The grosso issued in the name of Enrico Dandolo, doge of Venice from 1192 to 1205, was revolutionary not only for Venetian coinage, but for Latin medieval monetary history as a whole. It was the first fine silver multiple coin of the European Middle Ages, and in the century and a half of its issue established itself as a principal trade coin for Mediterranean commerce, the only silver issue to do so for the entire medieval period. I have dealt elsewhere with the historical and monetary context for the inception of this coinage; in this essay I wish to deal with a few technical numismatic questions concerning the issue (1).

The date of the introduction of the denomination has been the source of debate for some time; it is usually given either as 1193-4 or as 1201-2 (2). These disparate dates derive from two chronicle traditions, the earlier date preserved in the history composed by the future doge Andrea Dandolo in the first half of the fourteenth century, which puts the inception of the denomination in the second year of his ancestor’s reign, and the later date from the chronicle of Martin da Canal, written around 1275, where the introduction of the coin is discussed in the context of the account of the preparations for the Fourth Crusade (3).

The only truly contemporary source which might bear on the date of the introduction of the grosso is the Liber Abbaci of Leonardo Pisano,
called Fibonacci, composed in 1202 but revised in 1228 (4). In what appears to be a manuscript from the early recension of this work, a hypothetical arithmetical problem is given in which a pound of Venetian coins is equal to 12 pounds 4 shillings of Pisan denarii. As Fibonacci’s monetary problems are always based on realistic values of coins, it appears that the Venetian grosso, whose value was about twelve times that of the Pisan penny (unlike the earlier Venetian penny which was worth about half that of Pisa), was well known in Tuscany by 1202. This argues for the earlier date for its introduction, and for a historical context involving the worsening of Venetian ties with Byzantium in the 1180s rather than for a direct tie-in to the Fourth Crusade of 1204.

In appearance, the Venetian grosso was unlike any earlier Venetian issue or any European coin then in circulation; its imagery was clearly derived from Byzantine coinage (5). The closest prototype is the debased aspron trachy of Manuel I (1143-80), the principal coin of the Aegean trade which Venice had come to dominate (4). The Venetian design differs from its prototypes in having the figure on the left reach across his body (as had analogous figures on certain Byzantine issues of the previous century), has the central shaft surmounted by a banner flying left rather than a labarum or patriarchal cross, and has the saint identified as the evangelist Mark by the presence of a book, which echoes that held by Christ on the other side.

The Venetian grosso departs from its prototype most strongly in fabric. Not only had all of the Byzantine coins on which Venetian Mediterranean trade had depended in the eleventh and twelfth century been scyphate, or cup shaped, but so had been the earlier pennies of Venice as well as those of Verona, which formed the monetary basis of northeastern Italy. The decision to mint a flat coin tied the new issue of Venice to the coinages of northern Europe and divorced it from local and Mediterranean precursors.

The new coin is called simply a *venezianus* in Fibonacci’s treatise, but the term *denarius grossus* appears in a Venetian document of 1211, contrasted implicitly with the *parus veneticus* used in a document of the following year to specify a payment accounted in terms of the old pen-


(5) Its appearance recalls the silver ducat of Norman Sicily from the 1140s, but there is no evidence that it was derived from it rather than both coins being derived directly from Byzantine prototypes: see L. Travaini, *La monetazione nell’Italia normanna* (Istituto Storico Italiano per il Medio Evo, Nuovi Studi Storici, 28), Rome, 1995, p. 210-218.

ny (?). From then on, the coin is always called a ‘grosso’ in private documents and in state archival records. The chronicle traditions, however, use additional terms to refer to the denomination, and these have entered the numismatic literature as well. Martin da Canal characterizes the coins as «noble silver medals which are called ducats». The term *medal* seems to imply a coin that was extraordinary in appearance, while *ducat* was appropriate for the issue of a duchy or which identified a duke as in this case. Neither term is found for the grosso in other sources, and the name ducat was applied to Venice’s new gold coin in 1285, a decade after da Canal was writing (?). Andrea Dandolo characterized the coin as «a silver coin vulgarly called a Venetian grosso or matapan». The latter term is the name of the southernmost cape in the Peloponnnesus, of strategic importance to Venetian shipping, but not otherwise obviously relevant to the coinage; it never appears in archival or commercial references to the coin. It is not clear whether the chronicle terms of *ducat* and *matapan* resulted from a genuine popular usage or were the result of a literary process, but it is clear that the coin was called a grosso in all normal contexts.

There is some ambiguity as to which side should be taken as constituting the obverse of the Venetian grosso. This is a problem which carries over from the prototype Byzantine coins, on which the side with the two figures had been considered the obverse in works of the nineteenth century, but is now usually considered the reverse (?). Recent research, however, has shown that on Byzantine scyphate coins, the side with the two figures, which is concave, was in the lower die, hence the obverse according to classical numismatic usage (?). As the Venetian version is flat, the shape of the flan gives no indication as to which die was upper or lower. Since the die study below reports an equal number of dies used for each face, the side using the larger number of dies cannot be inferred to be the upper die and hence the reverse. The best procedure for designating the obverse, then, is to determine what the minters and users considered the principal identifying type of the coin. In the chronicle of Andrea Dandolo, the coin is described as having «the image of Jesus Christ on a throne on one side and the figure of Saint Mark and the doge on the other». This might be taken as an indication that the side with the seated Christ was considered the main one. However, the Capitulary of the Mint Mas-

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ters for Gold instructs that ingots for gold be stamped with the dies of the ducat (which had designs closely parallel to those of the grosso) and later documents characterize officially approved ingots of silver and gold as having «the stamp of Saint Mark» (11). As the side with the saint (identified by the legend as Saint Mark of Venice) also has the image and name of the doge and the only identification of Venice as the minting authority, it is best to consider it the obverse.

The earliest documentation for the standard of the grosso comes from the Capitulary of the Mint Masters for Silver, a document compiled around 1278 from earlier sources and revised to meet current conditions (12). This gives a fineness for the coin which works out to .984 pure (« no more than half of a quarter [of an ounce] dross per [eight ounce] mark from good silver ») and a weight of about 2.18 grams (« between 109 1/3 and 109 1/2 coins per mark [of 238.5 grams] »). No analyses of the fineness of surviving grossi of the issue of Enrico Dandolo have been carried out (13). Nicolò Papadopoli had a destructive chemical analysis done on a single specimen of the issue of Pietro Ziani (1205-29), which gave a result of .964 and led him to infer as its standard the .965 purity given for the grosso in the fourteenth-century coin list of Pegolotti (14). The figure given by Pegolotti, however, is only one of many divergent fineness values for the silver of the Venetian grosso in fourteenth-century merchant manuals and coin lists and has no particular authority. Moreover, a grosso of Pietro Ziani from the ANS Collection tested by Giles Carter in 1991 was found to have a silver content of .978. In the same year, Mark T. Wypyski and Ann Heywood of the Metropolitan Museum of Art kindly performed Energy Dispersive X-Ray Spectroscopy on a grosso of Jacopo Contarini (1275-80) from the ANS Collection, which they found to have a surface concentration of .985 silver and an interior core of .974 silver. In view of these results and the 1278 documentation of a .984 standard, it seems reasonable to conclude that the fineness of the original grosso issue of Enrico Dandolo was likewise set at .984.

(13) An example from the ANS Collection, #20a in the catalogue below, was sent in 1990 to Eastern Michigan University, where Professor Giles Carter had graciously offered to test it by X-Ray Fluorescence analysis; along with other Venetian coins sent in the same package for testing it was stolen from the U.S. Mails and has not been recovered.
(14) Papadopoli, p. 93 and p. 85.
about as fine as silver could realistically be refined by medieval technology.

The theoretical weight standard for the grosso is given as 2.18 grams in the 1278 capitulary. The fourteen weighed specimens in the catalogue below have a mean weight of 2.03 grams, though some appear to be clipped. Four of the examples weigh between 2.15 and 2.19 grams, suggesting that the theoretical weight of 2.18 was probably in effect at the beginning of the thirteenth century as well as in 1278. Thus, the intrinsic value of the grosso of Enrico Dandolo would have been 2.15 grams of pure silver. The die axes known for coins of the issue are all at 6 o'clock, with the exception of one specimen slightly off this alignment.

Grossi in the name of Enrico Dandolo come from a limited number of finds. In Italy they were found in a hoard from Martignano, southern Tyrol, which had otherwise only earlier pennies of Trent, Verona and Venice; a hoard from Digoman (Belluno) which had a single grosso of Dandolo along with 10 grossi of Pietro Ziani (1205-29), a gold Hispano-Arabic piece as well as five kilograms of earlier pennies; and three were in a hoard from Aquileia containing also 10 grossi of Pietro Ziani, 316 denari of Aquileia in the name of the patriarch Volker, and 38 denari of Triest in the name of bishop Givardus (1199-1202) (15). Three examples of the issue were in a hoard found in Kirkhigiates (Epirus), Greece, which also had a hyperperon of Johannes Vatatses (1222-54) and 179 grossi of later doges through Ranieri Zeno (1253-68) (16).

In the Digoman Hoard, grossi of Enrico Dandolo are outnumbered by those of Pietro Ziani by ten to one and in the Aquileia hoard by ten to three, but since the later issue closes both of these hoards, it may not be fully represented in them. Only the Kirkhigiates Hoard is late enough in its closing to give a contrast between the two issues, 3 coins of Dandolo versus 20 of Ziani. If the Dandolo issue was introduced in 1194, as the preponderance of evidence suggests, it would have been minted for eleven years up to the death of the doge; the issue of Ziani took place over 24 years. On the basis of this extremely limited data, and allowing for normal attrition from circulation, it would appear that the Dandolo issue got

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(15) B. Giovaneli, Altertümliche Entdeckungen in Südtirol im Jahre 1837, in Neue Zeitschrift des Ferdinandeums, 5, 1839, p. 31-43; V. Ostermann, Di un ritrovo di monete veneziane, veronesi e trentine, in RIN, 9, 1896, p. 383-390; A. Saccocci, Un ripostiglio di monete aquileiesi, triestine e veneziane da Aquileia, in RIN, 92, 1990, p. 199-237. Saccocci notes that one of the three specimens of the Dandolo issue had been stolen before the Aquileia hoard could be examined, and other pieces may have been found in addition to those originally handed over to the authorities. Thus it is possible that some of the specimens in the catalogue below that appeared on the market after 1969 might derive from this hoard.

off to a moderately slow start compared with the following issue. If one were to opt for the 1202 introduction date and an issue period of only 3 years, the Dandolo coinage would then appear to have been proportionally stronger than the succeeding issue, possibly to be understood in terms of the recoinage of older pennies or the financing of the Fourth Crusade.

A die study has given a more concrete idea of the size of this issue. The 31 specimens compared appear to have been struck from 20 obverse dies and 20 reverse dies. A standard formula for calculating original dies allows a projection of 45 ± 10 dies for each side of this issue (17). This would work out to four dies a year if the early date of inception is taken, and 15 a year for the later. In either case, it would suppose a total issue of about 450,000 coins in the original issue if the conservative figure of 10,000 coins per die is adopted. In any case, it is a much smaller rate than that projected for the only other issue of Venetian grossi subjected to a die study, that of the Type III grossi of Antonio Venier, produced from 1394 to 1400, where 335 obverse dies were projected for the six year period of minting (18).

The die study of grossi of Enrico Dandolo also allowed a study of the punches used for the die engraving, which suggests an internal chronology for the issue. Simple wedge and crescent punches were used for some of the lettering, and larger punches were used for various parts of the bodies of the figures, which were then decorated with carved lines and drilled circles. The most diagnostic punches, however, are those which were used for the heads of the three figures on the coins. The use of punches for images had not been practiced in Venice on the earlier penny issues and was relatively unusual in Europe at this time, though it had been brought to a high level of skill in twelfth century Bohemia (19).

It is not easy to be certain of identifications in the case of these small features on coins many of which are known only from published photos,

(17) G.F. CARTER, A Simplified Method for Calculating the Original Number of Dies from Die Link Statistics, in ANSMN, 28, 1983, p. 195-206. It should be noted that on the basis of only 21 specimens of the Dandolo grosso examined several years ago, I found far fewer die links and ended up with a projected original issue from 105 ± 52 obverse dies, a result presented as preliminary in A.M. STAHL, 1999. I have found a similar drop in the number of projected dies as the result of redoing a die study with a larger corpus in the case of the torneselli denomination, as reported in A.M. STAHL, The Cephalonia Hoard of Venetian and Hungarian Coins, in NomKron, 13, 1994, p. 88-89. The most likely explanation for the phenomenon in both cases is that the addition of new specimens allowed the recognition of common dies among other specimens, which is not always easy to determine with certainty in the case of dies produced from punches, as medieval Venetian coins were.


but it appears that each head is represented by two successive punches in
the course of the issue. A sequence can be derived by working backwards
from a comparison with the punches carried over into the dies for the
coinage of the succeeding doge, Pietro Ziani. It appears that the earlier
head punches on the Dandolo coinage were generally thinner and were
decorated with linear beards, while the later ones are more square and
were then decorated with drilled circles. It appears that the punch for
the doge's head was replaced first, then that for the Christ on the reverse,
and finally that of Saint Mark. A presumed chronological grouping ac-
cording to these criteria is presented in the catalogue, below.

Catalogue

The coins are numbered by die combination (C), obverse die (O), and reverse die (R).
They are grouped according to the punches for the heads of the figures in presumed
chronological order. Coins illustrated in the plate are starred (*).

Obv.: +H.DANDOL' [up left from 8 o'clock to 10 o'clock] DVX [vertical beneath banner
at 12 o'clock] S.M.VENETI [down right from 2 o'clock to 4 o'clock].
Doge standing to left, Saint Mark to right with book in left hand, each holding
staff with right hand, with banner of cross and stripes at top flowing to left.

Rev.: İC XC. Christ seated on throne, book on knee, left hand visible in right elbow.

Doge punch 1, Saint Mark punch 1, Christ punch 1

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Doge punch 2, Saint Mark punch 1, Christ punch 1

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* British Museum, 1847, 11-8, 1440, ex Baron Kolb, 2.20 g, 6 o'clock.
* Museum of Fine Arts, Boston, 1916, 12-2, 306, ex Dr. Charles S. Currier, 2.58 g, 6 o'clock.
* Magnaguti Collection (Ex Nummis Historia, Santamaria f.p.l. 1953), vol. 5, #297, 2.06 g;
* private collection, Davis, California.
* American Numismatic Society, New York [henceforth ANS], 1967.182.52, ex D.P. Dickie 1967, 2.05 g, 6 o'clock.
Doge punch 2, Saint Mark punch 1, Christ punch 2

| 10 | 10 | 9 | a)* Museo Bottacin, Padua, 2.19 g, 6 o'clock;  
| 11 | 11 | 10 | b) *Correr, Correr #17, 1.99 g, 6 o'clock;  
| 12 | 11 | 11 | b) Paolucci, p. 15, #1.  
| 13 | 12 | 11 | a)* ANS, 1928.21.1, ex E.T. Newell, 2.05 g, 6 o'clock;  
| 14 | 13 | 12 | b)* Correr, Boldu #346, 2.15 g, 6 o'clock.  
| 15 | 14 | 14 | a) Baranowsky, 23 June 1931 (Trivulzio), #1318;  
| 16 | 15 | 15 | b) Geri 9, 18 April 1980, #260.  
| 18 | 17 | 17 | a)* ANS, 1928.21.1, ex E.T. Newell, 2.05 g, 6 o'clock;  
| 19 | 18 | 18 | b) Correr, Boldu #346, 2.15 g, 6 o'clock.  
| 20 | 19 | 19 | a) ANS, 1971.42.11, ex. J. D. Rogasner [stolen from U.S. mails, 1990], 2.08 g = Santamaria, 21 March 1955 (Signorelli, pt. 5), #504.  
| 21 | 20 | 20 | a) Hamburger, 10 Nov. 1924 (Vogel, pt. 2), #1249.  

Doge punch 2, Saint Mark punch 2, Christ punch 2

| 19 | 18 | 18 | a)* British Museum, 1993, 3-2, 18, ex P. Greenall, 1.48 g 6 o'clock = MM 50, 27 Feb. 1975, #536;  
| 21 | 20 | 20 | a) ANS, 1971.42.11, ex. J. D. Rogasner [stolen from U.S. mails, 1990], 2.08 g = Santamaria, 21 March 1955 (Signorelli, pt. 5), #504.  
| 22 | 21 | 21 | a) Hamburger, 10 Nov. 1924 (Vogel, pt. 2), #1249.  

