929 tons; Number entries = 13; Total = 3.918 tons

¹⁶ B. Winsor, 'Historical sizes of Northern Cod' (unpublished paper, Memorial University, Newfoundland).

¹⁷ H. A. Innis, *The Cod Fisheries: The History of an International Economy* (Toronto, 1954), p. 50.

¹⁸ Canadian Department of Fisheries and Oceans, *The Statistical Co-ordination Committee of the Atlantic Coast Standard Conversion Factors, All Species*, Document No.2, Revision No.1 (June 1984).

Hides, Tanned (*corrior' tannat'*) – dicker (1 dicker = 10 hides)

Modern cow / steer hides weigh about 55-65 lbs.¹⁹ However, while the average withers height of Tudor cows was only 1.22 metres, most modern breeds are considerably larger than this.²⁰ For instance, Britain's most common dairy cow, the Friesian, averages 1.33 metres / 600 kg when fully mature, while the most common beef cow, the Hereford, averages 1.30 m / 540 kg.²¹ Among modern breeds from the British Isles, the closest in height to the Tudor cows is the Irish Kerry, average 1.22 m / 375 kg.²² Since this is only about two-thirds the size of the most common breeds, it was assumed that cow or steer hides in mid-sixteenth century Bristol would have weighed about 40 lbs. This would make a dicker 400 lbs.

Unit = 0.17871 tons; Number entries = 95; Total = 260.41316 tons

Honey (*Mellis*) - tun

Unit = 1 ton; Number entries = 3; Total = 10.333 tons

Hops (*hopps*) – C

It was assumed a C is a cwt.

Unit = 0.05 tons; Number entries = 1; Total = 0.1 ton

Iron (*ferris*) – ton

The late fifteenth century *Noumbre of Weyghtes* states that there were 112 lb. to a cwt. of iron and 20 cwt. to the ton. This was still true in the early seventeenth century.²³

Unit = 1 ton; Number entries = 86; Total = 2095.41644 tons

Lead (*plu'be*) – ton

Unit = 1 ton; Number entries = 29; Total = 436.599 tons

Lead (*plu'be*) – fother

There were 19.5 royal fothers to a ton.

Unit = 0.975 tons; Number entries = 2; Total = 189.14998 tons

Lead, worked (*plu'be operat'*) – ton

Unit = 1 ton; Number entries = 82; Total = 467.66247 tons

Lemons (*lemons*) – thousand pieces

Valued at 3s. 4d. per thousand. A thousand modern lemons weigh c. 200 lbs.²⁴

Unit = 0.08929 tons; Number entries = 1; Total = 0.89289 tons

Lemons & Oranges (*lemmans & orenge*) – thousand pieces

Valued 3s. 6d. per thousand. Assuming an even mix of oranges and lemons, a thousand would weigh c. 300 lbs.

Unit = 0.13393 tons; Number entries = 1; Total = 1.3393 tons

¹⁹ 'Prices', *Leather*, March 1996, p. 64.

²⁰ S. J. M. Davis, *The Archaeology of Animals* (London, 1987), p. 178.

²¹ M. H. French, *European Breeds of Cattle*, Vol. I (Rome, 1966), pp. 120-25, 137-43.

²² *Ibid.*, pp. 151-55.

²³ H. Hall and F. J. Nicholas (eds.), 'Select tracts and table books relating to English weights and measures (1100-1742)', *Camden Miscellany*, Vol. XV (London, 1929), pp. 11, 24.

²⁴ F.A.O., *Production Yearbook*, Vol. 25 (1971), p. 725.

Lime (*lyme*) – ton

Unit = 1 ton; Number entries = 2; Total = 1.75 tons

Liquorice (*licoric'*) - doz

It was assumed a 'doz' was 12 lbs.

Unit = 0.00536 tons; Number entries = 6; Total = 3.85916 tons

Locks, small (*small locks*) - piece

It was assumed a piece weighed 1 lb.

Unit = 0.00045 tons; Number entries = 1; Total = 0.00449 tons

Mantles (*Mant'*) - piece

These are Irish woollen cloaks. It is listed here because one arrived on the *Conception* of Leusa on 20 January 1546, which appears to have stopped in Ireland while on-route between the Continent and Bristol – see Appendix 4. It was assumed a piece it occupied half a cubic foot of ship's space.

Unit = 0.0125 tons; Number entries = 1; Total = 0.0125 tons

Marmalade (*marmylad*) – lb.

When recorded by the 'C' or 'barrel' it was assumed that a C is a 112 lbs. and a barrel was 280 lbs.

Unit = 0.00045 tons; Number entries = 13; Total = 1.9152 tons

Masts, little (*lytyll masts*) - piece

Valued 1s. per mast. In the eighteenth century masts were divided into 'great', 'middle' and 'small' masts, small ones being 6-8 inches in diameter and 6-8 yards long.²⁵ Assuming the 'little' masts described here were 7 inches in diameter and 7 yards long, they would contain 5.7 cubic foot of timber. However since an additional allowance should probably be allowed for the awkwardness of stowing such objects, it is suggested that each mast occupied 10 cubic foot of cargo space.

Unit = 0.25 tons; Number entries = 1; Total = 5 tons

Mees Brode – piece

An unidentified commodity. Assumed a piece weighed a cwt.

Unit = 0.05 tons; Number entries = 1; Total = 0.2 tons

Oakum (*ocam*) – C

It was assumed a 'C' was cwt.

Unit = 0.05 tons; Number entries = 4; Total = 0.525 tons

Oars (*owres, ores*) – piece

Assumed two cubic foot a piece.

Unit = 0.05 tons; Number entries = 2; Total = 9 tons

Oil, Olive (*olei*) – tun

Unit = 1 ton; Number entries = 103; Total = 547.125 tons

²⁵ R. G. Albion, *Forests and Seapower* (Cambridge, Mass. 1926), pp. 28-29; H. S. Kent, 'The Anglo-Norwegian timber trade in the eighteenth century', *Economic History Review*, VIII (1955), p. 64.

Oil, train (*trayn*) - tun

Unit = 1 ton; Number entries = 7; Total = 9.205 tons

Olives (*oyle berries*) - C

Valued 4s. per C. It was assumed a C was a cwt.

Unit = 0.05 tons; Number entries = 1; Total = 0.25 tons

Olives (*oyle berries*) – little barrel

Valued once at 6s. 8d. and once at 1s. 8d. per little barrel. Assumed a little barrel weighed a cwt.

Unit = 0.05 tons; Number entries = 2; Total = 5.1 tons

Onions (*onyons*) - rope

A rope of onions contained 15 heads.²⁶ Assumed 10 lbs. per rope.

Unit = 0.00446 tons; Number entries = 1; Total = 0.669 tons

Oranges (*orynges, orenge*) - thousand pieces

Valued 3s. 4d. per thousand. A thousand modern oranges weigh c. 400 lbs.²⁷

Unit = 0.17857 tons; Number entries = 8; Total = 25.53545 tons

Orchil (*orchel*) – C (1 C = 8 stone)

Assumed C refers to cwt.

Unit = 0.05 tons; Number entries = 10; Total = 5.39996 tons

Paper (*paper*) – ream (8 reams = 1 balett)

The Tudor *Book of Rates* indicates that 200 reams weighed one ton, making a ream of paper 12 lbs.²⁸

Unit = 0.00536 tons; Number entries = 2; Total = 0.16078 tons

Pepper (*piperis*) – lb.

Unit = 0.00045 tons; Number entries = 3; Total = 0.06209 tons

Perfume (*perfumes*) - lb.

Unit = 0.00045 tons; Number entries = 1; Total = 0.00765 tons

Pitch (*piche*) – C

Assumed 'C' is cwt.

Unit = 0.05 tons; Number entries = 1; Total = 0.08299 tons

Pitch & Rosin (*pytche & rosen*) – C (20 C = 1 ton)

Assumed a 'C' was a cwt.

Unit = 0.05 tons; Number entries = 2; Total = 11 tons

²⁶ H. Hall and F. J. Nicholas (ed.), 'Select tracts and table books relating to English weights and measures', *Camden Miscellany*, Vol. XV (London, 1929), p. 28.

²⁷ F.A.O., *Production Yearbook*, Vol. 25 (1971), p. 725

²⁸ T. S. Willan (ed.), *A Tudor Book of Rates* (Manchester, 1962), pp. 84-85.

Prunes (*prunes*) – C

Assumed a 'C' was a cwt.

Unit = 0.05 tons; Number entries = 1; Total = 0.34999 tons

Raisins (*resyns*) – ton (1 ton = 24 pieces)

Unit = 1 ton; Number entries = 29; Total = 188.45826 tons

Rosin (*rosen*) – C (20 C = 1 ton)

Assumed a C was a cwt.

Unit = 0.05 tons; Number entries = 15; Total = 13.299 tons

Salt (*salis*) – ton

Unit = 1 ton; Number entries = 84; Total = 1316.75 tons

Serches - doz

An unidentified product valued at 4s. 2d. per dozen. It always arrived with cargoes of Spanish iron, which suggests that it was a product of Guipuzcoa. It was assumed a 'doz' is 12 lbs.

Unit = 0.00536 tons; Number entries = 15; Total = 0.61625 tons

Skins, Budge (*pell' de boge*) – doz pieces (10 doz = C)

These were high quality lamb skins of a type originating in North Africa.²⁹ It was assumed a dozen accounted for one cubic foot of capacity.

Unit = 0.025 tons; Number entries = 6; Total = 21.35825 tons

Skins, Calf (*pell' vitul'*) – doz

When licenced for export 10 dozen calf skins were the equivalent of 1 dicker of hides.³⁰ It has thus been assumed that a dozen calf skins weighed one tenth of a dicker of tanned hides.

Unit = 0.01786 tons; Number entries = 69; Total = 44.28335 tons

Skins, Calf tanned (*pell' vitul' tannat'*) - doz

This appears to have been a fuller way of writing '*pell' vitul'*' - 'Skins, Calf'.

Unit = 0.01786 tons; Number entries = 5; Total = 2.33068 tons

Skins, fish (*pell' pisc'*) - doz

It was assumed a 'doz' refers to 12 lbs.

Unit = 0.00536 tons; Number entries = 3; Total = 0.0875 tons

Skins, for fletchers (*pell' pro fletchers*) – piece

It is not clear what these were. It was assumed each occupied a tenth of a cubic foot.

Unit = 0.0025 tons; Number entries = 1; Total = 0.05499 tons

Skins, fox (*pell' vulpis*) - piece

It was assumed that each occupied a tenth of a cubic foot.

Unit = 0.0025 tons; Number entries = 2; Total = 0.02749 tons

²⁹ E. M. Veale, *The English Fur Trade in the Later Middle Ages* (Oxford, 1966), pp. 216-17.

³⁰ *L&P*, XVII, no. 443/7.

Skins, Civet Cat (*pell' de gennett*) - piece
It was assumed that each occupied a tenth of a cubic foot.
Unit = 0.0025 tons; Number entries = 2; Total = 0.01248 tons

Skins, Kid rough – doz
It was assumed a dozen occupied two cubic foot.
Unit = 0.05 tons; Number entries = 1; Total = 0.8999 tons

Skins, lamb (*pell' Agnor*) - doz (10 doz = C)
Assumed the same as for 'Skins, Budge'.
Unit = 0.025 tons; Number entries = 2; Total = 15.875 tons

Skins, Marten (*pell' de martron*) – piece
Assumed that each occupied a tenth of a cubic foot.
Unit = 0.0025 tons; Number entries = 2; Total = 0.1748 tons

Skins, Marten Beach (*pell' de foyne*) - piece
Assumed that each occupied a tenth of a cubic foot.
Unit = 0.0025 tons; Number entries = 2; Total = 0.00498 tons

Skins, sheep (*pell' ovin'*) - doz
Valued at 1s. per dozen. Assumed two cubic foot per dozen.
Unit = 0.05 tons; Number entries = 4; Total = 2.625 tons

Skins, Sheep worked (*pell' de ovin' operat'*) – doz
Valued at between 1s. and 1s. 4d. per dozen. Assume that worked skins were those that had been tanned. Assume same tonnage as ordinary sheep skins.
Unit = 0.05 tons; Number entries = 6; Total = 13.025 tons

Skins, Wildcat (*pell' catorn'*) - piece
Assumed that each occupied a tenth of a cubic foot.
Unit = 0.0025 tons; Number entries = 1; Total = 0.125 tons

Soap (*sope*) – C (1 C = 1.5 serons)
Assumed a C was a cwt.
Unit = 0.05 tons; Number entries = 61; Total = 63.35 tons

Steel (*stelle*) – C
One entry, brought in with a cargo of iron. Assumed a C was a cwt.
Unit = 0.05 tons; Number entries = 1; Total = 0.22499 tons

Strats
Unidentified commodity. Assumed each occupied a doz. lbs.
Unit = 0.005 tons; Number entries = 1; Total = 0.125 tons

Sugar (*shuger*) – lb. (120 lb = 48 loafs = 1 chest)
Unit = 0.00045; Number entries = 21; Total = 3.78 tons

Tankards (*tankards*)– doz

Assumed a dozen tankards occupied 1 cubic foot.

Unit = 0.025 tons; Number entries = 1; Total = 0.1 tons

Tar (*tarr*) – last (1 last = 12 barrels)

Valued £1 per last. A 1533 reference to tar bought by the navy notes that a barrel of tar was 16 gallons.³¹ If the Bristol barrel was the same as this, the Bristol last would be 192 gallons.

Unit = 0.7619 tons; Number entries = 4; Total = 93.33274 tons

Thread (*filli*) - bolt

Assumed a bolt of thread occupied 1 cubic foot.

Unit = 0.025 tons; Number entries = 1; Total = 2.5 tons

Tin (*stanni*) – M

Assume 'M' = 10 cwt.

Unit = 0.5 tons; Number entries = 2; Total = 0.375 tons

Tin, worked (*stanni' operat'*) – lb.

The number of ship-tons worked tin would occupy would depend entirely on how densely it could be packed. Assumed 1 lb. occupied 6 'ship lbs.'

Unit = 0.00268 tons; Number entries = 3; Total = 3.60192 tons

Turpentine (*turpentyne*) - C

Assumed a 'C' was a cwt.

Unit = 0.05 tons; Number entries = 3; Total = 0.5 tons

Vestments, Misc. (*indiversus peces of vestments*) – unspecified quantity

Valued at 6s. 8d. Assumed it occupied 8 cubic foot.

Unit = 0.2 tons; Number entries = 1; Total = 0.2 tons

Vinegar (*vini egri*) – tun

Unit = 1 ton; Number entries = 10; Total = 19.5 tons

Wax (*wex, cere'*) – lb.

Unit = 0.00045 tons; Number entries = 4; Total = 0.71729 tons

Wheat (*frumete, tritur'*) – quarter

Contemporary estimates suggest that five quarters of wheat were equivalent to one tun of Bordeaux wine for shipping purposes.³²

Unit = 0.2 tons; Number entries = 4; Total = 30 tons

Wine (*vini*) – tun

Unit = 1 ton; Number entries = 450; Total = 4465.666 tons

Wine, Corrupt (*vini corrupti*) – tun

Unit = 1 ton; Number entries = 67; Total = 345 tons

³¹ J. E. T. Rogers, *A History of Agriculture and Prices in England*, Vol. IV, (Oxford, 1882), pp. 394-95.

³² D. Burwash, *English Merchant Shipping 1460-1540*, p. 94.

Wire (vyre) – pole

Assumed a pole weighed a cwt.

Unit = 0.05 tons; Number entries = 1; Total = 0.6499 tons

Wood (*wode, gaid*) - C (2.5 cwt. = 1 bale)

Unit = 0.05 tons; Number entries = 9; Total = 16.9675 tons

Wood, Azores (*gaid insulis*) – C (2.5 cwt. = 1 bale)

Unit = 0.05 tons; Number entries = 27; Total = 329.28748 tons

Wood, Toulouse (*gaod tholozie, gaid tolos*) – C (2.5 cwt. = 1 bale)

Unit = 0.05 tons; Number entries = 17; Total = 78 tons

Wood, Boards, Bewdeley – doz

Assumed a dozen boards occupied the same space as a dozen wainscot boards.

Unit = 0.1 tons; Number entries = 1; Total = 1.5 tons

Wood, Clapboard (*Clappoll*) – Hundred pieces

The *Noumbre of Weyghtes* notes that 30 hundred pieces of clapboard equalled a ship-last – the Dutch and Baltic ship-last being roughly two English tons.³³

Unit = 0.06667 tons; Number entries = 1; Total = 0.40002 tons

Wood, Wainscot (*Weynscot*) – hundred boards

The *Noumbre of Weyghtes* notes that two hundred boards of wainscot make a ship-last, so a hundred boards would equal a ton.³⁴

Unit = 1 ton; Number entries = 2; Total = 9.70832 tons

Wool, Spanish (*Lane, Hespan'*) – stone

Assumed that a stone (14 lbs.) of raw wool occupied three times its weight in ship space.

Unit = 0.01875 tons; Number entries = 3; Total = 0.74999 tons

³³ H. Hall and F. J. Nicholas (ed.), 'Select tracts and table books relating to English weights and measures', *Camden Miscellany*, Vol. XV (London, 1929), p. 18; F. C. Lane, 'Tonnages, Medieval and Modern', *Economic History Review*, XVII (1964) pp. 224-25.

³⁴ Hall and Nicholas 'Select tracts and table books relating to English weights and measures', p. 18.