

LONG-DISTANCE TRADE AND MARKETS

EGYPTIAN SPECIE MARKETS AND THE INTERNATIONAL GOLD CRISIS OF THE EARLY FIFTEENTH CENTURY¹

Ian Blanchard

The years 1375-1434 witnessed an acute dislocation of European gold markets which assumed crisis proportions during the “Great Bullion Famine” of 1392-1412. After half a century of remarkable stability in the price of gold from 1325-1375, during which market disorders were both ephemeral and localised, mint masters were confronted with a situation of acute instability which ushered in an era of endemic enhancement in the price of the precious metal. For more than half a century, as may be seen in Figures 1-3, gold prices continually increased. In order to maintain a supply of coins commensurate with the requirements of a stable commodity price level and sufficient to avoid the evils of a protracted deflation, mint masters and legislators were forced to either raise mint prices, or to impose restrictions on the trade in bullion. They attempted thereby to maintain the level of national specie stocks in a dwindling European total. Nor, as Professor Day has shown, were they entirely unsuccessful.² Their efforts ensured that the supply of coin diminished much less rapidly than the supply of specie, and proved sufficient to maintain stable commodity prices throughout the fifteenth century. None the less, their frenzied activities, as they assumed the role of market equilibrators, were symptomatic of a fundamental supply crisis as European gold stocks rapidly diminished.

¹ An earlier unpublished version, “Le marché égyptien des espèces et la crise de l’or au quinzième siècle,” was presented at Maurice Aymard’s seminar conducted at the École des Hautes Études en Sciences Sociales, Paris in 1985. Subsequent revised versions have been given at various seminars. I would like to thank all those present at these seminars for their most helpful comments which have contributed greatly to this paper and to the much fuller discussion of the questions raised therein in the third volume (*Continuing Afro-European Supremacy (African Gold Production and the Second and Third European Silver Production Long Cycles)*) of my *Mining, Metallurgy and Minting in the Middle Ages*, 4 vols. (Stuttgart: Franz Steiner Verlag, 2001-).

² J. Day, “The Great Bullion Famine of the Fifteenth Century,” *Past and Present* 79 (1978): 3-53.

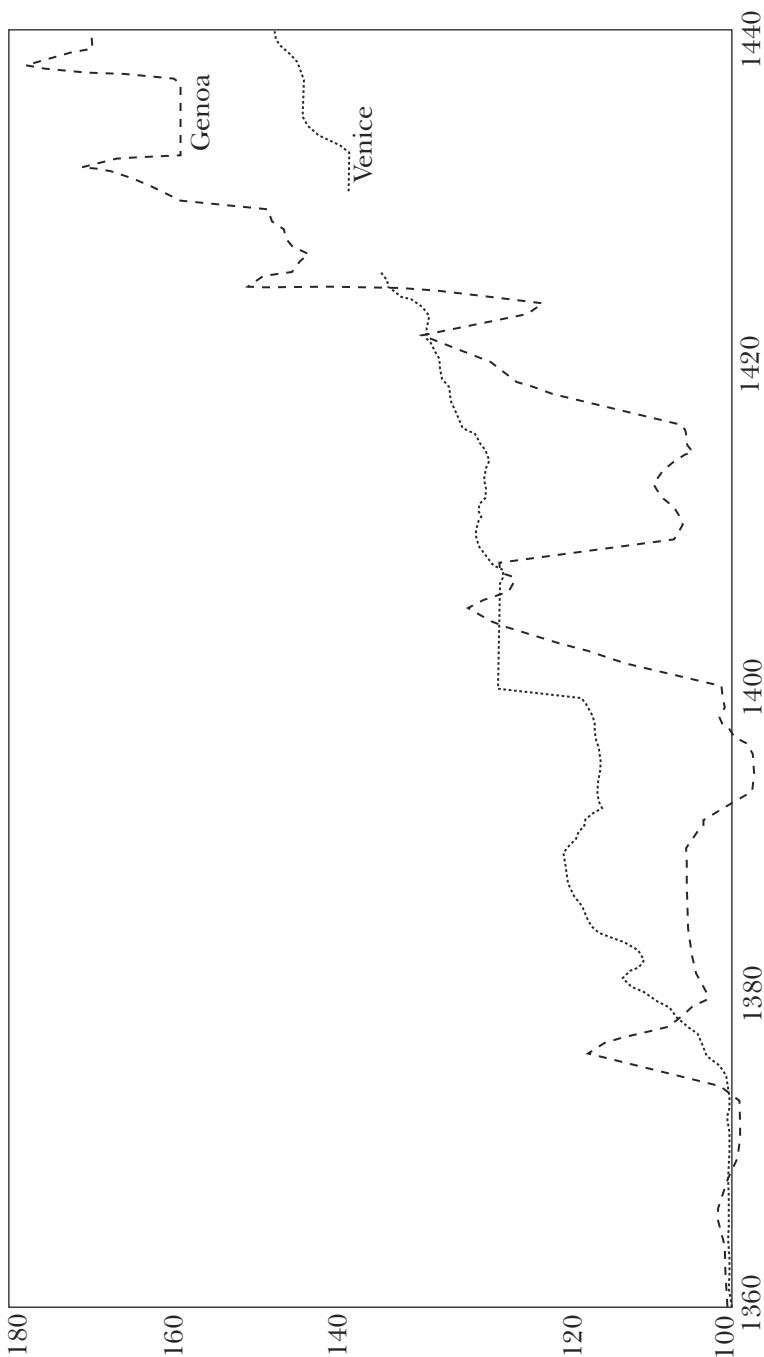


Figure 1. Price of Gold (1360=100): Mediterranean "Levantine" Ports

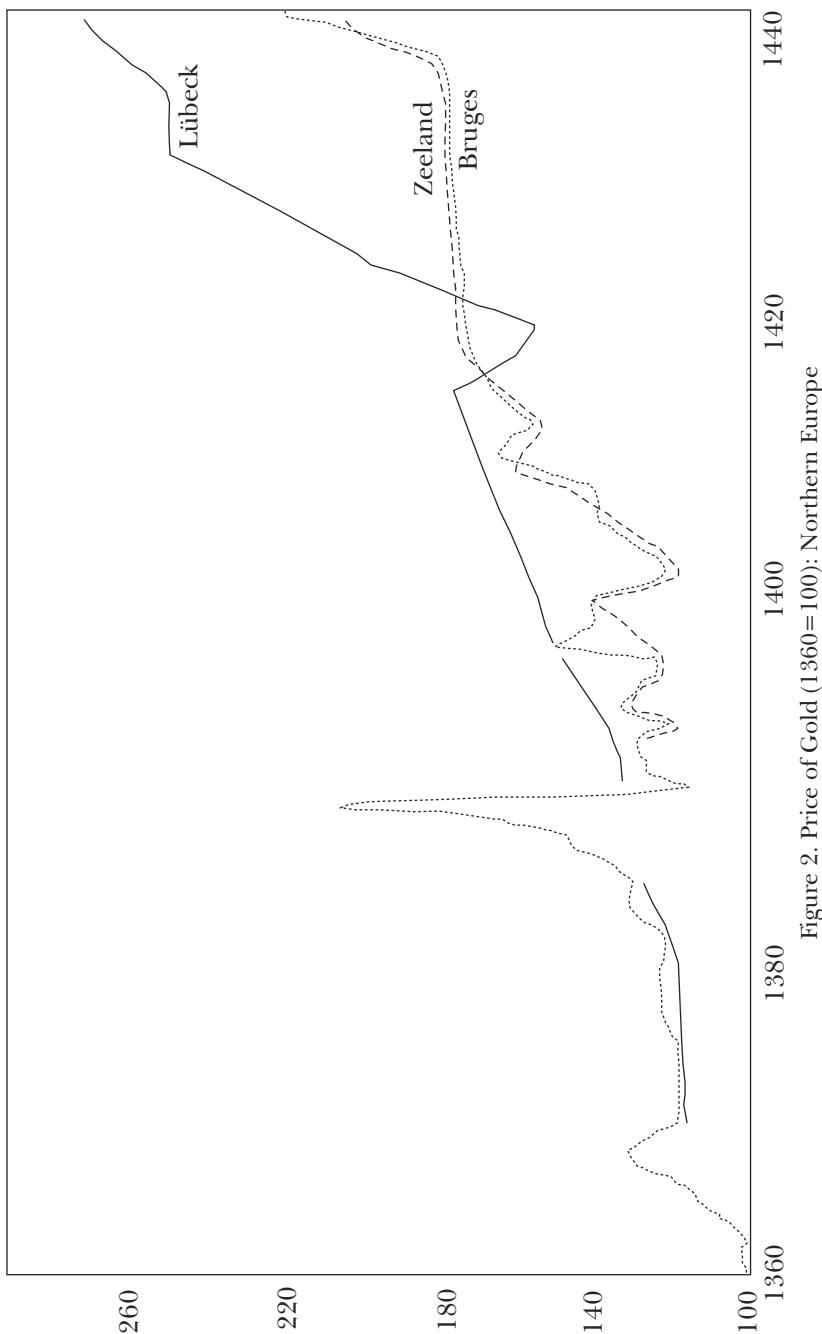


Figure 2. Price of Gold (1360=100): Northern Europe

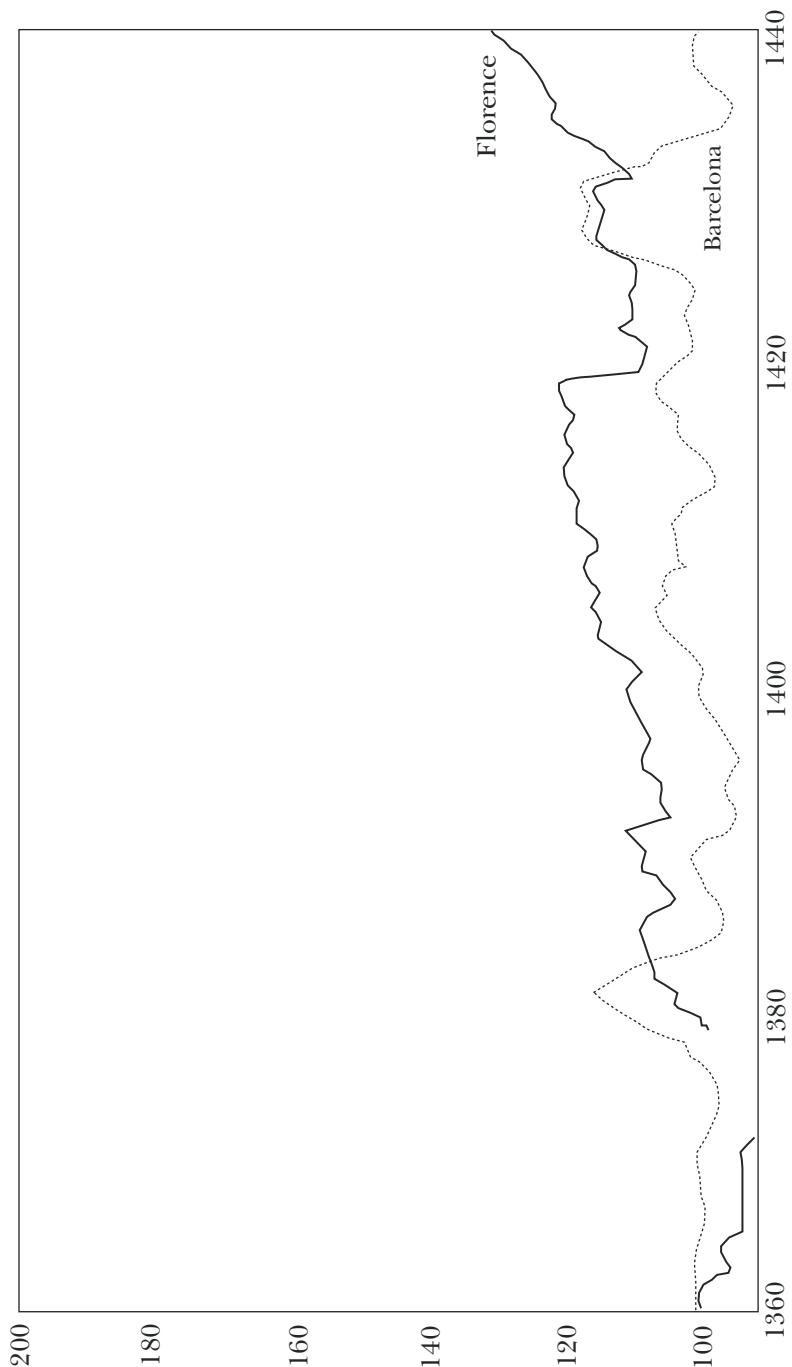


Figure 3. Price of Gold (1360=100): The Western Mediterranean

I

The long-term stability in gold prices, which characterised European specie markets during the mid-fourteenth century (1325-1375), rested upon the existence of a delicately balanced bi-metallic equilibrium within and between a series of autonomous specie markets. Each maintained the level and composition of its precious metal stock from independent, indigenous supply sources of silver and gold.

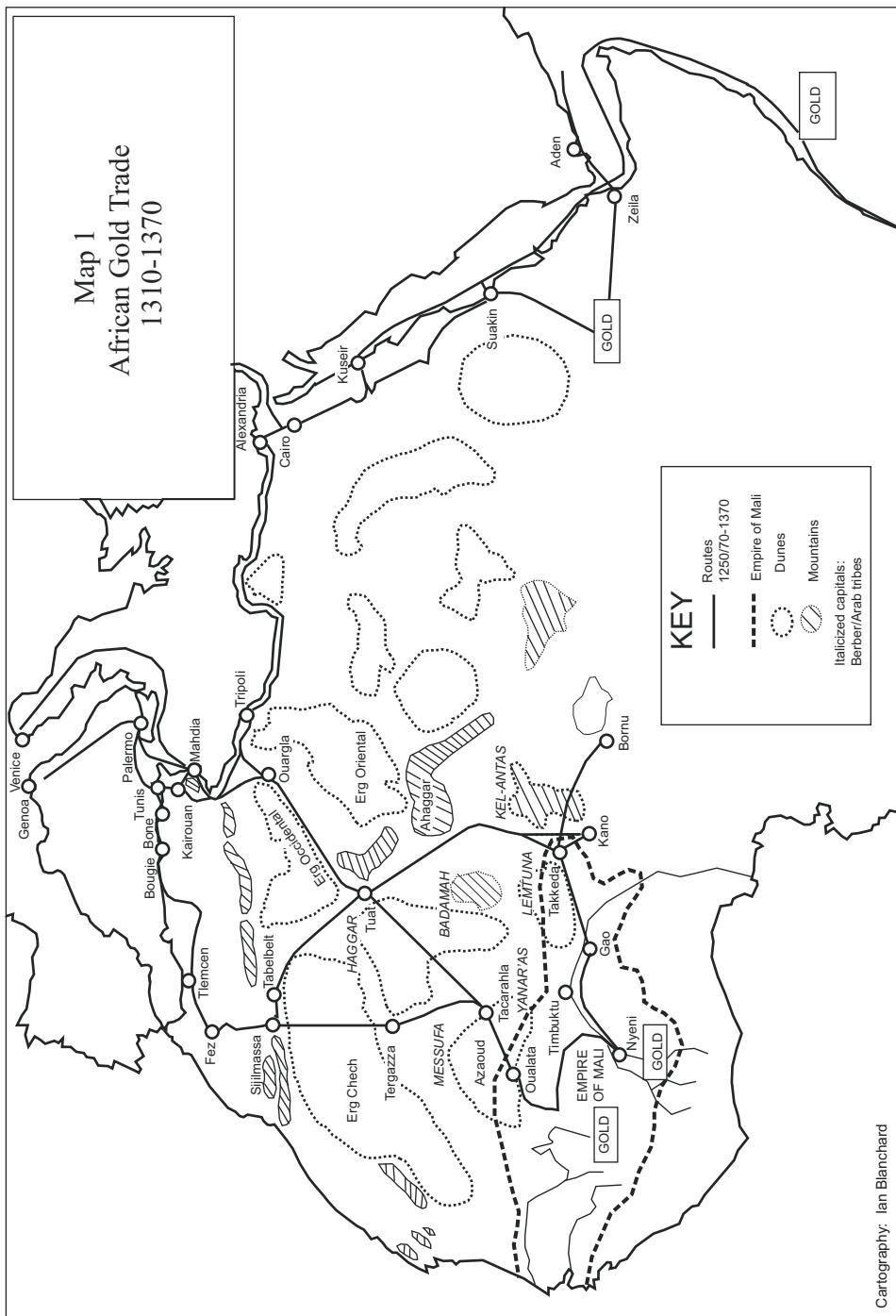
The first of these, north of the Alps, possessed plentiful supplies of gold emanating from Hungarian mines.³ When this was exchanged against silver initially produced in England (Bere Ferrers, Devon) and Bohemia (Kutná Hora) during the years 1290-1345 and subsequently in Saxony (Freiberg-in-Meissen),⁴ a stable metallic ratio of 1:10-11.4 was established.⁵ Further south, two similar autonomous markets existed on the basis of an efficient inter-continental exchange network, facilitating the exchange of African gold for silver from Europe and Asia Minor. Driving directly northward from the Niger Bend across the deserts of the central Sahara, caravans carried gold each year to the refining and minting centres of *al-Maghrib al-Aqṣā*, providing the base for an abundant local circulation of “heavy” single and double dinars. Further east, caravans travelling via either Wargla or Ghadames brought similar supplies to Egypt, for minting into those miscellaneous gold pieces that found currency in the lands of the Circassian Sultanate, the regions of the Muslim East, the Hijaz and the Yemen (Map 1).⁶ Two distinct zones—in the Mahgrib and Egypt—thus emerged, each with cheap and plentiful supplies of gold, which were juxtaposed against equivalent areas

³ Blanchard, *Mining, Metallurgy and Minting*, 3: Chap. 1, §2, 935.

⁴ Blanchard, *Mining, Metallurgy and Minting*, 3: Chap. 1, §1, 927-34.

⁵ Blanchard, *Mining, Metallurgy and Minting*, 3: Chap. 1, §3b, 950-70.

⁶ Shihāb al-Dīn Abū 'l-Abbās Ahmad b. Yahyā b. Fadl Allāh al-'Adawī al-'Umari, *Māsalik al-absār fī mamālik al-amsār*, trans. and annot. Maurice Gaudefroy-Demombynes, 2 vols. (Paris: Bibliothèque des Géographes Arabes, 1927), 2, Bk. 10: 54; Shams al-Dīn Abū 'Abd Allāh Muḥammad al-Lawātī al-Tanjī a.k.a Ibn Baṭṭūṭa, *Rihla* or *Tuhfat al-nuzzār fī gharā'ib al-amṣār wa 'ajā'ib al-asfār*, ed. and trans. C. Defrémery and B. R. Sanguinetti, 4 vols. (Paris: Imprimerie Nationale, 1853-1858; reprinted Frankfurt am Main: Institute for the History of Arabic-Islamic Science at the Johann Wolfgang Goethe University, 1994), 4: 376-82; Zakāriyā ibn Muḥammad al-Qazwīnī, *'Ajā'ib al-makhlūqāt wa gharā'ib al-mawjūdāt*, in Yusuf Kamal, ed., *Monumenta cartographica Africæ et Aegypti*, 5 vols. in 16 books (Cairo-Leiden, 1926-1951), 1046.



Cartography: Ian Blanchard

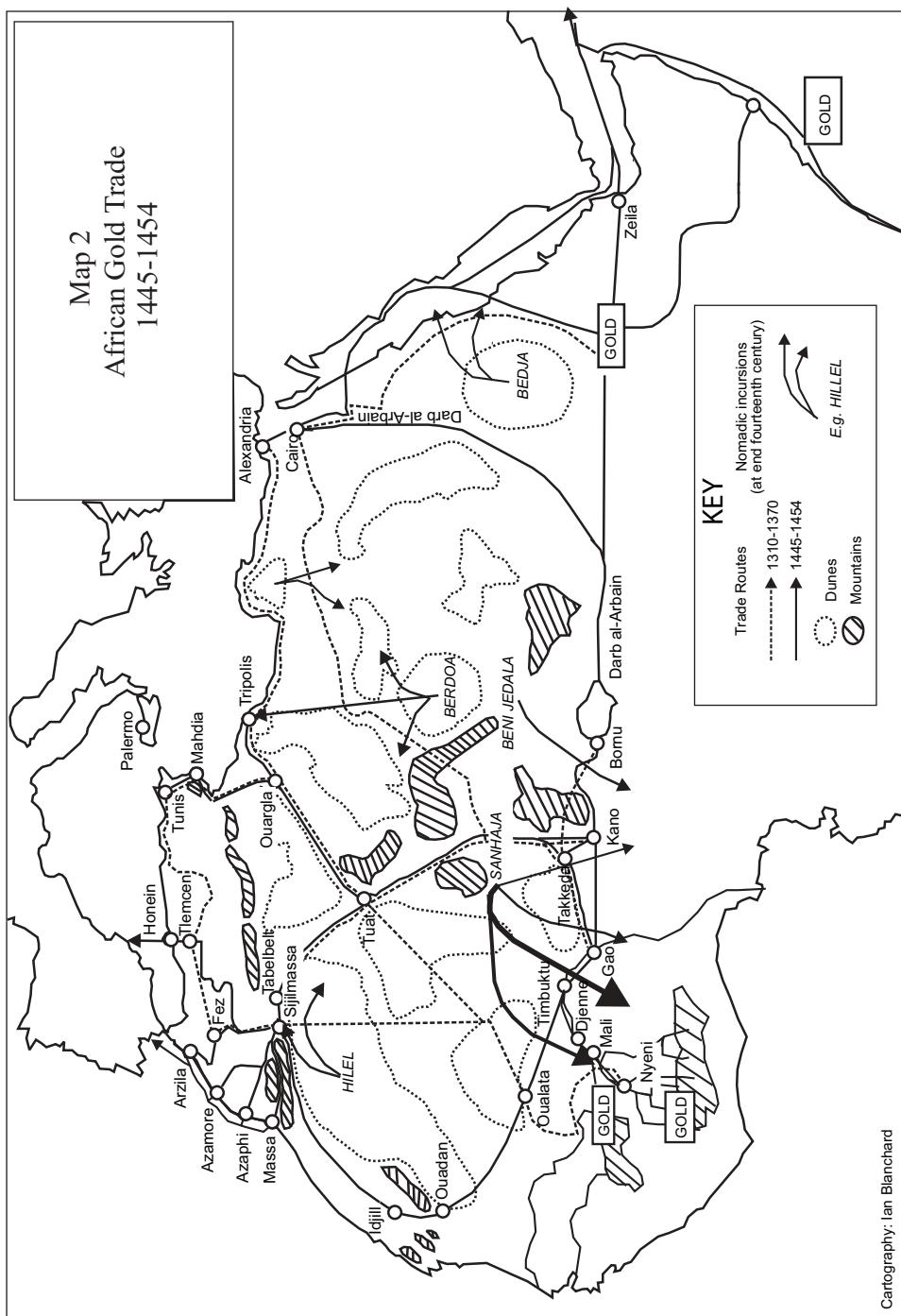
of abundant silver, thereby encouraging an active interchange of the two metals. In the west the profitability of this exchange was such that for half a century trade in goods was subordinated to trade in specie.

From 1325-1375 gold *doblas* (double dinars) regularly passed north bring forth a countervailing supply of European silver southward. In response to these flows a distinctive market structure evolved in the western—Tyrrhenian—basin of the Mediterranean, characterised by a long-term stability in gold prices and an “anti-cyclonic” distribution of the two metals between the continental littorals. Although relatively scarcer as one moved northward, gold was abundant to customers within a unitary market in which the African product reigned supreme. Nor was the situation significantly different within the eastern zone. Gold arriving in Egypt from *al-Bilād al-Sūdān* was distributed after minting in a similar market structure receiving small amounts of European silver and larger quantities from the mines of the Isaurian Taurus.⁷ Within the area spanned by European commercial networks there were thus three distinct and autonomous specie markets. Each of these had a similarly balanced stock of precious metals conforming to a common bi-metallic standard (1:9.4-10.9), and thus, whilst retaining their autonomous character, the markets were united into a homogeneous and unitary system. Unlike in the period 1135-1175, however, in 1336-1375 African gold no longer enjoyed a complete hegemony in the supply of this metal to specie markets within the area spanned by European commercial activity. Yet the existence of an efficient inter-continental trade network, facilitating the exchange of African gold for European or Middle Eastern silver supplies, still ensured bi-metallic exchange stability within and between at least two of the three autonomous specie markets.

The unitary “European” system existed, moreover, on terms of bi-metallic parity with another one of similar character, which encompassed the lands bordering the Indian Ocean (Map 2).⁸ This “Asiatic” specie distribution system was also divided into a series of autonomous elements which, existing in conditions of bi-metallic

⁷ Ibn Battūta, *Tuhfat al-nuzzār*, trans. H. A. R. Gibb, *Travels in Asia and Africa* (London: Hakluyt Society, Second Series, CXVII, 1929), 61-2 436-7. C. Cahen, *Pre-Ottoman Turkey. A General Survey of the Material and Spiritual Culture and History, c. 1071-1330* (London: Sidgwick and Jackson, 1968), 160-1.

⁸ Blanchard, *Mining, Metallurgy and Minting*, 3: Chap. 7, §3a-1, 1275-89.



equilibrium, were conjoined within a unitary system. Here Chinese gold held pride of place, being distributed by Muslim and Chinese merchants through a commercial system that extended from the source of supply to Ormuz on the Persian Gulf and drew a counter-vailing flow of silver through three distinct points of access. In the west it was Iranian silver, from the Elburz (Reshteh-ye Alborz) mountains (Rayy and Dāmghān), traded through Ormuz, which laid the foundations of a bi-metallic system. Further to the east silver, drawn from the once mighty workings of the Pamir and Hindu Kush, passing through Cambay and Chittagong, played a similar role in the markets of the Arabian Sea and Bay of Bengal. Autonomous yet united by a common bi-metallic standard these markets thus formed a single system, which co-existed with its "European" counterpart, bringing conditions of specie price stability and bi-metallic uniformity to a "world" trading network, divided by religion and politics, but united in its monetary mechanisms.

II

From about 1375, however, the first signs of disintegration began to appear in this monolithic edifice. Gold prices began to rise on European markets but not universally (Figures 1-3). Some regions remained able to acquire adequate supplies whilst others suffered acute shortages as the once universal market split into atomistic elements.

The primary cause of these changes, as far as northern "European" specie markets were concerned, was rooted in the vicissitudes of indigenous gold production. Until the introduction of Afro-Asiatic techniques of separating gold from auriferous quartz by mercury amalgamation in the 1440s, this was largely confined to small-scale placer workings of European gold bearing gravel. Such placers, during the balmy days of overpopulation and low wages in the early fourteenth century, were thronged with workmen who sustained an annual output of about four tonnes of the yellow metal.⁹ From about the 1380s, however, a combination of labour shortages and resource

⁹ M. Malowist, "Problems of the Growth of the National Economy of Central-Eastern Europe in the Late Middle Ages," *Journal of European Economic History* 3 (1974): 345.

depletion caused production to fall to below three tonnes a year, causing producers to cast around for new sources of gold. In the event they lighted upon the exploitation of copper and lead ores containing auriferous silver.

Deposits of the former were found in Hungary to the north of Banská Bystrica (Neusohl) but, because of their low metallic content, their exploitation was dependent on a new technology—the *Saigerprozess*—and a favourable conjuncture of primary metal (copper and silver) prices. Slovak gold production, accordingly, became tied to the fortunes of the silver industry and was most pronounced in the boom conditions—in 1391-1399, 1412-1418 and 1435-1439—affecting that sector. Thus during the 1390s the deposits of argentiferous copper of the Kingdom of Hungary and the Polish lead fields attracted the attention of two Nürnberg corporations—the Kammerer-Seiler and Flextorfer-Zenner—and the Genoese house of Gallici, and until the end of the decade the pickings were rich. Falling copper and silver prices from 1399-1412, however, posed difficulties from which the first German house emerged victorious, thanks to its collaboration with the Venetian and Florentine agents of the Medici.¹⁰ From 1412 therefore, secure in the purchase of Polish lead and with control over Hungarian copper supplies, the Italians and Nürnbergers now profited from the boom years 1412-1418. The *Spleiss-Saigerhütten* and *Hammerwerke* established at Neusohl produced some 2,000-2,500 *zentners* of refined copper and some 8,000-10,000 *zentners* of unrefined “black” copper, which was exported to Venice together with an indeterminate amount (perhaps 2,500 *zentners*) sent to Nürnberg. Nor was their contribution to specie markets unimportant. The 900-1,000 tonnes of copper yielded some fifteen tonnes of silver and 140 kg of gold. Hungarian production from auriferous silver thus played a not insignificant role

¹⁰ W. von Stromer, “Nürnberger Unternehmer im Karpatenraum. Ein oberdeutsches Buntmetall-Oligopol 1396-1412,” *Kwartalnik Historii Kultury Materiałnej* 16 (4) (1968): 641-62; as well as von Stromer, *Oberdeutsche Hochfinanz, 1350-1450* (Wiesbaden: F. Steiner, 1970), 119-25, 143-8, 448-95; and von Stromer, “Das Zusammenspiel oberdeutscher und Florentiner Geldleute bei der Finanzierung von König Ruprechts Italienfeldzug, 1401/2,” in Hermann Kellenbenz, ed., *Öffentliche Finanzen und privates Kapital im späten Mittelalter und in der ersten Hälfte des 19. Jahrhunderts*, Bericht über die 3. Arbeitstagung der Gesellschaft für Sozial- u. Wirtschaftsgeschichte in Mannheim (Forschungen z. Sozial- u. Wirtschaftsgeschichte 16) (Stuttgart, 1971), 50-86.

in European gold supply during the crisis years of the early fifteenth century. As silver prices rose ever upwards, moreover, its contribution became ever greater, attaining at the beginning of the next boom in the early 1430s an annual output of about 400 kg.¹¹ Yet whilst it made a contribution to the long-term stabilisation of European gold stocks it was an erratic one due to the primary role of silver and copper prices in determining production levels in plant using the new technology.

Such was not the case, however, with the other major source of European auriferous silver—the *argenta indorata* found in the lead ores of Novo Brdo, Serbia. Here the much higher gold content of the silver, amounting to as much as a sixth, made it, at prevailing relative prices, the primary object of exploitation. Production thus moved counter-cyclically to that of Slovakia. Established during the crisis of 1280-1320 the workings were neglected until the gold boom of 1418-1435 when production rose to 6.1 tonnes of silver and 108 kg of gold. With the fall in gold prices after 1435, however, production fell from even this diminutive level, amounting to no more than sixty per cent of its former size in the early 1450s.

Table 1

European Gold Production, 1325-1450 (metric tonnes)

Date	<i>Placer-lode gold (Hungary)</i>	<i>Auriferous silver (Slovakia & Serbia)</i>	<i>Gold quartz (Rhineland)</i>	Total (a)
1325-1375	4.0	—	—	4.00
1375-1400	2.9	0.04	—	2.94
1400-1425	3.5	0.04	—	3.54
1425-1450	3.7	0.36	2.0	6.06

Note: (a) Augmented until the late fourteenth century by African gold imports of about 2.0-2.5 tonnes annually.

¹¹ "Und anfänglich bey König Mattyás auch Vladislai Zeiten ist keine Spleyss-Saygerhütten noch Hammer in Neusohl gewesen, sondern man hat den schwarzen Kupfer alssso aus den Land geführet und andersowo gespleissen, geseigert und geschmit," quoted from the "Memorial of the Fugger's Factor at Neusohl," printed in Peter Ratkoš, *Dokumenty k baníckemu povstaniu na Slovensku, 1525-1526* (Bratislava: Vydavateľstvo Slovenskej Akadémie Vied, 1957), 457. On the production of copper see Jozef Vlachovič, *Slovenská med' v 16. a 17. storočí* (Bratislava: Vydavateľstvo Slovenskej Akadémie Vied, 1964), 23.

Together, therefore, the Slovak and Serbian producers exploiting copper and lead ores containing auriferous silver made a small but growing contribution to European gold supply. During the critical years 1375-1425, however, their contribution was slight and as Hungarian placer production declined, so gold prices rose.¹² Yet the decline in indigenous supplies was sufficient only to explain some one third of the price increase during the years 1375-1425. Other factors were at work, which were of far greater significance.

III

Of primary importance amongst these non-indigenous influences was a fundamental restructuring in the patterns of trans-Saharan trade. As early as the 1390s basic structural changes may already be discerned in the transport network used by merchants. Caravans increasingly avoided the direct routes across the arid dune zones, where nomadic attacks¹³ and increasing difficulties in securing adequate water supplies rendered the transients' life precarious. They turned instead to the aqueous gravel at the foot of the Ahaggar and the Adrar des Iforas (Map 2). A major restructuring of the trans-Saharan trade routes was underway. During the next half-century (1385-1435) this resulted in the emergence of a completely new commercial network within which merchants avoided the dangers of desert transport and sought the greater security of the circumlocutious way of the Sahel and the central highlands.

¹² Blanchard, *Mining, Metallurgy and Minting*, 3: Chap. 3, §2b, table 3.3, 1030.

¹³ Which destroyed the trade entrepôts of Gao in 1454 and Sijilmassa in 1432. The town of Sijilmassa, whose inhabitants had been "very rich and had great traffic with the lands of the negroes" in the fourteenth century, was totally razed in the 1430s. Commercial and minting activity, however, was deflected to castles—Tenegent, Tabuhasin and Mamun—within its territory, all of which were frequented by Jewish and Arab merchants, who continued to grow rich "using great traffic into the lands of the negroes". These castles, within the territory of the erstwhile town, continued for centuries thereafter to be referred to by both contemporaries and subsequent historians, who drew on their writings, as "Sijilmassa." Al-Hasan b. Muhammad al-Wazzān al-Zayyātī a.k.a Leo Africanus, *The History and Description of Africa*, trans. John Pory (1600), ed. R. Brown, 3 vols. (London: Hakluyt Society, XCII-XCIV, 1896), 3: 782-6. This practice has been adopted by the writer of this essay.

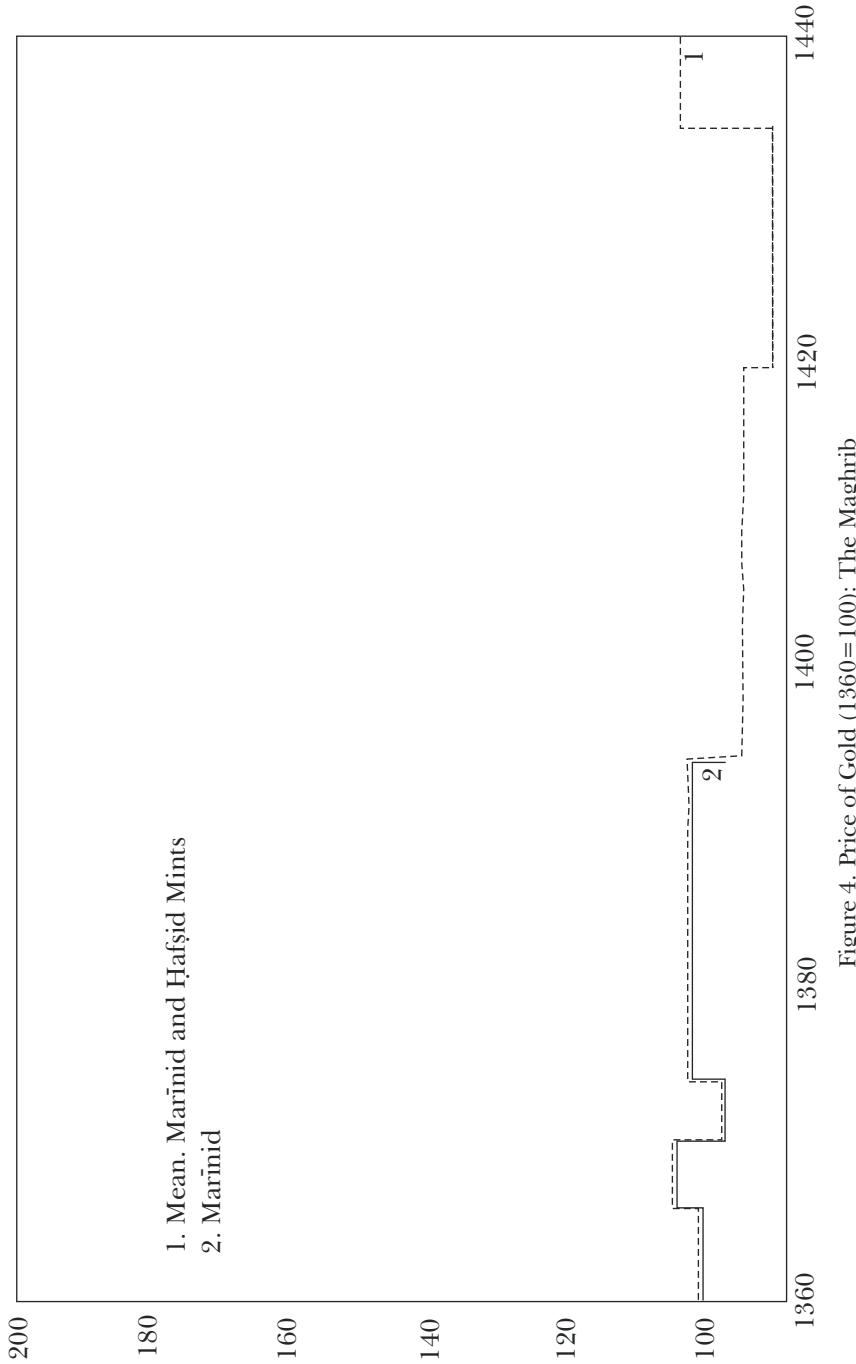


Figure 4. Price of Gold (1360=100): The Maghrib

The effect of these changes on the supply of gold to North African and Middle Eastern specie markets was dramatic. Within the Mahgrib supplies continued unabated and the price of gold (Figure 4) continued, after a brief dislocation from 1370-1394, to fall to 1435. Yet this stability was achieved only by a basic restructuring of inter-Mahgribi supply networks. The once active Marīnid mints strung out along the western routes of the mid-fourteenth century, after a brief period of debasement from 1373-1394 during which coins became more barbaric in design, ceased minting entirely during the opening decade of the fifteenth century. In their place a new network of Hafṣid mints arose, strung out along the new routes which emerged during the years 1395-1435. If route reorientation thus ensured intra-regional price stability within the Mahgrib, such was not the case further east in Egypt. Here gold had regularly arrived in the mid-fourteenth century. It passed from either East African sources, via Quṣeir or Suakin, or from the Niger Bend by the trans-Saharan Ghadames route, or when this was disrupted, as during the years 1348-1366, via the Mahgrib and the coastal route to Alexandria. Again this had resulted in a steady fall in the price of the yellow metal.

With the change in route alignment during the years 1375-1435, however, this was completely changed. Cut off from trans-Saharan supplies, and particularly during the years 1385-1390 and 1399-1412 with little compensation provided by transhipments from the Maghrib, Egyptian markets experienced acute shortages. Gold prices rose (Figure 5) and conditions prevailing in inter-continental exchanges were totally altered. Gold became relatively scarce in relation to both the unit of account and silver. Henceforth, from 1374, rising gold prices attracted gold eastward by enhancing the bi-metallic ratio (Figure 6) relative to those prevailing in Europe. Yet these movements in 1385-1390, 1399-1412 and 1418-1435 created a marked instability in the market. Each rise in gold prices, reflecting stock wastage without compensatory supply increase, resulted in an enhanced bi-metallic ratio, making it attractive to export gold from Europe, the Mahgrib and Asia Minor to Alexandria. Given a lack of indigenous sources of silver, however, each gold boom led to a cessation of silver imports and as stocks diminished, through natural wastage and a reversal of the specie flow, prices rose, lowering the bi-metallic ratio until gold imports ceased and the pattern was reversed. Silver flowed east and as gold stocks di-

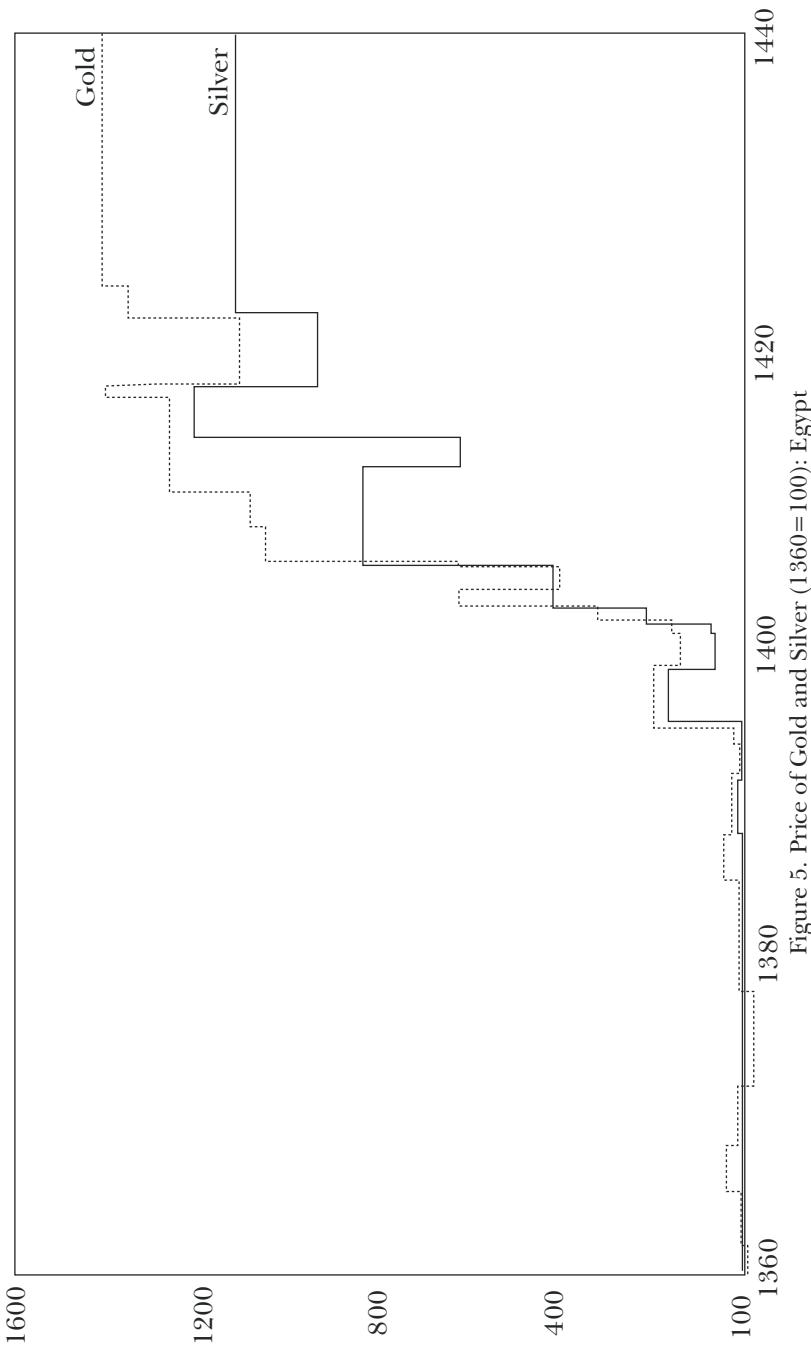


Figure 5. Price of Gold and Silver (1360=100): Egypt

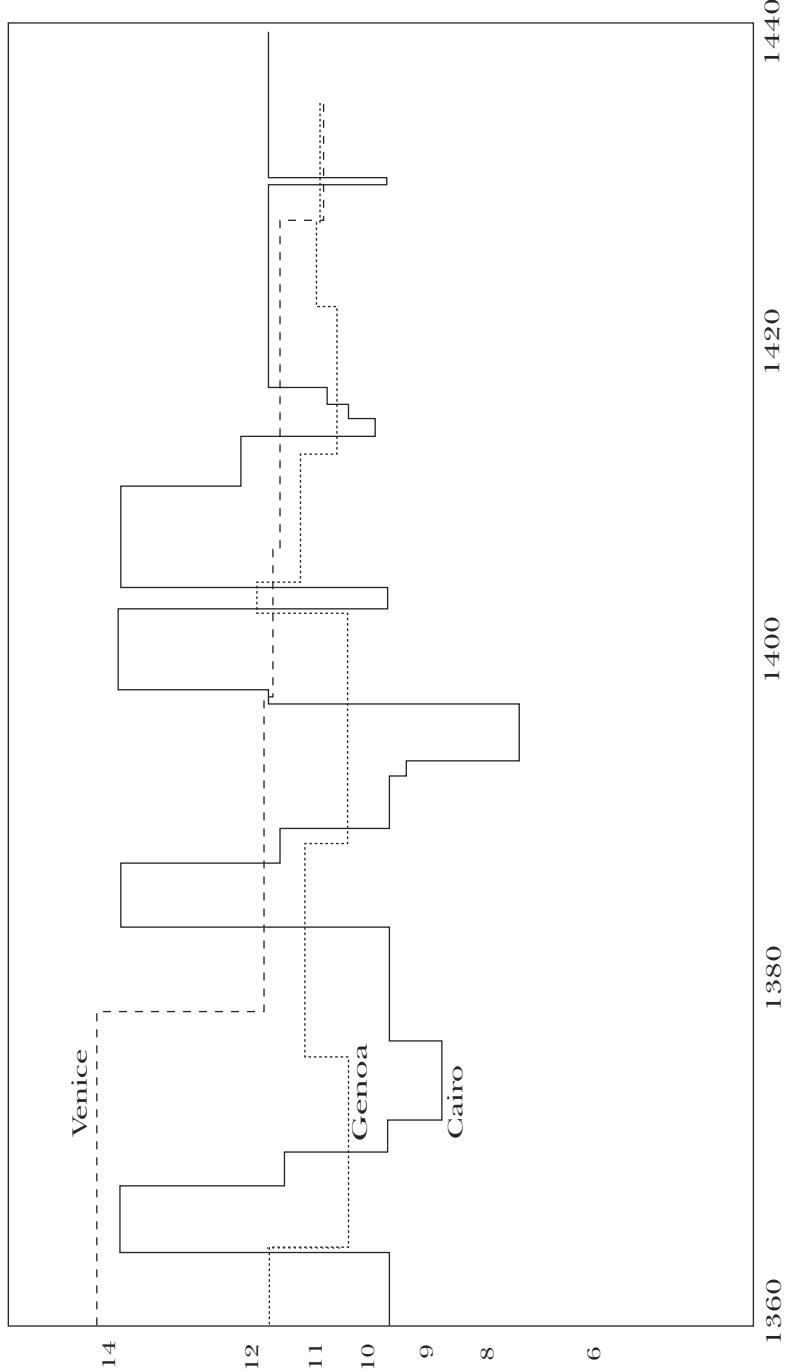


Figure 6. Bi-Metallic Ratios

minished its price increased ... From 1375, therefore, cycle followed cycle and in the absence of compensatory supply inputs, stock wastage took its toll of the metal shuttling back and forth across the Mediterranean, resulting in a gradual enhancement in specie price levels.

As both metals steadily increased in price, each upward movement, first in gold and then silver, drew the precious metal east and the depleting stocks raised prices on European markets. The years after 1375 thus saw the emergence of an extended market network, which alternatively channelled gold—in 1385-1390, 1399-1412 and 1418-1432—and silver—in 1374-1384, 1391-1399, 1413-1417 and 1431-1439—east to Alexandria. Each of the major ports of the northern Mediterranean formed a focus within which the impact of this specie trade was proportional to the size of its Levantine commerce. Each gold boom enhanced market prices, each silver boom resulted in an abatement of gold price, the general upward trend being most pronounced in the northern extensions of the supply network. Here disproportionate decreases in stocks, exacerbated by the emergence of a direct gold trade from Central Europe to the Middle East across the steppes of Tartary, led to an abnormally rapid rise in prices.¹⁴

As precious metals shuttled back and forth across the Mediterranean in conditions of gradual stock depletion, however, a much more fundamental change was taking place, which totally altered relations between the two trading blocks, a change centred on the years 1392-1412. As already noted, 1392/3 marked the beginning of a phase of rising gold prices on the Egyptian markets. Yet this rise brought forth no compensatory export of gold to Alexandria and European specie markets remained largely unaffected. The reason lay in the emergence of an acute crisis in the Egyptian monetary system.¹⁵ Until that date the standard of the whole system was the silver dirham. To the dirham was related gold, the value of which fluctuated with market conditions and in 1392 exchanged at 20 silver dirhams per dinar or *mithqâl*, and copper, exchanged

¹⁴ F. Lütge, *Strukturverwandlungen im ostdeutschen und osteuropäischen Fernhandel des 14. bis 16. Jahrhunderts* (München: Verlag der Bayerischen Akademie der Wissenschaften—C. H. Beck, 1964), 14-27.

¹⁵ Appendix, Numismatic Notes, Section 1.

by tale at 24 coins of 4.25 grams per silver dirham.¹⁶ In such circumstances the rise in gold prices to 26 1/2 dirhams in 1394 and 30 in 1399, shifted the bi-metallic ratio from 9.3-12.3 to 14.1.¹⁷ With Genoese and Venetian ratios of 10 and 11.4 respectively, therefore, Venetian exporters were offered potential profits of 7.8 and in 1399 22.8 per cent, which should have resulted in a reverse flow.¹⁸ In the event, however, it was not to be. At the low prevailing price of copper (0.25+ *riyl* per dirham) it was initially more profitable to take that metal to the mint and receive silver (12.5 per cent).¹⁹ The result was obvious. As Maqrīzī later described the situation prevailing during the years 1392-1395: "The Franks carried away the silver dirhams because of the increase in Egypt of the use of copper which they themselves had imported there."²⁰

In these circumstances the canonical standard collapsed. From 1392 to mid-1395 silver was exported and its price rose rapidly to a level incompatible with the official exchange.²¹ Accordingly, high-grade dirhams disappeared into hoards or were sold in the bazaars like other precious wares. Dirhams were found being worn as ornaments. Others were used in the manufacture of silver luxury articles

¹⁶ W. Popper, *Egypt and Syria under the Circassian Sultans, 1382-1468 AD. Systematic Notes to Ibn Taghrī Birdī's Chronicles of Egypt*, University of California Publications in Semitic Philology 15-16, 2 vols. (Berkeley: University of California Press, 1955-1957), 43-4, 68; and J. L. Bacharach, "Circassian Monetary Policy: Silver," *Numismatic Chronicle*, 7th ser., 11 (1971): 267-8.

¹⁷ Popper, *Egypt and Syria*, 52, 67. The forcing of the exchange to this latter rate, physical punishment being threatened to those who disobeyed, caused great hardship.

¹⁸ A. M. Watson, "Back to Gold—and Silver," *Economic History Review*, 2nd ser., 20 (1) (1967): 23-4 (Table 1).

¹⁹ Popper, *Egypt and Syria*, 68; Taqī al-Dīn Alīmad b. 'Alī al-Qādir b. Muhammād al-Maqrīzī, *al-Mawā'iz wa 'l-i'tibār bi dhikr al-khitāt wa'l-āthār* known as *Khitāt al-Maqrīzīya*, 2: 396.6,15; 397.4, as quoted by Popper, *Egypt and Syria*, 68.

²⁰ Al-Maqrīzī, *Kitāb al-nuqūd al-qadīmah al-islāmiyah*, ed. Anastase-Marie de St.-Élie (Cairo, 1936), quoted from the edition *Traité des monnaies musulmanes*, trad. A. L. Silvestre de Sacy (Paris: Imprimerie du Magasin Encyclopédique—Fuchs, 1797), 47.

²¹ Al-Maqrīzī, *Shudhūr al-'uqūd fī dhikr al-nuqūd*, ed. P. Anastase-Marie (Cairo, 1939), 62, as quoted in J. L. Bacharach, "Circassian Monetary Policy," 268; and Olav Gerhard Tychsen (Tuka), *Takieddin Al-Makrizii historia monetae arabicae, ex codice Escorialensi cum variis duorum codicum Leidensium lectionibus et excerptis anecdotis nunc primum edita, versa et illustrata* (Rostock, 1797), 131.

such as saddles or vases.²² The effect was to demonetize the classical dirham. In its place debased coins came to dominate the circulating media, which passed by the derogatory nomenclature *dirham fulūs* (copper dirham)—whose silver content reflected market prices.²³ With metal stocks doubly depleted by export (1392-1395) and hoarding, prices rocketed upward. In 1397/8 coins of only one third silver content comprised the major element of the circulating media (*i.e.* half the standard of the canonical dirham) exchanging at a de facto rate of fifteen to one (or a bi-metallic ratio of 7:1).²⁴ In such circumstances the import of copper ceased. That of silver resumed, allowing the restoration of the silver coinage at the price level of 1392, some 30 coins of two-thirds canonical standard being declared equivalent to 20 canonical dirhams and being exchanged against one dinar, thereby establishing a bi-metallic ratio of 9.3:1.²⁵ Yet this stabilisation of silver was only achieved at the expense of the gold coinage. Copper imports from 1392-1395 had prevented the alleviation of the crisis whilst exports of gold 1395-1399 had aggravated the situation. The coinage accordingly deteriorated, heavily worn coins displacing high-grade dinars in circulation, compensated only in 1398 by the first appearance of European gold from Genoa—florins which circulated at a discount in relation to the dinar in circulation (Appendix, Numismatic Notes, Section 2).²⁶ By 1399 a new equilibrium had been achieved between the two metals, exchanging at a bi-metallic ratio of 11.2:1, and between the Egyptian and Venetian currencies, but only at the cost of a 20 per cent depletion of gold stocks.

At this point, however, the administration of Yashbak al-Shā'bānī with its financial ghuru Ibrahīm ibn Ghurāb, which had come to power under the new Sultan Faraj²⁷ determined to defend gold and

²² Al-Maqrīzī/Sacy, *Traité des monnoies*, 40.

²³ Popper, *Egypt and Syria*, 61.

²⁴ Aḥmad b. ‘Alī al-Qalqashandī, *Subḥ al-a’shā fī sinā’at al-inshā*, ed. M. A. Ibrahīm, 14 vols. (Cairo, 1913-1920; reprinted Cairo: al-Mu’assasa al-Miṣriyya, 1964), 3: 467.3.

²⁵ Popper, *Egypt and Syria*, 56.

²⁶ Popper, *Egypt and Syria*, 45-7.

²⁷ Abū al-Mahāsim Yūsuf Ibn Taghrī-Birdī, *al-Nujūm al-żāhirah fī mulūk Miṣr wa ’l-Qāhirah*, ed. and trans. William Popper, *History of Egypt, 1382-1469*, Parts 1-7, University of California Publications in Semitic Philology 5-7, 12, 14, 17-19, 22 (Berkeley: University of California Press, 1915-1960), translation *History* 2: 2 (Arabic text *Nujūm*, 6: 3).

reform the monetary system, which had been reduced to chaos. A standard of 30 canonical dirhams to one canonical dinar was affirmed,²⁸ establishing a bi-metallic ratio of 14:1, which was more than sufficient to attract European gold and the actual coins in circulation were related to this standard.²⁹ The debased gold and imported coins were set at intrinsic value: the dinar at 24-25³⁰ and the ducat at 26 silver dirhams,³¹ the “copper dirhams” again at intrinsic value, 1.5 coins exchanging for one silver dirham.³² The effect was dramatic. Gold flooded in. Looking back in 1425 on this period Ibn Taghrī-Birdī recorded,³³

The use of the dinar *ifrantī* (ducat) became general in our commerce in the 800s (*i.e.* 1398-1409) in the principal towns of the world such as Cairo, Fostat, the regions of Syria, the principal lands of the Greeks, the regions of the Muslim East, the Hidjaz, the Yeman, to the point of becoming the current money and the most sought after in commercial transactions.

Without following in detail the vicissitudes of the reform, it must suffice to say that as long as the firm hands of Ibn Ghurāb and his protégé al-Bīrī were at the helm gold was successfully defended and the canonical standard reaffirmed.

The stability of gold, however, was only achieved through the debilitation of silver. For the population the remedy was more disastrous than the disease. With the raising of the bi-metallic ratio silver not only ceased to flow in but, indeed, in exchange for the inflow of ducats it was exported. As a result of this export and the process of natural wastage, prices rose, reflected in a diminution of the intrinsic value of the *dirham fulūs*. By 1403/4 the fractional currency of white metal was reduced to chaos. Coins of only one fifth the canonical standard were circulating in Cairo, whilst at Alexandria, where the impact of the gold inflow was acutely felt, the nor-

²⁸ Popper, *Egypt and Syria*, 52.

²⁹ Watson, “Back to Gold,” 27 (Table 2).

³⁰ Ibn Taghrī-Birdī/Popper, *Nujūm/History of Egypt*, translation *History* 2: 51 (Arabic text *Nujūm*, 6: 69.11); Popper, *Egypt and Syria*, 53.

³¹ Popper, *Egypt and Syria*, 47.

³² Popper, *Egypt and Syria*, 52.

³³ Ibn Taghrī-Birdī/Popper, *Nujūm/History of Egypt*, translation *History* 4: 30 (Arabic text *Nujūm*, 6: 596.5).

mal coins in circulation contained only half that amount of silver (Appendix, Numismatic Notes, Section 3).³⁴ Nor was the other popular base of the monetary system—copper—immune. The flood of coins entering circulation of the years 1392–1395 came to an end with the de facto rise in silver prices already noted. From 1395, with the cessation of imports, a new age began of “high” copper, because little arrived and merchants exported coin from the country”.³⁵ Prices rose from 4 dirhams per *ritl* in 1392 to 41/4 in 1397, 41/2 in 1403, 6 in 1404 and 12 in 1412.³⁶ In response to these changes and the rising price of silver, the actual copper coinage, which continued to pass by tale, was continually lightened as small and worn coins displaced the heavier issues of an earlier age. By 1403/4 the *mithqāl*-weight (*i.e.* 4.25 grams) coins had disappeared, replaced by quarter-dirham weight (*i.e.* 0.74 grams) pieces, which exchanged at 24 to the actual *dirham fulūs* in circulation.³⁷

The popular coinage was in chaos, causing great resentment amongst the population. Whether this contributed to the fall of Yashbak is uncertain, but the opposition party was clearly aware of the tensions in society and the period August 1404 to June 1405 saw a return to the populist policies, which had characterised the sultanate of Faraj’s father.³⁸ In the first month of the new administration the coinage was called down to 100 *dirham fulūs* accepted at their intrinsic value per dinar, representing at Cairo a bi-metallic ratio of 9.3:1, involving the merchant community in great losses and threatening the integrity of gold.³⁹

This populism, however, soon came to an end. In September 1405 Yashbak and Ibn Ghurāb once more came to power and the primacy of gold was restored.⁴⁰ Within the year the old standard was

³⁴ Ibn Taghrī-Birdī/Popper, *Nujūm/History of Egypt*, translation *History* 2: 78 (Arabic text *Nujūm*, 6: 106.5); 2: 84 (6: 115.15), 2: 89 (6: 121.20); Ibn Hajar al-‘Asqalānī, *Inbā’ al-ghumr bi anbā’ al-‘umr*, 3 vols. (Cairo: Majlis al-A’lā li ‘l-Shu’ūn al-Islāmīyah, 1969–1972), 2: 45, as quoted in J. L. Bacharach, “Circassian Monetary Policy,” 271.

³⁵ Popper, *Egypt and Syria*, 69.

³⁶ Popper, *Egypt and Syria*, 69.

³⁷ Popper, *Egypt and Syria*, 69.

³⁸ Ibn Taghrī-Birdī/Popper, *Nujūm/History of Egypt*, translation *History* 2: 81–2 (Arabic text *Nujūm*, 6: 111).

³⁹ Ibn Taghrī-Birdī/Popper, *Nujūm/History of Egypt*, translation *History* 2: 84, 89 (Arabic text *Nujūm*, 6: 115.5, 121.20).

⁴⁰ Ibn Taghrī-Birdī/Popper, *Nujūm/History of Egypt*, translation *History* 2: 95

re-established and the debilitation of silver continued apace as there was a gradual spread of the Alexandrine coins containing one-tenth silver (Appendix, Numismatic Notes, Section 3).⁴¹ Thereafter, month after month, they gained ground. In recognition of the decline in the intrinsic value of the *dirham fulūs* in circulation against the ducat and newly introduced *nāṣirī* dinar,⁴² there was a shift in the exchange rate from 150 in October 1405 to 250 in March 1406, when Ibn Ghurāb died.⁴³

From the death of Ibn Ghurāb and the fall of Yashbak, however, there was an increasing reluctance to acknowledge these changes by the new populist administration. As the ten-percent coins thus continued to spread, the de facto exchange rose to 264 in 1410 and 300 in 1412.⁴⁴ The official rate, however, was frozen at 250⁴⁵ and the standard maintained, as Maqrīzī explained “by the alteration of the *nāṣirī* and *ifrantī* by those who struck them, the Sultan on the one part and the Venetians on the other.”⁴⁶ Counterfeit and debased gold thus appeared in 1408, the coins being lightened from their standard of 3.55 grams to 2.94 grams. The system was once more reduced to chaos, reflecting the deplorable state of precious metal stocks, which steadily dwindled from 1392 (Appendix, Numismatic Notes, Section 4). Reform following the death of Faraj once more established the primacy of silver, lowering the bi-metallic exchange within a restructured system to 11.9: 1. This change, however, was overshadowed in the new environment of the 1410s by problems arising from Egyptian monetary stock depletion.

The years 1392-1412 witnessed, as a result of the diminution of Egyptian monetary stock, a complete alteration in the purchasing power of specie in terms of commodities within the two trading area, fundamentally altering the nature of trade (Appendix, Section V). European goods became increasingly un-competitive in relation to Levantine rivals as their relative price increased by 40-70 per cent

(Arabic text *Nujūm*, 6: 131.1).

⁴¹ Popper, *Egypt and Syria*, 54.

⁴² At its introduction the *nāṣirī* dinar circulated at a discount of 10 dirhams in relation to the ducat (*ifrantī*), Popper, *Egypt and Syria*, 49.

⁴³ Popper, *Egypt and Syria*, 63-4; Ibn Taghrī-Birdī/Popper, *Nujūm/History of Egypt*, translation *History* 2: 121, 125 (Arabic text *Nujūm*, 6: 167.20, 173.8).

⁴⁴ Popper, *Egypt and Syria*, 49, 57.

⁴⁵ Popper, *Egypt and Syria*, 74.

⁴⁶ Al-Maqrīzī/Sacy, *Traité des monnoies*, 59.

in the years after 1412. Trade in specie displaced trade in goods eastwards, fluctuations in bi-metallic ratios merely placing a premium on one metal and then the other in the specie outflow. Moreover, the trade could be highly profitable for, in free market conditions, oriental wares were correspondingly cheaper. Accordingly, the pattern of exchange of specie against specie, which had characterised the years 1374-1412, now from 1412 was displaced by an exchange of specie against goods.

How far European merchants benefited from this situation, however, depended on the reaction of indigenous traders to the new market environment. Where the Europeans operated in a competitive environment, as in the market for consumables and raw materials, one finds them buying up the country with alien gold and silver. On the other hand, where they faced an organised group, like the Kārimī merchants (*tujjär al-kārim*) in the spice trade, who with the encouragement of the Sultan were capable of a positive response, their position was weaker. Faced with a decline in specie returns for their goods, the Kārimī merchants simply restricted supplies of spices. Their first venture in 1412 was overly hasty, their price increase from 60 to 220 dinars per *sporta* grotesquely overshot the mark and they were left with spices on their hands.⁴⁷ Within two years, however, they had learnt to manage the monopoly effectively, maintaining domestic prices at about twenty per cent above the level of the 1390s.⁴⁸ These changes both within the international situation and the Egyptian economy were to have profound effects on the European specie export trade and on those who participated in it.

Structurally there was a major displacement in the foci of the rapidly growing trade. For Venice, heavily tied to the spice trade, the ability of the Kārimī merchants to maintain the specie price of spices ensured that they gained no advantage from the new situation. Indeed as relative prices in Europe were enhanced by almost two-thirds the trade declined. They reacted by diversifying into unrestricted markets for commodities like cotton and potash (Table 3).

Yet this could do little more than maintain a stable outflow of specie from the city, equivalent to 1.5 tonnes of gold annually.

⁴⁷ E. Ashtor, *Levant Trade in the Later Middle Ages* (Princeton: Princeton University Press, 1983), 313 (Table XXIX).

⁴⁸ Ashtor, *Levant Trade*, 313 (Table XXIX).

Having played a major role in the gold export boom of 1385-1390 and a paramount one in that of 1399-1412, Venice subsequently played only a small part in the unfolding drama of the gold export trade. Tied to the spice trade, the volume of specie exports did not grow, and with a bi-metallic ratio hovering constantly just above that of Egypt to 1433 gold played little role in what outflow there was.

Table 2
Amount of Specie Required to Buy a Basket
of Commodities (1380-1389=100)⁴⁹

Date	A. Egypt		B. Europe		<i>Relative Purchasing Power</i>
	1. Consumables & manufactures	2. Spices	1. Consumables & manufactures	2. Spices	
1380-9	100	100	100	100	100
1390-9	100	109	100	100	100
1400-9	92	98	105	114	
1410-9	47	160	75	160	
1420-9	52	120	73	140	
1430-9	47	118	81	172	

Table 3
Venetian Shipping and Trade⁵⁰

Date	Galleys		Cogs and Roundships		<i>Total Value</i>
	Number	<i>Value of Cargo</i>	Number	<i>Value of Cargo</i>	
1390-1410	7	450,000	2	24,000	474,000
1430-1439	5.7	350,000	7	100,000	450,000

⁴⁹ Popper, *Egypt and Syria*, 80-100; E. Strauss, "Prix et salaires à l'époque mamlouk," *Revue des études islamiques* 17 (1949): 49-94; E. Ashtor, *The Medieval Near East: Social and Economic History* (London: Variorum Reprints, 1978), Chap.10; J. Day, "The Great Bullion Famine," 3-53.

⁵⁰ F. C. Lane, "The Mercantile Marine of the Venetian Republic," in *Venice and History: The Collected Papers of Frederic C. Lane* (Baltimore: Johns Hopkins Univ. Press, 1966), 143-162; Ashtor, *Levant Trade*, 116-9 (Tables V-VI), 328 (Table XXXIII).

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In contrast Genoa, which had lagged behind Venice in the boom of 1385-1390 and had been totally ousted from the final stages of the following boom by not having, during the years 1405-1412, a marketable product in the florin, now came to the fore. Its merchants, always more committed to the bulk commodity trade, took full advantage of the new market situation. Tapping a constantly widening market in Egypt their commodity export trade from there grew rapidly, engendering a corresponding import trade in specie from Europe. Moreover, with a bi-metallic ratio that constantly remained below that of Egypt, each gold boom registered significantly in the market place. Genoa had become the motor of Europe. Tapping specie supplies from the European heartland as well as Spain and the Mahgrib, it channelled specie east in return for a burgeoning volume of bulk commodities. The Genoese market was transformed: the slow rise, which had characterised gold prices in the period when metals had shuttled back and forth in conditions of gradual stock depletion, gave way to a rapid increase as the metal outflow grew without any compensatory reciprocal flow.

A burgeoning gold export trade, increasing from about a third of a tonne net annually during the last quarter of the fourteenth century to 1.89 tonnes from 1400-1425 and perhaps as much as 4.5 tonnes annually from 1425-1432, as a result of Egyptian monetary disorders, denuded European gold stocks. Eclipsing the effects of the mining crisis of 1375-1400, the specie outflow became the principal cause of the gold crisis during the years 1400-1432. Only with the fall in gold prices, concomitant upon the establishment in the 1440s of mercury-amalgamation gold production in the Rhineland, and the increase in silver prices as a result of the mining crisis, did the specie outflow come to end. Bi-metallic equilibration between the two trading blocs allowed a resumption of commodity trades.

APPENDIX

Numismatic Notes

I. Canonical Standard (Standard of Whole System)

Silver dirham weighing 2.975 grams (67% silver)

to which was related

Gold, the value of which fluctuated with market conditions and in 1392 exchanged at 20 silver dirhams per dinar weighing 4.25 grams (97.9% gold)

Copper, exchanged by tale at 24 coins of 4.25 grams to the silver dirham (0.22 Egyptian lb. [*ritl*]=1 silver dirham)

II. Weight of Gold in Circulation

1392	4.25 grams dinar
1399	3.56 grams dinar = 30 silver dirham
	3.32 grams florin= 28 silver dirham

III. Deterioration of Silver

Date	Number of dirham <i>fulūs</i> to canonical dirham	Number of dirham <i>fulūs</i> to canonical dinar	Intrinsic silver content (% of canonical standard)
Yashbak	1399	1.5	45
	1401	1.6	48
	1402	2.6	78
	1403/4		
	Cairo	5.0	20.0
	Alexandria	10.0	10.0
1404	3.3	100	30.0
1405	3.3	100	30.0
Yashbak	1405	5.0	20.0
	1406	8.3	12.0
1410	8.8	(265)	11.0
1412	10.0	(300)	10.0

IV. Monetary Stocks

	<i>Gold</i>	<i>Silver</i>	<i>Copper</i>	<i>Total</i>
1392	100	100	100	100
1399	80	100	90	90
1412	76	15	30	40

V. Value of Gold

Value of Gold on the Alexandrine Specie Market in Terms of Both
Silver and the Unit of Account, 1412-1422
(in *dirham fulūs*; M=market; O="Official"; E=Exchange; V=Value)

	<i>Gold</i>		<i>Silver</i>				<i>Bi-metallic Ratio</i>	
	<i>Canonical Dinar</i>	<i>Nāṣirī Dinar</i>	<i>Ducat</i>		<i>Half-Mu'ayyadī Dirham</i>			
			<i>M</i>	<i>O</i>	<i>E</i>	<i>V</i>		
Jan. 1412	230	200	210					
Feb. 1412	240	210	225		30	7.5 ^(a)	14.1	
April 1413	250	210	230					
March 1414	250	200	230					
April 1415	250		230		30	9	8.75	
May 1415	250		230					
Jan. 1416	270	200	250					
Feb. 1416	280	250	260	230				
March 1416			230-	250		9	8.75	
April 1416	270		250					
May 1416	230		210					
June-I 1416			230		30	7.5 ^(b)	8.66	
June-II 1416	280	250	260	230				
Aug. 1416	270-	250	252-	235				
Oct. 1416			230					
Feb. 1417	250		230					
June 1417	280	250	260	230				
Jan. 1418	280		260					

(cont'd)

V. Value of Gold, cont'd

	Gold			Silver			<i>Bi-metallic Ratio</i>
	<i>Canonical Dinar</i>	<i>Nāṣirī Dinar</i>	<i>Ducat</i>	<i>Half-Mu'ayyadī Dirham</i>			
			<i>M</i>	<i>O</i>	<i>E</i>	<i>V</i>	
March 1418	280	250- 230		260	220- 230		
Sept 1418				210	30	7	6.69
Jan 1421	230			210			
Jan 1422	240			220	22	10	8.00

Notes: (a) Related in this year and until 1416 to the dinar-*mithqāl*.
(b) Related after mid-1416 to ducat-florin.

Sources: E. Ashtor, “Études sur le système monétaire des Mamlouks circassiens,” *Israel Oriental Studies* 6 (1976): 268-70 (Table 2); Popper, *Egypt and Syria*, 74-5.

FROM VENICE TO THE TUAT: TRANS-SAHARAN COPPER TRADE AND FRANCESCO DI MARCO DATINI OF PRATO¹

Martin Malcolm Elbl

From 1394 to 1410, the well-known Tuscan merchant firm of Francesco di Marco Datini of Prato both watched and participated in the traffic of Venetian-supplied copper through the Balearic Islands to the Maghribi ports of Honein and Ghassāṣṣa.² From Honein, in particular, the metal then moved south to the oasis of Tuat, en route to the Western Sudan. Pending further discoveries in the Datini archive, Tuat seems to have been the southernmost point in the Sahara with which Datini agents in Majorca were explicitly albeit indirectly familiar. Their indirect knowledge was mediated through contact with Majorcan Jewish merchants involved in the caravan

¹ Offered to John Munro, mentor and a lasting source of inspiration, upon his retirement. My ongoing research on the Datini firm owes much to the impetus of his graduate seminars and his numerous works. The topic aims to honor John Munro's place on the Scientific Committee of the Istituto Internazionale di Storia Economica "F. Datini" in Prato.

² Honein (*Ar. Hunayn*; commonly gazetteered as Honaine; JOG NI30-03; lat. 35.16° N, lon. 1.65° W): port formerly located northeast of modern Nemours, in Honein Bay (Marsa Honaine, between Cape Noé and Marsa Agla), at the mouth of Oued Honaine. Ghassāṣṣa, known to the Europeans as Alcudia (Khassaṣṣa, Iguesasen, also al-Qudia al-baīḍā' = the White Hill) is not to be confused with Alcudia in Majorca. The port was located in Ghassāṣṣa Bay (still known to World War II Mediterranean coastal pilots as *Cala de Cazaza*, mod. Marsa de Sidi Lahsen, west shore of Cabo de Tres Forcas [Cap de Trois Fourches], east of the prominent vertical cliffs of Punta Negri. See e.g. North Africa, 1:250,000, Edition 1-AMS, JOG NI30-02 (U.S. Army Corps of Engineers, 1954 –). The port is shown more or less correctly in many late medieval portolan charts (very well visible in BM MS Egerton 2803, Plate X of the *Atlas of Portolan Charts*, ed. E. L. Stevenson (New York, 1911)); also in the Fra Mauro map (c. 1450), in R. Almagià, ed., *Monumenta Cartographica Vaticana*, 1, *Planisferi, carte nautiche e affini dal secolo XIV al XVIII* (Vatican: Città del Vaticano, 1944 –), Plates XIII-XV, as *Larcildia*; and in many others, all the way back to the Carignano planisphere (c. 1320), Archivio di Stato di Firenze (ASF), *Portolani* (as *Alcudia*).

trade, several of whom resided in or originated from Honein. Far from a mere oddity, however, this extension of the firm's conceptual map possessed direct relevance, given the exposure of the Datini branch in Majorca to copper trade vicissitudes traceable as far as the Tuat.

At first a mere observer, the Majorca branch took its first serious plunge in the copper trade in 1398. The involvement gradually escalated to a complex set of transactions, undertaken in 1407-1408 partly on behalf of the mother firm and its contacts and partly in conjunction with a diversified group of Balearic merchants, Christian, Jewish, and *converso*. The venture's disastrous outcome, even though accidental, upset the Majorcan copper market for many months and repercussions were felt from Valencia to Venice. Undeterred, the Majorca branch nonetheless maintained interest in exports of copper to Honein as late as August through September 1410, a period straddling Francesco Datini's last illness, his death on 16 August, and the firm's legal dissolution. The substantive Datini evidence predates by some fifty years the notorious but far less richly contextualized voyage to the Tuat by the Genoese Antonio Malfante in 1447, still commonly cited as "the first Italian commercial venture in the Sahara."³

Given the dates (*c.* 1390-1410), the geography (a Venice-Majorca-Honein-Tuat artery), and the commodity (copper), it is practically indispensable to set this trade flow in the context of Prof. Ian Blanchard's recent cyclical intercontinental models of medieval trade in metals and other commodities, some aspects of which remain as yet unpublished but circulate in digital manuscript.⁴ The Majorcan

³ R. H. Rainero, "La prima iniziativa commerciale italiana nel Sahara: Antonio Malfante nel Tuat nel 1447," *Universo* (Florence), 64 (5) (1984): 556-69. For Malfante's letter from the Tuat, addressed to Giovanni Marione, see G. R. Crone, *The Voyages of Cadamosto* (London, 1937), 86.

⁴ Ian Blanchard, "The Trans-Saharan Slave Trade, c. 1320-1520: A Study of Environmental Change and Commercial Adaptation," paper presented at the conference *Slavery, Freedom and Unfreedom in the Middle Ages*, University of Nottingham, 23 April 2005; Ian Blanchard, "The Medieval World of Islam: An Economic and Environmental Analysis," paper presented at the *International Medieval Congress*, Leeds, 2001; Ian Blanchard, "Egyptian Specie Markets and the International Gold Crisis of the Fifteenth Century," in the present publication, 383-410. The arguments are also reflected in the third volume of Blanchard's *Mining, Metallurgy and Minting in the Middle Ages*, Vol. 3, *Continuing Afro-European Supremacy (African Gold Production and the Second and Third European Silver Production Long Cycles)* (Stuttgart: Steiner, 2005), Part 3,

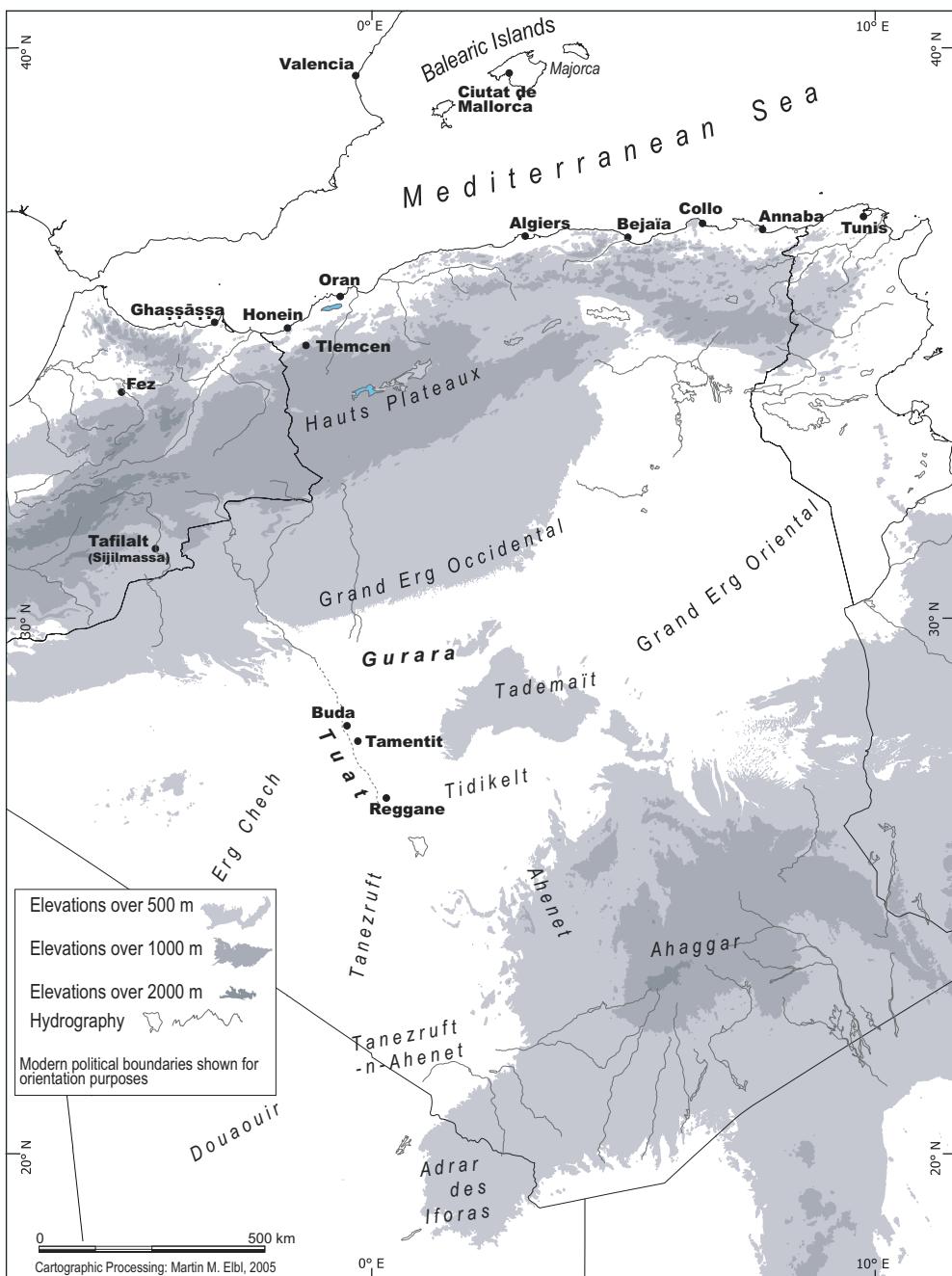
copper trade is indeed of some relevance to supporting, adjusting or correcting (as the case might be) those portions of the models that cover the Western Mediterranean and the West-Central Sahara desert around 1400.

Blanchard has generally posited 1375 as the starting point of troubles in the distinctive Western Mediterranean market structure that since c. 1325 had arguably witnessed an adequate flow of gold in the form of double dinars (*doblas*) from the Maghrib to Europe, eliciting a countervailing southbound supply of European silver. Around the same time the trans-Saharan caravans ceased to enjoy a roughly simultaneous benign climatic cycle. As Blanchard has argued, the latter's lower temperatures and higher precipitation promoted prosperity among nomad populations, relative safety and stability along the desert margins, and the use of trails crossing the West-Central Sahara through fairly difficult dune and sand sea (*erg*) regions, particularly between the Tafilalt (Sijilmassa), the Tuat, and Walata. From the 1390s, however, increasing aridity and the related upheavals among desert dwellers contributed to a major shift in trade routes. The latter swung to take advantage, among other, of "aqueous gravel at the foot of the Ahaggar and the Adrar des Iforas"⁵ (in this case the strip of Tanezruft routes from Tuat to the eastern Niger Bend). The trail realignment was largely completed by 1435, and endured throughout the arid phase stretching from about 1420 to 1470.

The 1375-1435 shift was accompanied by a "basic restructuring of inter-Maghrebian [precious metal] supply networks" reflecting changes in the flow of gold and thus presumably also other articles of trans-Saharan trade. Marīnid mints in Morocco ceased operating in the first decade of the fifteenth century, while the Ḥafṣid mints of Ifriqīya in the east rose to prominence. European maritime trade in the Western Mediterranean followed suit, shifting away from the western Maghrib to focus more on Ifriqīya, from where Ḥafṣid double dinars passed north "in exchange for European silver". Related mechanisms lying outside the scope of this paper contributed to a relative isolation of Egypt from African sources of gold, acute shortages of gold on the Egyptian market, and the emergence

"Base Metal Production and Trade: Lead, Tin and Copper."

⁵ Blanchard, "Slave Trade," 12; "Medieval World of Islam," 32-33; "Egyptian Specie Markets," 338.



Map 1. West-Central Sahara and the Maghrib

of alternating money-pump flows channelling respectively gold and silver from Europe and Asia Minor to Egypt. The corresponding vagaries of the Egyptian monetary system—silver, gold, and copper—were partly reflected in the pattern of Egyptian copper imports.⁶

Certain difficulties, however, beset Blanchard's macro-models with respect to Western Mediterranean and Maghribi commerce and, specifically, the West-Central Saharan caravan traffic. Firstly, the Maghrib is all too often treated as an unproblematic trade membrane between Europe on the one hand and the Sahara and sub-Saharan Africa on the other hand. The distinctiveness of the Maghribi regional economies and the intricacy of their role in Western Mediterranean commerce thus recede unduly into the background. Secondly, even as a mere *lieu de passage* the Maghrib becomes a somewhat schematic doughnut in this rendering. Morocco and Ifriqīya namely hold the limelight, while Tlemcen, in the middle, almost vanishes were it not for mentions of the port of Honein. This is reflected in some of Blanchard's trail maps, which seem to reduce West-Central Saharan trade dynamics to a see-saw between "Sijilmassa" in the west and Wargla in the east. The result is a great "X" shape whose legs cross at the Tuat both in "old" trail system of 1310-1370 and in the "new" system of 1445-1454.⁷

Wargla and "Sijilmassa" anchor the northern tips of the "X" throughout, abstracting from the destruction of the walled city of Sijilmassa and from attendant changes in the role of the surrounding oasis of Tafilelt in the 1390s. Trade flows from Honein and Tlemcen are depicted as passing through Fez, or rejoin the Fez branch in the Atlas Mountains and invariably appear to follow the Tafilelt route. The more direct Oued Guir-Oued Saoura trails are not featured. Correspondingly, Catalan, Genoese and Provençal maritime trade is described as emulating in a somewhat mechanistic fashion the arid era rise of the easterly trails leading through the Tuat and other channels to Ifriqīya.⁸ The middle band represented by the axis Balearics-Honein-Tuat is underplayed, as is the Tlemcenian/Algerian

⁶ Blanchard, "Egyptian Specie Markets," 338-43.

⁷ Blanchard, "Slave Trade," Maps 1 ("Trans-Saharan Trade, 1310-1370") and 2 ("Trans-Saharan Trade, 1445-1454").

⁸ Blanchard, "Egyptian Specie Market," unpublished draft, at http://www.esh.ed.ac.uk/Courses_IB/Mid_Ages/alexandria.pdf, 10-11.

coast whose mundane but certainly not unimportant hides, kermes (dyer's grain), wax or wool, and grain were the money-making staples of Balearic and partly also Valencian light shipping. Very much part of this "middle band" economy, the vibrant Italian/Majorcan trade in copper and other goods carried through the Tuat to the Western Sudan in the 1390s and early 1400s thus fills a virtual void in Blanchard's phase of west-east route shift (1375-1435).

As early as 1955 Jacques Heers hinted at the relative importance of the Balearic copper trade, suggesting that the sizeable quantities of copper on board the Venetian galleys westbound to Flanders in 1401 were perhaps partly routed to the Maghrib, by way of Majorca. He did not elaborate, however, or show that this metal indeed moved across the desert.⁹ Since then, the route Venice-Balearic Islands-Maghrib seems to have faded out of sight as a factor in the trans-Saharan trade.¹⁰ The works of Charles-Emmanuel Dufourcq or Pierre Macaire did not go beyond restating the commonplace, and David Abulafia's history of the Catalan kingdom of Majorca passed the Balearic copper trade under silence. María Dolores López Pérez's seminal study of exchanges between the Maghrib and the Crown of Aragon in the fourteenth century, heavily drawing on Majorcan data, ignored copper among Balearic re-exports. Finally, the first Catalan monograph to use the Datini material more extensively, Dolors Pifarré Torres' analysis of trade between Barcelona and Flanders, briefly alluded to Catalan imports of Flemish copper, but without tracing any Maghrib trade links or touching on the Venetian strand of the copper traffic.¹¹

⁹ J. Heers, "Il commercio nel Mediterraneo alla fine del sec. XIV e nei primi anni del XV," *Archivio Storico Italiano* 113 (2) (1955): 177.

¹⁰ The promotional summary for Georges Jehel's *L'Italie et le Maghreb: conflits et échanges du VIIe au XVe siècle* (Paris: Presses Universitaires de France, 2001) (signed Georges Jehel, June 2002, at <http://www.clio.fr>), further complicated matters by including copper among late medieval Maghribi exports to Italy ("... qui constituent, avec certains minéraux comme le cuivre, l'essentiel des exportations du Maghreb vers l'Italie pour approvisionner une production artisanale et industrielle diversifiée en plein essor au XIV^e siècle"). The book itself, however, is rather more muted in this matter (Jehel, *L'Italie et le Maghreb*, 162).

¹¹ Ch.-E. Dufourcq, *L'Espagne catalane et le Maghrib aux XIII^e et XIV^e siècles. De la bataille de Las Navas de Tolosa (1212) à l'avènement du sultan mérinide Aboul-Hasan (1331)* (Paris: Presses Universitaires de France, 1966); Pierre Macaire, *Majorque et le commerce international (1400-1450 environ)* (Lille: Atelier de reproductions de thèses (Univ. of Lille III), 1986); David Abulafia, *A Mediterranean*

The current gap in the literature is not, however, a consequence of scanty data—enough is available to frame at least preliminary answers. It rather reflects a bottleneck in exploiting such massive sources as the Datini archive effectively, in order to find pass-keys unlocking other archival leads and to build up a critical mass of cross-referenced evidence spanning the Western Mediterranean. David Abulafia's *Mediterranena Emporium* unintendedly but pertinently exemplified the issue. Having argued that “the Datini evidence, superabundant as it is, cannot be used with confidence to map out Mallorca’s trading links”—a sensible if over-cautious position—Abulafia also suggested that the archive was of limited use for the study of the Maghrib trade. Francesco Datini namely “showed rather little interest in North Africa,” as evidenced by a negligible exchange of letters between “north African localities and Datini agents in the Balearics.” The firm, while expressing “strong interest” in African wares offered in Majorca, supposedly focussed mainly on wax and “to some degree” leather.¹² Unfortunately, this amounts to a severe misestimation of the Datini records.

From Maghribi wax, wool, and kermes (dyer’s grain)¹³ to “feather” alum, the West African spice malaguetta, Moroccan gum sandarac, ostrich feathers, and a wide array of Maghribi skins, pelts, rawhide and leather of varying grades and regional provenances, the Datini firm’s *Compagnia di Catalogna* was in fact extensively involved in

Emporium. The Catalan Kingdom of Majorca (Cambridge: Cambridge University Press, 1994); María Dolores López Pérez, *La Corona de Aragón y el Magreb en el siglo XIV (1331-1410)* (Barcelona: CSIC, Institución Milá y Fontanals, 1995), 570-573; Dolors Pifarré Torres, *El comerç internacional de Barcelona i el Mar del Nord (Bruges) a finals del segle XIV* (Barcelona: Publicacions de l’Abadia de Montserrat, 2002).

¹² Abulafia, *Mediterranean Emporium*, 220-1.

¹³ One of the substances used to dye fabrics in shades of deep red, purple, or scarlet. See e.g. John H. A. Munro, “The Medieval Scarlet and the Economics of Sartorial Splendour,” in Negley B. Harte and Kenneth G. Ponting, *Cloth and Clothing in Medieval Europe: Essays in Memory of Professor E. M. Carus-Wilson*, Pasold Studies in Textile History No. 2 (London: The Pasold Research Fund and Heinemann Educational Books, 1983), 13-70; reprinted in John Munro, *Textiles, Towns, and Trade: Essays in the Economic History of Late-Medieval England and the Low Countries*, Variorum Collected Studies series CS 442 (Aldershot, Hampshire; and Brookfield, Vermont: Ashgate Publishing Ltd., 1994). Also J. H. A. Munro, s.v. “Scarlet,” *Dictionary of the Middle Ages*, 13 vols., edited by Joseph R. Strayer et al., Vol. 11: *Scandinavian Languages to Textiles, Islamic*, 36-7 (New York: Charles Scribner’s Sons/MacMillan, 1982-88 [1988]).

North African commerce. The same *Compagnia* supplied Balearic exporters with an array of European goods either retailed in the Maghrib or carried in part across the Sahara, from cloth to petty metalware, eyeglasses, mirrors, beads and paternosters, paper, Eastern spices and lac, chemicals and medicinal substances—and copper. It is true that all the Datini transactions with North Africa were indirect, conducted through Majorcan or Valencian intermediaries. Yet the firm's lack of direct contact with Maghribi clients, regrettable as it might be for historians, did not reflect faint interest, but the circumstances in which the local branch was set up, and the Balearic merchants' protectionist tactics. The Datini archive should certainly not be underrated as a resource for the study of North African maritime commerce and, at least obliquely, of discrete Maghribi economic sectors.¹⁴

The recent publication (2003) of Giampiero Nigro's two volumes of Datini and related letters from Majorca may begin to change perceptions in this matter.¹⁵ The coverage, however, stops in 1396, the year when the *Compagnia di Catalogna* finally emerged as a business entity from the awkward formative stage that saw the first implantation of a branch in Majorca. For the bulk of the latter's most active and profitable years, 1396-1410, and for the intimately related evidence from sister branches in Valencia and Barcelona, it remains necessary to work with the original documents. Moreover, Nigro focussed on the correspondence—quite wisely, from the point of view of timely publication. The bulky unpublished branch ledgers and associated account books, however, are as crucial for interpreting the letters as the latter are for setting the bland transaction records in context. Finally, both strands of the Datini material require careful matching with local sources—Balearic, Valencian or both—to tease out their full significance. In particular, the extent of the Datini firm's exposure to North African markets can prove difficult

¹⁴ Relevant elements can be traced back to the classic works of Federigo Melis, including his fundamental *Aspetti della vita economica medievale: studi nell'archivio Datini di Prato* (Florence: L. S. Olschki, 1962), but new detailed studies (companion pieces to the present paper, based on both correspondence and ledgers) of the Datini wax, kermes, malaguetta, and hide and skin trade through Majorca are only now on the verge of being published.

¹⁵ Giampiero Nigro, *Mercanti in Maiorca. Il carteggio datiniano dall'isola (1387-1396)*, 3 vols. (Florence: Le Monnier, 2003). The third volume containing an interpretive essay and the index was still "in press" as of November 2005.

to assess without a close knowledge of the Balearic/Valencian merchant scene, especially in the current absence of good indices to the Datini papers.

Before discussing the Datini role in the Balearic copper trade and the rather dramatic circumstances of the largest and so ill-starred copper deal orchestrated by the firm's Majorca branch, a quick sketch of Majorca's copper market is in order. There is no evidence thus far that the Balearics functioned as a crossroads of Venetian and Flemish supply strands. Virtually all the copper arriving in Majorca in the Datini years was shipped from Venice, frequently with direct involvement by Venetian firms or agents. Copper from the Low Countries did reach the key transshipment nexus in the Maghribi port of Honein, although not through Majorca, but according to contemporary testimony North African buyers distinctly preferred Venetian copper.¹⁶ Moreover, as Torres has shown, Tuscan merchants in particular tended to balk at shipping copper from the Low Countries to the Mediterranean because they could not acquire it in Bruges on easy payment terms or through barter for other goods. In the north, copper was all too often cash business. It remains difficult to determine whether the Flemish copper sold in Honein tended to be virgin or part scrap—the firm of Diamante and Altobianco degli Alberti certainly signalled the availability of both at Bruges.¹⁷

Venice supplied copper to the Western Mediterranean in three forms: loaf ingots (*pani*), plates (*tavole, tole, lastre di rame*), and rods (*verghe*). The first two predominated in the Majorcan market. Scattered prices for *verghe* are found in the Datini material but copper was rarely if ever delivered to Majorca in this form even though the Saharan caravans might have preferred rods, as we shall see.¹⁸ No

¹⁶ ASP, D. (Archivio di Stato di Prato, Archivi di Famiglie e di Persone: Archivio Datini) 998 (number of Datini *filza*), *Majorca-Valencia*, Datini Co. (the notation Datini Co. identifies here the so-called *lettere di compagnia* or “open” letters from one Datini branch to another, as opposed to letters exchanged among individuals within the firm, or strictly private and confidential correspondence; the repetitious full business styles of originating and recipient branches will thus not be given), 23 Jul. 1406, fol. 1v.

¹⁷ Torres, *Barcelona*, 148. Torres mistitled the Diamante and Altobianco degli Alberti partnership in Bruges as “els Diamante”. The correct attribution is evident from the letters to which she refers.

¹⁸ ASP, D. 892, *Majorca-Barcelona*, Datini Co., 31 Jul. 1409, fol. 1v. Further p. 437 below.

provision seems to have been made for turning plates into rods in Majorca in the Datini years, although in the case of tin Pegolotti clearly stated that in his time (1320-1347) rods for re-export were made from ingots of Cornwall tin both in Majorca and in Venice, with the hallmarked Venetian ones fetching the higher price.¹⁹ The documents clearly show that the copper shipped to the Maghrib at the turn of the fourteenth and fifteenth centuries came largely in plates.

The less frequent ingots quoted in Majorca as *dell'angnolo* (*i.e.* with the “Lamb” hallmark) occasionally topped the price range. They fell into the category of *rame di Papa* or the *rame della bolla di San Marco di Vinegia* (whose general description is found in Pegolotti’s *Pratica della Mercatura* trade manual). This was refined red copper in bread-sized loaves. Somewhat cheaper were the unmarked small loaves of red *rame dell’ene*.²⁰ Given the colour (*molto vermiglio e rosso*) and the price, it is likely that both types corresponded at the very least to *Rosettenkupfer* (using standard German smelting terminology) if not *Hammergarkupfer* (for the hallmarked ingots). These were the last two steps of copper refining, sometimes conflated in the literature, but in fact distinct. The primary refining of raw copper (*Schwarzkupfer*) in an open oven (*Garherd*) to reduce impurities, volatilize arsenic, antimony and zinc, and tie other companion metals in slag, yielded *Garkupfer* (refined copper) in the form of *Rosettenkupfer*, but despite its nice red hue the product, while marketable, was still not quite pure and remained poorly malleable. The final *Hammergarmachen* involved one more smelting with charcoal, and only then were the ingots stamped with a producer’s hallmark.

Whether hallmarked (*di bolla*) or not, the *rame in tavole* refined and made up into plates in Venice was put on the market in part as malleable *Hammergarkupfer*. The product was yellowish, verging on brass in colour, although Pegolotti stressed the difference, acknowledged and appreciated by merchants, between this copper and brass properly speaking (“yellow copper”, *ottone*). The plates were rated good and “sweet” only if they “held up to the hammer” and bent without cracking or breaking. In Pegolotti’s time standard

¹⁹ Francesco Balducci Pegolotti, *La pratica della mercatura*, ed. Allan Evans (Cambridge, MA: The Mediaeval Academy of America, 1936), 381-2.

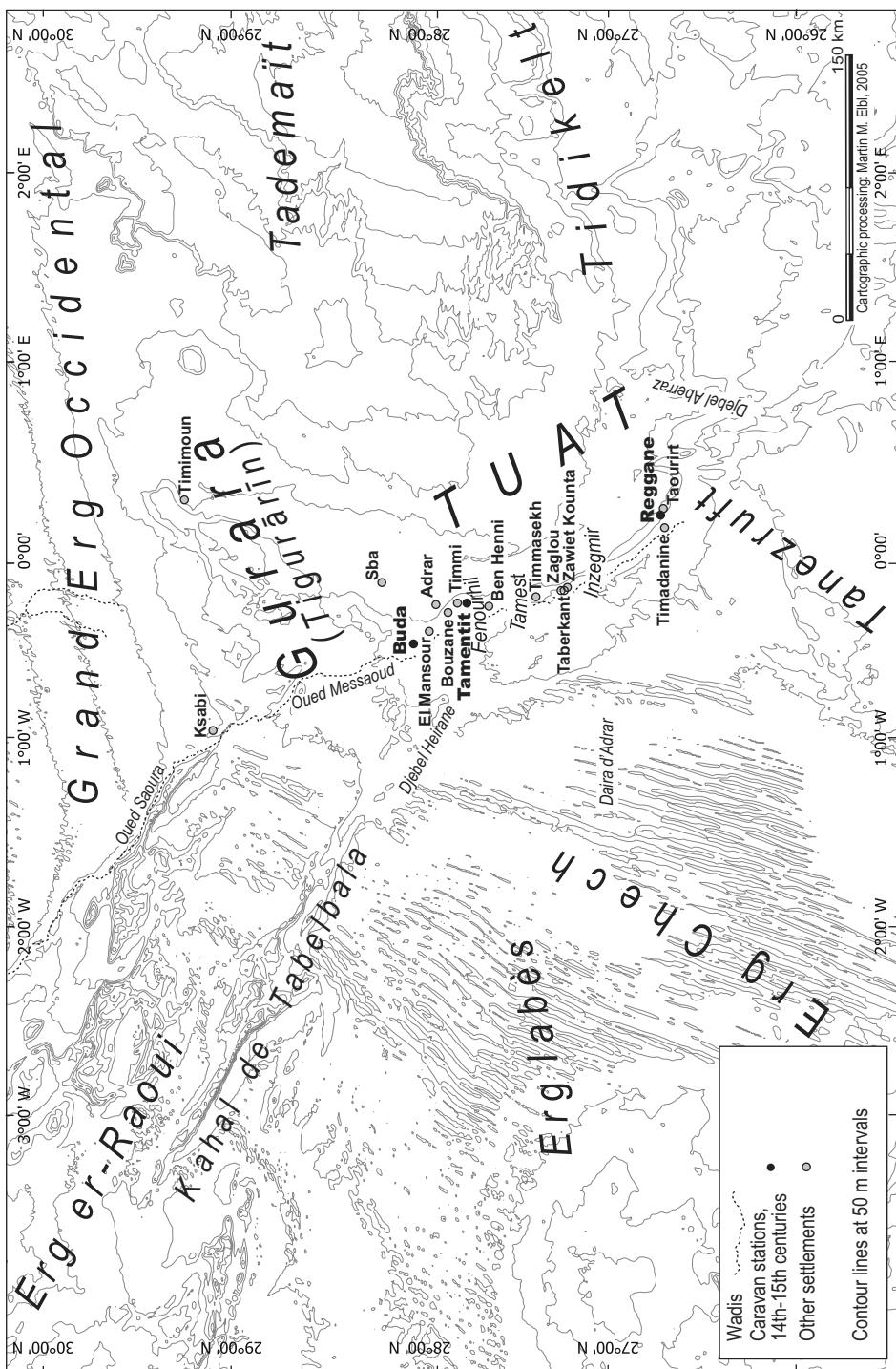
²⁰ Pegolotti, *Pratica*, 381. For discussion of possible provenance, see pp. 446-7 below.

Venetian-made plates were sized 1 by 0.5 *braccia* (0.68 m by 0.34 m).²¹ The Datini ledgers suggest an average plate weight of c. 12.43 Majorcan pounds or 5.04 kg, and thus a thickness of c. 0.25 cm—if indeed the other two dimensions remained roughly the same since Pegolotti's time.²² Whether the plates traded through Majorca were mostly “sweet” is not entirely clear from the Datini and Majorcan records. Brittle “sour” plates were undeniably on the market, and Pegolotti had explicitly urged testing batches for “sweetness”. It is tempting to interpret the “sour” plate as copper subjected to imperfect *Hammergarmachen* or none at all, and mixed in to “pad” bundled lots.

The port of Honein, as already implied, was a key entrepôt hub of the Majorcan/Venetian copper trade, while Ghassāṣṣa (Alcudia) served as a secondary outlet geared towards Moroccan markets, above all Fez. The Datini letters leave no doubt that Honein was at this juncture a prominent head of trail serving the large annual caravans bound for the northern Saharan oases—and from there across the desert (even though the correspondence does not say much regarding the latter). The oasis region of Tuat, repeatedly mentioned in the letters, was a vital staging point south of the Grand Erg Occidental (Great Western Sand Sea) and the Gurara oasis group. It provided a gateway to the so-called Tanezruft route and ultimately to the Niger Bend. Wedged between the Tademaït Plateau and the Tidikelt in the east and the northern outliers of the long dunes of Erg Chech in the west, the Tuat was a major source of food and water at the northern edge of the desolate *reg* (gravel desert) dominating the Tanezruft Basin. Describing the Tuat in the later fourteenth century, Ibn Khaldūn spoke of some 200 *quṣūr* (fortified settlements), the most notable among them the bustling caravan station of Tamentit (Tamanṭīt). Besides Tamentit, Ibn Khaldūn highlighted the micro-regions of Buda (in the north) and Reg-

²¹ Pegolotti, *Pratica*, 381.

²² ASP, D. 1016, *Libro grande bianco segn. C* (Majorca), fol. 115r (27,968.5 Majorcan pounds = 2,251 copper plates). The probable thickness has been calculated using the specific weight of 8.6 kg/dm³ as a reasonable compromise in lieu of the unknown specific weight of the medieval copper sold in Majorca. The specific weight of pure modern copper is 8.93 kg/dm³ at 15° C, falling to 8.9 and 8.8 for laminated and cast copper respectively. Casting brass and rolled and drawn brass vary between 8.4 and 8.73 kg/dm³ and the specific weight of beryllium copper can be as low as 8.1 kg/dm³.



Map 2. The Tuat and Gurara

gane (the southern outpost where the Oued Messaoud (Ghir-Saoura) “vanished among the sands”).²³ Buda, the former head of trail for caravans travelling to Mauritania’s Walāta, had reputedly yielded its rank to Tamentit by Ibn Khaldūn’s time.

Confusingly enough, Ibn Khaldūn also referred to Buda as the “westernmost” of Tuat’s micro-regions and to Tamentit as the “easternmost” one, but this is true only in a rather tenuous sense—the Tuat in fact stretches along a steep NNW to SSE line (Maps 1 and 2). The region is a string of discrete oasis nodes straddling the Greenwich meridian (0° longitude) down the east side of the Oued Messaoud (Oued Tuat) valley, an extension of the Oued Saoura.²⁴ The *quṣūr* of the larger Tuat were clustered in micro-regional groups structuring the oasis region geographically and politically from north to south, *not* east to west: Buda, Timmi/Adrar, and then Tuat as such (Fenughil [Fenourhil], Tamest, Zaglou (Tuat al-henna), Inzegmir, and Reggane). There was not much real difference between a caravan station at Buda (north-west of mod. Adrar) and at Tamentit (south of Timmi, north of Fenughil), some 50 km or a long day’s march away.²⁵ Buda was simply the first cross-roads of trails from the Dar'a and the Tafilalt in the north-west (through the Kahal de

²³ Walī al-Dīn ‘Abd al-Rahmān Abū Zayd ibn Khaldūn, *Kitāb ta’rīkh al-duwal al-islāmīya bi-l-Maghrib min Kitāb al-ibar. Histoire des Berbères et des dynasties musulmanes de l’Afrique septentrionale*, trans. MacGuckin De Slane, new ed. P. Casanova (Paris: Geuthner, 1925–1956) 1: 191, 196; 3: 298. The standard coordinates for Tamentit (often not shown on general maps), are lat. 27.75° N, lon. 0.28° W. For recent studies see Y. Guillermou, “Survie et ordre social au Sahara. Les oasis du Touat-Gourara-Tidikelt en Algérie,” *Cahiers de l’ORSTOM, Série Sciences Humaines* 29 (1) (1993): 121–38. Despite its title, B. Gabriel’s “Zur vorzeitlichen Besiedlung Südalgeriens (Tanesrouft, Tidekelt, Touat, Gourara),” *Erde* 115 (1–2) (1984): 93–109 surveys some of the local medieval structures, as does J.-C. Échallier, *Villages désertés et structures agraires anciennes du Touat-Gourara (Sahara algérien)* (Paris: A.M.G., 1972). Note that the Oued Messaoud “vanished” in roughly the same place still in the nineteenth century (the dunes cut across it just south of Timadanine and Taourirt, the southernmost *quṣūr* of Reggane. See e.g. Camille Sabatier, *Touat, Sahara et Soudan. Etude géographique, politique, économique et militaire* (Paris: Société d’éditions scientifiques, 1891), 261).

²⁴ The standard definition of the Tuat refers to the stretch from Adrar and Reggane, or, according to a broader topographic schema, from latitude $26^{\circ} 5' N$ to latitude $27^{\circ} 5' N$.

²⁵ The “long day” is based on nineteenth-century estimates of the speed of a merchant caravan comprising only riders (*c.* 38–40 km/day). A caravan partially on foot would see this fall to some 32 km. Sabatier, *Touat*, 234–5.

Tabelbala), and from Figuig in the north. Most routes from the east, north, and west intersected, however, at Timmi and Tamentit. The latter was a little more defensible, but in no way precluded striking out along south-westerly trails. Only upon reaching Reggane, another 100 km to the south, would a caravan essentially have to commit to the Tanezruft route.²⁶

The Tuat was by no means unknown to fourteenth- and fifteenth-century Italians and Catalans. Buda and a *castrum de Tagenduhet* (possibly Tamentit) appear in the Majorcan portolan of Angelino Dulcert²⁷ (1339), Buda in the *Catalan Atlas* of 1375 and in the “Catalan Planisphere” of the Biblioteca Nazionale in Naples (fifteenth century), and both Tamentit and Buda (*ciutat de Buda*) in the planisphere of Mecìà de Villadestes (c. 1413), in the “Catalan Planisphere” of Modena’s Biblioteca Estense (fifteenth century), and in the atlas chart of the Genoese Battista Beccario (1426). Tuat and *Buda grande* figure in a fifteenth-century Italian planisphere from the Vatican Galleries.²⁸ The importance of the oasis region appears to have been fairly well understood by those working for the Datini firm: from the very first mention in the Datini letters the tone is matter-of-fact, without any hint of need for explanation. One can thus only assume that Tuat was equally familiar to Venetians involved more often and more routinely in the copper traffic. Venetians resident in the Balearics (e.g. Bernardo Bon) or leading copper suppliers such as the Contarini may have known at least as much as the Datini men.

Jewish merchants—Majorcan as well as Maghribi—played a significant role in the copper trade linking the Balearics, Honein, and Tuat. By 1394, Majorcan Jews and post-1391 *conversos* were forcefully

²⁶ Buda was exposed to nomad raids from the north-west in the sense of being located at the vulnerable northern tip of the Tuat. Tamentit enjoyed at least a notional “defense in depth” advantage. None the less, given that a raiding party mounted on mehari camels could cover up to 100 km/day when pushing the mounts, Tamentit’s greater “safety” from Dar'a or Sus raiders was dubious.

²⁷ Also known as Dulcet (Eduard Pérez i Pons, *Fons per a l'estudi de la comunitat jueva de Mallorca*, Catalonia Hebraica VI (Barcelona: PPU, 2005), 124 (doc. 495, Mar. 1330)).

²⁸ Ch. de la Roncière, *La découverte de l’Afrique au moyen âge: cartographes et explorateurs*, 2 vols. (Cairo: La Société Royale de Géographie d’Égypte, 1925–1925), 1: Frontispice, Plates VIII, X, XI, XIII, XV. In the “Catalan Planisphere” of the Estense, Buda is considerably displaced, as compared to the almost correct position in Dulcert and a fair approximation in Villadestes.

reasserting themselves in the Maghrib trade, despite the hardship and disruption inflicted on the Majorcan Jewish community by the violent socio-political crisis of 1391 and the attendant assault on the *aljama* in Ciutat de Mallorca (mod. Palma). Honein Jews, some of them from Majorcan lineages or from families with close ties to Majorca before 1391, were instrumental in warehousing the metal and arranging its transport to Tuat, even though they do not seem to have always travelled south with the caravans. The exact division of labour between Honein and Tuat Jews remains nonetheless unclear. Tamentit has long been associated in both oral tradition and in historiography with a vibrant Jewish presence, particularly between 1300 and 1492. The isolated fourteenth-century tombstones with Hebrew inscriptions found at Buda (in Ghormali) and at Tamentit between 1903 and the 1950s moreover suggest a certain opulence, as well as the presence of reputable rabbis and *halakha* commentators. The structures of the trade on which this prosperity rested are poorly known, however, and the Datini material adds only tantalizing glimpses.²⁹

Jewish and *converso* participation in the copper trade should by no means obscure, however, the substantial and aggressive involvement by Majorca's "old Christian" merchants of diverse financial stature, from Bernat Tudela and Joan Toreyó to the notary and Maghrib trader Julià Fontcuberta and powerful players such the Pachs brothers and Antoni Quint. It is true that they focussed largely on one segment of the metal traffic—within the triangle Majorca-Honein-Ghassāṣṣa—which they deemed they could control at least in part. Yet this was by no means exceptional. The Datini firm, to

²⁹ The responsa (*takkanot*) of Issac b. Sheshet concerning Tuati affairs (incidentally confirming the importance of the Honein-Tuat link) are far too sketchy, as are those of R. Solomon b. Semah Duran (for instance concerning copper transported from Oran to the Tuat), conveniently referenced in H. Z. (J. W.) Hirschberg, "The Problem of the Judaized Berbers," *Journal of African History* 4 (3) (1963): 323-4 (note, however, that the article contains errors and should be used with caution). Malfante reported that in 1447 Tuat trade was in the hands of local Jews, but that does not say much about the situation around 1400. Subsequently, the Jewish community of Tamentit was decimated (probably in 1492, and again in 1503), during episodes of repression fomented by the scholar Muhammad b. 'Abd al-Karīm b. Muḥammad al-Maghīlī, who had first settled in the Tuat in 1477-1478 (see 'Abd al-'Aziz 'Abd-Allah Batran, "A Contribution to the Biography of Shaikh Muhammad Ibn 'Abd al-Karim Ibn Muhammad ('Umar) al-Maghīlī al-Tilimsani," *Journal of African History* 14 (3) (1973): 381-94).

some extent on sufferance from the Majorcans, was doing the same, and in so far as it functioned as a supplier of copper it relied in turn on Venetian contacts and most often on Venetian ships. The Balearic and Maghribi Jews who competed in the maritime triangle with the Majorcan “old Christians” and Italians projected their influence further south, to the Maghribi-northern Saharan segment—but once again within limits. The Datini letters and other sources suggest that prominent operators such as Ayon Susen rarely if at all travelled south of Honein, gladly leaving the next stage to better informed and more entrenched locals, Muslims and Jews, and ultimately to the Tuatis.

The first coherent glimpse of the Majorcan turn-of-the-century copper trade dates to 1390, while the economically depressed 1380s represent a void, for now. In 1390, deliveries of copper to Majorca were channelled mainly through the Venetian merchants Bernardo Bon and Polo di Giovanni, with the most important shipment reaching the Balearics on board the cog of Giaconello de’ Falchi.³⁰ Information for 1391-1393 is meagre, owing to the paucity of Balearic trade records and to lack of research on Majorcan notarial registers predating the well-known fifteenth-century records of the notary Antoni Contestí. The Datini letters—those received from business contacts and arms-length agents prior to the arrival of Datini staff in the Balearics—fail to fill the gap. The reason is threefold. Firstly, it is quite clear that outsiders had a certain mental image of the Datini firm’s “profile” and typical requirements and adjusted their reporting accordingly. Secondly, the letters amply show that even the best contacts were politely coy about “trade secrets” in terms of specific local knowledge. Finally, the flow of information was shaped by the contacts’ own business operations. The Datini firm was simply perceived as not being very much into raw metals, correspondents such as Nofri di Bonaccorso or Antonio di Filippo Lorini and Co. were not prone to dabble in copper, and Nofri was overtly paranoid about his fragile position of intermediary and local expert.

³⁰ ARM (Arxiu del Regne de Mallorca), RP (Patrimoni Reial/Real Patrimonio) 1998, fols. 2v-3r, 6v-7r (the identification of the Majorcan registers’ “Polo de Venecia” with Polo di Giovanni remains tentative). The customs register in question carries a misleading attribution to 1386-1390; the contents cover in fact the year 1390, while a detached folded sheet inserted at the back provides a summary financial statement by the *clavari* for the year 1387.

The year 1394 saw the island market resupplied in copper for the most part by the outbound galleys of the regular Venetian Flanders line, which docked at Ciutat de Mallorca on Good Friday (17 April) and unloaded virtually nothing but a large quantity of copper, as reported by Antonio Lorini.³¹ An identical schedule was followed in 1395, when copper and brass shipped from Venice partly on behalf of Alvise Contarini and partly consigned to the Majorcan Bernat Tudela and the Venetian Benedetto di Michele was delivered by the Flanders galleys *Capitana*, *Lombarda*, *Moceniga* and *Giustiniana* on 16 April.³² The Datini firm began to pay moderate attention to the transit of copper through the islands in 1394, following its first awkward attempt to find a foothold in Majorca. Ambrogio Lorenzi de' Rocchi, the young Datini factor who arrived in the Balearics from Valencia on 16 March 1394, was routinely quoting local copper prices in his business correspondence within the next half-year.³³ It was not until two years after the Datini *Compagnia di Catalogna* branch structure had finally been set up in 1396, however, that the firm developed a sustained and growing interest in the Majorcan-Maghribi copper traffic.

Cristofano di Bartolo Carocci, who had assumed management of the Majorca branch in March 1396, at first handled brass and copper only on behalf of others, such as Alberto degli Alberti of Bruges, and the Venetians Messer Antonio Contarini and Paoluccio di Maestro Paolo. In January 1399, however, he strongly urged the mother company to order from Venice, through Zanobi di Tadeo Gaddi, up to 15 or 20 *migliai grossi* of copper plate (7.1 to 9.5 metric tons) for resale to Majorcan Maghrib traders ("per la

³¹ Nigro, *Mercanti*, 2: 994 (doc. 439, 25-28 April 1304, *Majorca-Valencia*, Antonio di Flippo Lorini Co. To Datini Co.).

³² ARM, RP 2002, fols. 6r-6v (the folio numbers for this register are the original manuscript numbers, not the subsequently stamped archival page numbers). The 31 bales of copper (*aram*) sheet on the *Capitana*, for which duty was paid by Messer Giacomo Arnuzzi were consigned by the Contarini merchant house and declared to be worth 440 *l.M.* (Majorcan pounds of account); the 52 bales on the *Lombarda* were worth 840 *l.M.*; the 20 *costals* on the *Moceniga* were worth 100 *l.M.* The Tudela/Michele shipment on the latter galley amounted to 17 *costals* worth 115 *l.M.* The *Giustiniana* carried 8 *costals* of copper (*coure*) worth 115 *l.M.*

³³ E.g. Nigro, *Mercanti*, 930 (doc. 406, Ambrogio Lorenzi to Datini Co., 7 (12) Oct. 1394), 607 (doc. 255, Ambrogio Lorenzi to Datini Co., 30 Oct. 1394), 642 (doc. 265, Ambrogio Lorenzi to Datini Co., 22 (29) Dec. 1395).

Barberia").³⁴ His insistence on delivery by the first available ship or failing that by the Flanders galleys (obviously those of the spring *muda*) fell, however, on deaf ears. Bernardo Bon and the Contarini had saturated the Majorcan market with loaf ingot copper by May, and were trying to move much of it out to Valencia, speculating on a rise in prices in case of war between Portugal and Castile rather than on sustained sales in the Maghrib. Plate copper, more suited for the latter market, was nonetheless in short supply and deliveries from Venice, delayed by a quarrel between Venice and the Crown of Aragon over navigation laws, were not expected until later in September. In October 1399 Cristofano still vainly advocated that the firm invest in some 200 to 300 *centinai grossi* of copper plate (9.5 to 14.3 metric tons).³⁵

Stoldo di Lorenzo and Francesco Datini (the principals of the mother company in Prato/Florence) stubbornly held off into the spring of 1400. In the meantime, the renewed outbreak of the Portuguese-Castilian conflict was imminently expected to raise the price of loaf ingot copper, preferred in the Iberian Peninsula. Copper plate for the Maghrib was also in strong demand, however, and the 16 bales unloaded in May from the *Verzona* were snapped up at above market price. The trading season's main profits went to Datini competitors, particularly Bastiano di Bartolo. It was not until the following year (1401) that Cristofano finally managed to have 20 bales of plate shipped out to Majorca. He waited anxiously for the galleys, but did not receive his copper until much later, in mid-June. He thus partly missed a window of opportunity for getting cargo on board the ship scheduled to connect with the caravans in Honein, and nearly half the batch consequently remained in his

³⁴ ASP, D. 667, *Majorca-Florence*, Datini Co., 27 Jan. 1399, fol. 1v. The recommendation, ultimately intended for the firm's main contact in Venice, was framed in Venetian units of measure and the corresponding conversion is used here (1 *migliaio grosso* = 477 kg). The same applies to the *centinai grossi* mentioned next (1 *centinaio grosso* = 47.7 kg). See Frederic C. Lane and Reinhold C. Mueller, *Money and Banking in Medieval and Renaissance Venice*, Vol. 1, *Coins and Moneys of Account* (Baltimore, 1985), 360 and Ronald Edward Zupko, *Italian Weights and Measures from the Middle Ages to the Nineteenth Century* (Philadelphia, 1981), 134 (for the underlying Venetian pound).

³⁵ ASP, D. 996, *Majorca-Valencia*, Datini Co., 24 May 1399, fols. 1r, 2r; ASP, D. 996, *Majorca-Valencia*, Datini Co., 5 Jun. 1399, fol. 1r; ASP, D. 667, *Majorca-Florence*, Datini Co., 4 Sep. 1399, fol. 3r; ASP, D. 667, *Majorca-Florence*, Datini Co., 22 Oct. 1399, fol. 2r.

stockroom. September brought further complications both for him and for competitors. The Jewish traders who had initially been willing to buy up all that was left, plate and loaf ingots as well, had been advised from Honein to hold off. Ultimately the Balearic market went into hibernation until next March, and the Valencia branch was only partially successful in finding takers for copper as late as October.³⁶

The advancing autumn spawned its usual share of pipe dreams, and Cristofano suggested an over-ambitious scheme for shipping cloth, copper, and other merchandise to the Maghrib with the help of the Valencian Muslim merchant Jucef Xipio. The pressure to come up with some strategy increased when, in the middle of the slack season, Tuccio di Gennaio consigned with Cristofano another 30 quintals of copper re-routed from Valencia and brought in by way of Ibiza. Unfortunately, the expected departure of the *nave* of Jaume Tudela for Ghassāṣṣa in January 1402 brought Cristofano no comfort, for to his surprised irritation he found himself locked out through tacit collusion among Majorcan merchants. To dispose of his remaining 36 bales of metal he then put his hopes in the Jewish merchants trading to Honein, and geared up for the next trading bout only in July, almost too late. By then copper plate for the caravans was a hot item, demand in Honein was stronger than ever before, and the Saharan trade buying pressure had spilled over even to such items as glass prayer beads, "blue and large as a middling nut, such as are customarily brought by the Venetian galleys."³⁷

³⁶ ASP, D. 996, *Majorca-Valencia*, Datini Co., 31 Jan. 1400, fol. 1v; ASP, D. 667, *Majorca-Florence*, Datini Co., 6 Apr. 1400, fol. 1r; ASP, D. 667, *Majorca-Florence*, Datini Co., 26 May 1400, fol. 1v (recommending a shipment of 20,000 pounds of copper plate); ASP, D. 996, *Majorca-Valencia*, Datini Co., 28 Aug. 1400, fol. 2r; ASP, D. 997, *Majorca-Valencia*, Datini Co., 13 Jun. 1401, fol. 1v; ASP, D. 668, *Majorca-Florence*, Datini Co., 16 Jun. 1401, fols. 1r-1v; ASP, D. 997, *Majorca-Valencia*, Datini Co., 12 Sep. 1401, fol. 1v; ASP, D. 997, *Majorca-Valencia*, Cristofano di Bartolo to Luca del Sera, 6 Oct. 1401, fol. 1r.

³⁷ ASP, D. 997, *Majorca-Valencia*, Cristofano di Bartolo to Luca del Sera, 28 Oct. 1401, fols. 1r-2v (fol. 2v contains the lengthy outline of the Jucef Xipio project, and a digression on how to save on customs by shipping goods to the Maghrib in Xipio's name and to Majorca under the Datini merchant mark); ASP, D. 997, *Majorca-Valencia*, Cristofano di Bartolo to Luca del Sera, 15 Nov. 1401, fol. 1v; ASP, D. 668, *Majorca-Florence*, Datini Co., 12 Jan. 1402, fol. 1r; ASP, D. 997, *Majorca-Valencia*, Cristofano di Bartolo to Luca del Sera, 11 Feb. 1402, fol. 1r; ASP, D. 668, *Majorca-Florence*, Datini Co., 17 Apr. 1402, fols. 1r-1v; ASP, D. 668, *Majorca-Florence*, Datini Co., 17 Apr. 1402, fol. 2v (".... i

Cristofano now dared to think bigger, in the range of 500 quintals (20.3 metric tons) of copper at one go.³⁸

In the summer of 1403 Cristofano was hard at work negotiating the potential sale of a sizeable shipment of copper sent out by the Contarini on board the *Chopa*. The talks were not going quite well, given that his usual Jewish contacts ("gli amici"), Haim Susen and Balaix Feraig, besides being short of cash, were already overcommitted on account of taking off his hands metal belonging to the Dandolo firm of Venice. Haim and Balaix held off even after having been rescued by an inflow of gold coin from the Maghrib, and drove a hard bargain when they finally agreed to buy 120 quintals. Cristofano was desperately trying to get Aion Haim and others interested.³⁹ That autumn's bright point, as he stressed, was the fact at least the leftovers of Contarini copper and the Dandolo tin remained unscathed and were successfully excavated from the ruins of the Datini house in Majorca, which collapsed in mid-October 1403. A massive flash flood of the Riera stream that wound down the centre of the late medieval Ciutat de Mallorca devastated the downtown business district, and the stacked metal ingots were one of the few things not carried away or destroyed by the muddy waters.⁴⁰

By December the market remained soft and then virtually collapsed, making Cristofano rue having received another 16 quintals of Contarini metal through Piero Mattei in Ibiza. His expectations that it would take a year to see an improvement turned out, however, to be unjustified. Between January and August 1404 he and

paternostri di vetro azurini, grossi chome una nuciola mezana, chome solglono portare le ghalee de' Viniziani ...").

³⁸ ASP, D. 668, *Majorca-Florence*, Datini Co., 23 Jul. 1402, fol. 1r. Given the reference frame of the Datini letters and ledgers, the quintal is here reckoned as 100 Majorcan pounds of 0.406 kg. Pegolotti does set the size of the Majorcan quintal (*cantaro dells terra*) at 104 Majorcan pounds, and specifies that copper is sold by the "Barbary quintal" (*cantaro barberesco*) of 121 Majorcan pounds. The Datini ledgers, however, systematically reckon copper by a quintal of 100 pounds (see e.g. ASP, D. 1015, *Libro grande bianco segn. B* (Majorca), fol. 71r), and the firm's internal usage is obviously the one to follow when converting relevant figures.

³⁹ ASP, D. 668, *Majorca-Florence*, Datini Co., 7 Jul. 1403, fol. 2r; ASP, D. 668, *Majorca-Florence*, Datini Co., 12 Jul. 1403, fol. 1v; ASP, D. 668, *Majorca-Florence*, Datini Co., 23 Jul. 1403, fol. 1r.

⁴⁰ ASP, D. 997, *Majorca-Valencia*, Cristofano di Bartolo to Luca del Sera, 6 Nov. 1403, fol. 1r.

his chief factor Niccolò di Giovanni Mazzuoli successfully sold over 6,000 pounds of copper plate (2.44 metric tons) on behalf of Messer Antonio Contarini to a select group of dealers comprising Haim Susen, Solomon Sorell, and Samuel (probably Samuel Fazuati) on the Jewish side, and Joan Toreyó and the money-changer Pere Barrera among the Christians.⁴¹ The volatile nature of the copper trade nonetheless re-asserted itself by April 1405, six months after Niccolò replaced Cristofano as manager. Although there was no copper to be had in Majorca, the island's Maghrib traders remained cautious, willing to buy only on merchant credit with payment due only after return from Honein. Even such mavericks as Ayon Susen were short of cash, and there was little sign of the boom about to start during the winter of 1405–1406.⁴²

The subsequent magic-wand change, however, had Niccolò soon in a panic. He had sold third-party copper forward and by March 1406 penalties for non-delivery threatened. Branch letters to Barcelona, Valencia, and Florence were peppered with reminders, accompanied by exclamations of pious hope that the metal would arrive with the Flanders-bound galleys. Measures were also taken to secure offshore lighters for unloading in case the galleys failed to tie up at the main quay because of current tensions over potential new duties. Finally, June 1406 found Niccolò busy weighing copper with his large balance (*romana*) for his Jewish customers and for Joan Toreyó. Over 22,000 pounds of copper plate (8.93 metric tons) belonging to the Florentine firm of Bernabò degli Agli went to Abraham Arquet, Magalluf ben Allon, and Ayon Susen, as well as to Joan Toreyó. Ayon took another 1,414 pounds belonging to Francesco Datini and 227 pounds were consigned to Jaume Bonet in Valencia, through Pere Bassa. The *nave* of Rafael Ferrer brought more plate and loaf ingots from Venice, and the Valencia branch staked an interest in part of the shipment even though Niccolò favoured selling it in Majorca if the metal was weighed, packed, and ready to go before the expected departure of the last ship to Honein, set at around 29 July. Ultimately, 780 pounds of Bernabò

⁴¹ ASP, D. 668, *Majorca-Florence*, 9 Jan. 1403, fol. 2v; ASP, D. 1014, *Libro grande bianco segn. A* (Majorca), fols. 154v–155r.

⁴² ASP, D. 997, *Majorca-Valencia*, Datini Co., 9 Apr. 1405, fol. 3r; ASP, D. 997, *Majorca-Valencia*, Cristofano di Bartolo to Luca del Sera, 14 Jun. 1405. Ayon Susen was a relative of Haim Susen, living on and off in Tenes (Algeria), Majorca, and then Honein.

degli Agli's loaf ingots from the Ferrer shipment were sold to Abraham Arquet and to the *converso* Maghrib traders Pere Pardo and Francesc Bellviure.⁴³

By the end of August, however, Niccolò began to feel uneasy. Joan Toreyó, Abraham Arquet, Magaluff ben Allon and Ayon Susen had virtually cornered the copper trade to Honein and the Datini firm, as well as Bastiano di Bartolo, had several thousand florins at stake with them. Pere Bassa, who was attempting to carve out his own privileged niche, moreover pressed the Majorcan branch for a binding arrangement to deliver copper on demand, any time, and drove a hard bargain. His terms were for retied bundles, wrapped in fresh canvas, and delivered FOB to the hold of the outbound vessel. The bustle died down by mid-September and payments were now beginning to flow back from the Maghrib, but not necessarily in cash—one of the return commodities tended to be the scarlet dyestuff kermes. Selling the kermes, however, required time and put the onus on the payee, not the debtor. This created a timing problem for Niccolò—the Datini firm was once again in the throes of serious reorganization and it appeared, until the spring of 1407, that the Majorca branch would after all be liquidated and Niccolò transferred to Valencia.⁴⁴

Regardless of diverse economic troubles, however, including weak demand for cloth in the Maghrib, the copper market stubbornly picked up once again. The Majorca branch having been granted a “stay of execution” by the mother company, Niccolò tried to make up for profits lost during the months of uncertainty and betted heavily on copper, with Francesco Datini’s blessing. By mid-June he reported having disposed of around 500 quintals belonging to Francesco and to Ser Antonio di Lapaccio, while another 200 quintals were earmarked for loading on board a galley armed by the prominent Majorcan merchant Nicholau de Pachs. Some 150

⁴³ ASP, D. 891, *Majorca-Barcelona*, Datini Co., 23 Mar. 1406, fol. 1r; ASP, D. 998, *Majorca-Valencia*, Datini Co., 26 Mar. 1406, fol. 1r; ASP, D. 998, *Majorca-Valencia*, Datini Co., 4 May 1406, fol. 1r; ASP, D. 998, *Majorca-Valencia*, Datini Co., 21 Jun. 1406, fols. 1r-1v; ASP, D. 998, *Majorca-Valencia*, Datini Co., 10 Jul. 1406; ASP, D. 998, *Majorca-Valencia*, Datini Co., 19 Jul. 1406, fol. 1v; ASP, D. 998, *Majorca-Valencia*, Datini Co., 23 Jul. 1406, fol. 1r; ASP, D. 1015, *Libro grande bianco segn. B* (Majorca), fols. 70v-71r, 78v-79r.

⁴⁴ ASP, D. 998, *Majorca-Valencia*, Datini Co., 31 Aug. 1406, fols. 2v, 3v; ASP, D. 998, *Majorca-Valencia*, Datini Co., fol. 1v; ASP, D. 981, *Majorca-Barcelona*, Datini Co., 27 Oct. 1406, fol. 1r.

quintals were expected to sell shortly, before the scheduled departure of the Pachs galley for Honein (toward the end of June). The 200 quintals set aside were part of an untypical interlocking set of common ventures between Italian merchants and Majorca's "old Christians" headed by the Pachs and by Antoni de Quint, aimed at unseating Jews and *conversos* from their current position of leadership in the copper trade.⁴⁵

To hedge bets, however, 279 quintals belonging mostly to Francesco Datini, with Antonio di Lapaccio contributing a minor share, were also spread among various Jewish, *converso*, and other traders, on credit terms stretching into December.⁴⁶ On behalf of another countryman, Giovanni Tosinghi, Niccolò sold just over 213 quintals of the 550 that Tosinghi had consigned with the branch on commission.⁴⁷ The metal ultimately put up by various participants, including 500 quintals ventured by Nicholau de Pachs, amounted to roughly 200,000 Majorcan pounds or 82 metric tons of copper, not counting copper traded outside of the Datini circle and thus much more poorly documented. By the end of September, the Venetian *nave* of Ser Marco de' Benedetti had unloaded another 141 bales of copper plate and the local market showed signs of glut. Niccolò begged the Valencia branch to explore all possibilities of selling copper there, on condition of making buyers agree not to resell in Majorca, for that would further spoil the already saturated market.⁴⁸

⁴⁵ Tosinghi and Antoni de Quint were also shipping out between them another R 2,000 worth of copper, 2/7 of which represented Tosinghi's investment and the rest that of de Quint. This is reported in letters outlining subsequent developments: ASP, D. 998, *Majorca-Valencia*, Datini Co., 29 Sep. 1407, fol. 1r; ASP, D. 668, *Majorca-Florence*, Datini Co., 25 Mar. 1408, fol. 1r. For allusions to the other issues, see e.g. ASP, D. 668, *Majorca-Florence*, Niccolò di Giovanni Mazzuoli to Francesco Datini, 15 Nov. 1406, fol. 1v.

⁴⁶ The whole Datini/Lapaccio batch weighing 27,968 1/2 lb was posted as sold for 2,622 *l.M.* 1s. 2d., or 2,471 *l.* 10s. 2d. net of expenses (ASP, D. 1016, *Libro grande bianco segn. C* (Majorca), fols. 114v-115r. Further see ASP, D. 998, *Majorca-Valencia*, Datini Co., 16 Jun. 1407, fol. 1r. The related losses are discussed for instance in ASP, D. 892, *Majorca-Barcelona*, Datini Co., 16 (18) Dec. 1408, fol. 1v; ASP, D. 892, *Majorca-Barcelona*, Datini Co., 31 Jul. 1409.

⁴⁷ ASP, D. 1016, *Libro grande bianco segn. C* (Majorca), fol. 38v. Tosinghi's copper was worth 2,006 *l.M.* 16s. 1d., or 1,794 *l.M.* 15s. 9d. net of expenses (ASP, D. 1016, *Libro grande bianco segn. C* (Majorca) fols. 116v-117r).

⁴⁸ ASP, D. 998, *Majorca-Valencia*, Datini Co., 29 Sep. 1407, fol. 1r; ASP, D. 668, *Majorca-Florence*, Datini Co., 25 Mar. 1408, fol. 1r; ASP, D. 998, *Majorca-*

Then, in January and February 1408, alarming news reached the Balearics that a raiding party had attacked and robbed the Tuat caravan. Initial estimates of potential loss tallied up to 2,622 *l.M.* for Francesco Datini and Antonio di Lapaccio, and some 600 *R.* (*reials*) for Giovanni Tosinghi, with the possibility that Tosinghi's joint loss with Antoni de Quint might run as high as 2,000 *R.*⁴⁹ Subsequent revised assessments dating to December 1408 showed that about half the copper was irretrievably lost. The full extent of the disaster is impossible to specify—Niccolò's comments indeed suggest that the caravan also carried, for instance, copper and other goods sent from Valencia, and at least one Genoese merchant active in Majorca, Battista Campanaro, may have supplied more metal to the affected Jewish and *converso* dealers.⁵⁰ Various merchants from Tlemcen, Fez, and other trade centers surely suffered losses as well, given that an annual caravan to the Western Sudan could easily marshal 8,000 to 12,000 camels and represented the confluence of diverse strands of commerce.

What was the robbery's Maghribi context? Firstly, the considerable delay with which the news broke and the lack of available detail leave some doubt about the location: either somewhere between Honein and Tuat, or in the vicinity of the oasis region. Secondly, in saying that culprits were "una chonpagnia d'Arabi" Niccolò might have been unable to appreciate the difference between "Arab" and Tuareg.⁵¹ If, however, "Arabs" were indeed involved, then two alternatives are perhaps worth considering. On the one hand, the attackers may have been either traditional rivals of the dominant Ma'qil nomad group that benefited from the passage of the caravans by virtue of controlling the space between Honein, the lower Moulouya River, and Tuat, or a disaffected splinter of the dominant group. On the other hand, the fact that reports of subsequent nego-

Valencia, Datini Co., 29 Sep. 1407.

⁴⁹ ASP, D. 668, *Majorca-Florence*, Datini Co. to Francesco Datini, 25 Mar. 1408, fol. 1r. The Majorcan *real* (*reale* in the Datini ledgers) was worth on average 15 *s.* Barcelonese, and thus equivalent to the Florentine florin. See Melis, *Aspetti*, 249 and Peter Spufford, *Handbook of Medieval Exchange* (London: Royal Historical Society, 1986), 141.

⁵⁰ ASP, D. 892, *Majorca-Barcelona*, Datini Co., 10 Apr. 1408; ASP, D. 892, *Majorca-Barcelona*, Datini Co., 16 (18) Dec. 1408, fol. 1v.

⁵¹ ASP, D. 668, *Majorca-Florence*, Datini Co. to Francesco Datini, 25 Mar. 1408 ("... lo mandavano [the copper] a Tuet, e una chonpagnia d'Ar(a)bi l'ano tutto rubato ...").

tiations for return of the cargo trickled in from varied points, as far east as Collo and Annaba, raises the possibility that the caravan was held to ransom by Arab partisans of the force sent from Morocco by the Marīnid sultan Abū Sa‘id ’Uthmān III to support the emir Abū ‘Abd Allāh Muḥammad b. Abī Yahyā in his attempt to seize power in Ifriqīya in 1407-1408.⁵²

As for the first alternative, it is well known that Gurara and the Tuat formed part of the winter nomadization grounds of the Ma‘qil Arabs of the Dhū ’Ubayd Allāh group. The ’Ubayd Allāh controlled by the later fourteenth century northern (summer) grounds reaching from the region of Tlemcen to Taurirt, to Oujda and the estuary of the Moulouya, and from there southward to sources of the Za. While in their summer encampments in the *tell*, they collected tolls from traffic, for instance, between Honein and Tlemcen. The eastern segment of the ’Ubayd Allāh, the Kharāj, tended to recognize in the later fourteenth century the authority of Tlemcen, whereas the western Haddāj gravitated under Marīnid influence. Their neighbours and standing rivals were the Banū ’Amr b. Zoghba, who claimed as summer grounds the approaches to Oran, the Tessala, and the areas south of Tlemcen.⁵³ The Honein-Tuat caravan may well have fallen victim to a breakdown of peace at the intersection of the cross-cutting allegiances and closely adjacent nomadization corridors, none too stable during the fulsomely praised but conspicuously fragile reign of Abū ‘Abd Allāh Muḥammad I, sultan of Tlemcen.

It is however equally plausible, and perhaps more so, given the specific timing, that the culprit was indeed the eastbound expedition of Abū ‘Abd Allāh Muḥammad b. Abī Yahyā. A former governor of Annaba and a rebel cousin of ‘Abd al-‘Azīz Abū Fāris the Ḥafṣid sultan of Tunis, Abū ‘Abd Allāh had taken refuge at the court of Fez. It is a moot point whether or not the Ḥakīm were the Arab fraction who reportedly came to request Marīnid help and who brought the emir back east with them, together with his Marīnid support force. Certainly they and their *shaykh* Ahmād b. Abī Sanūna were in the forefront of the rebellion against Abū Fāris and were

⁵² R. Brunschwig, *La Berbérie orientale sous les Ḥafsides. Des origines à la fin du XVe siècle* (Paris: Adrien-Maisonneuve, 1940), 214-5; E. Fagnan, trans., *Chronique des Almohades et des Ḥafsides attribuée à Zerkechi* (Constantine: Adolphe Braham, 1895), 200-201.

⁵³ Ibn Khaldūn, *Berbères*, 1: 101, 103-4, 120-2.

responsible for his initial defeat in late summer to early fall 1407 between al-Hamma and Nefzaoua.⁵⁴ The Honein caravan may have in fact delayed its departure in a bid to avoid the Abū ‘Abd Allāh’s eastbound forces, only to run into them all the same, or into their flanking Arab outriders. It would have been quite natural for part of the captured copper to be then carried east, with the advancing army, while negotiators sought a ransom that would have nicely rounded out Abū ‘Abd Allāh’s war chest. This would account rather tidily for news of the robbery spreading as late as January 1408, as well as for the fact that word of the stiff ransom of 10 double dinars a camel load arrived by way of Collo and Annaba around mid-May 1408.⁵⁵

By 15 June 1408, as the rebellion was collapsing under Abū Fāris’ counterattack, there was still hope that the metal would be ransomed by Jewish negotiators. The Majorcan copper market had nonetheless stalled, and the Datini branch feared that its Valencian counterpart would find itself in the same position, given that “all of it [the copper] goes by the same route” (*i.e.* through Honein).⁵⁶ Abraham Arquet had lost all the copper purchased from the Datini firm and was temporarily penniless, and Niccolò begged the Florence mother company to arrange the sale of a batch of Arquet’s kermes in lieu of cash payment. Magaluff ben Allon anxiously waited for a ship to return from Oran, Honein and Mostaganem so that he could pay the Datini firm for the copper that originally formed part of the batch put up for sale on Francesco Datini’s own account. Niccolò’s pocket, incidentally, was just as empty and he proposed to draw bills of exchange on Barcelona to raise much needed cash.⁵⁷ Finally, in December the worst possible news arrived from the Maghrib—although some of the metal had indeed been recovered, over a half was lost for good.

Some 315 quintals (12.8 metric tons) of the Datini/Lapaccio copper had fortunately remained in Honein under the safeguard

⁵⁴ The exact dating of the rebellion’s last stages remain uncertain (1407–1409). Brunschvig, *Berbérie*, 214–5; Fagnan, *Hafsides*, 200–1; E. Fagnan, trans., *Extraits inédits relatifs au Maghreb* (Algiers, 1924), 297.

⁵⁵ ASP, D. 998, *Majorca-Valencia*, Datini Co., 13 May 1408, fol. 1r.

⁵⁶ ASP, D. 998, *Majorca-Valencia*, Datini Co., 15 Jun. 1408, fol. 1r; ASP, D. 998, *Majorca-Valencia*, Datini Co., 4 Sep. 1408, fol. 1r.

⁵⁷ ASP, D. 892, *Majorca-Barcelona*, Datini Co., 20 Jun. 1408, fol. 1v; ASP, D. 892, *Majorca-Barcelona*, Datini Co., 12 Sep. 1408, fol. 1r.

of Ayon Susen. So did some of Giovanni Tosinghi's lot (whether also stored with Susen or not remains unclear). Another 60 quintals were rescued, but the ransom was more "than it was worth," as Niccolò put it. The Jewish merchant who made the arrangements took the copper to the Tuat in person, but was not expected to do better than break even. The Majorca branch was moreover billed 78 *R.* for its share of customs and expenses. Another 1,256 *doblas'* worth of copper was entrusted to a Honein Jew who forwarded the entire lot to the Tuat together with other remnants of merchandise, but this cargo was in its turn stolen, probably in November 1408. The unfortunate merchant was finally allowed to discount the lost shipment at 700 *doblas* (as opposed to over 1,300 original worth), pawning a house in Honein to raise 400 *doblas* and promising to pay the remaining 300 in nine months' time.⁵⁸ In Majorca the Jewish copper dealers closed ranks and made themselves inconspicuous, sold only for cash, and insisted on generous merchant credit when buying.⁵⁹

In April-May 1409 caravan suppliers began to make deals again, but the market remained soft. Niccolò hoped that "those of the caravan (*chanfila*, i.e. Ar. *qāfila*)" might ultimately buy some of the metal left with Ayon Susen, but in vain. There was no demand for copper plate. Buyers might eventually be found, as Niccolò was informed, if the plates were made up into rods, but the expense sounded like throwing good money after bad. By 1410, however, things seemed back to normal. The late summer brought news that Tosinghi's leftover copper was finally about to find a buyer, and Niccolò wrote in an upbeat tone to the Barcelona sister branch that he was on the verge of bartering another 150 quintals for merchandise. He also sought to bring over to Majorca 100 quintals of copper obtained by the Valencia branch at an advantageous price. His key letter from this period is dated 16 August 1410, the very day Francesco Datini died.⁶⁰

⁵⁸ ASP, D. 892, *Majorca-Barcelona*, Datini Co., 16 (18) Dec 1408, fol. 1v.

⁵⁹ ASP, D. 998, *Majorca-Valencia*, Datini Co., 28 Jan. 1409, fol. 1r.

⁶⁰ ASP, D. 892, *Majorca-Barcelona*, Datini Co., 16 Aug. 1410, fol. 3r. See also ASP, D. 875, *Florence-Barcelona*, Luca del Sera to Datini Co., 23 Aug. 1410; ASP, D. 892, *Majorca-Barcelona*, Datini Co., 23 Sep. 1410, fol. 2r; ASP, D. 1110, *Florence-Barcelona*, Ser Lapo Mazzei to Datini Co., 24 Aug. 1410, in Melis, *Aspetti*, 76. For well-known general accounts of Francesco Datini's death, burial, and bequests, see Melis, *Aspetti*, 75-7, and Iris Origo, *The Merchant of*

To set the Majorca-Honein-Tuat metal trade into a broader context, it will be useful to review here the main European sources of copper at the turn of the century. A clear answer regarding the Datini copper provenance, however, must await the outcome of attempts to backtrack through Venice individual west-bound metal shipments. Given the nature of the firm's correspondence with Zanobi di Taddeo Gaddi and then with the executors of his commercial estate,⁶¹ unravelling the archival leads does not hold much promise of a quick and unequivocal identification of specific mines or even intermediate markets associated with individual batches of copper demonstrably shipped to the Balearics. The present discussion remains therefore confined to outlining plausible alternatives and screening out unlikely ones in the light of current research.

The Datini records offer a few interesting although not unproblematic hints. Firstly, as already mentioned, Venetian copper was clearly favoured by Honein dealers supplying the southbound trans-Saharan caravans. The difficulty is that while copper of varied provenances passed through both markets, Flemish and Venetian, some of the sources were identical. This was particularly true for the so-called Polish copper, which came from the mines of Slovakia and Hungary. Barring differences imparted by final refining and plate production (impossible to ascertain from the data thus far associated with the Majorca route), the intrinsic characteristics of such shared-source metal should not in principle have diverged so widely as to affect buyer behaviour in a systematic fashion. As in the case of earlier fourteenth-century Levant tin-buyers' reputed preference for Venetian-made rods,⁶² the pattern may thus reflect nothing more than the assurance of quality implied in the Venetian product's hallmark, without saying much about preferences for copper from any given primary source.

Secondly, and somewhat more usefully, the prevalence of *rame in tavole* in the shipments makes it likely that the metal resembled

Prato (Harmondsworth, G.B.: Peregrine Books, 1963; reprinted 1979), 341-6.

⁶¹ Zanobi died on 21 July 1400. The estate's *commissaria* (with Antonio di Ser Bartolomeo and Lorenzo di Francesco di Vanni as executors and Domenico di Tommaso di Francesco della Vacca overseeing the Venetian office) carried on business on behalf of his minor male heirs (taken to Florence by their mother). For parallels between the business styles of *commissaria* and *eredi di ...* ("heirs of"), see Melis, *Aspetti*, 31 n.3.

⁶² Pegolotti, *Pratica*, 382.

the yellow-hue rame *afinato e messo in tavole a Vinegia* described by Pegolotti more than half a century earlier.⁶³ The hue points to a natural copper-zinc alloy containing too little zinc to be rated by contemporaries as brass. This is not at all strange, for prior to c. 1740 pure metallic zinc was for the most part neither known nor available, and varieties of brass or bronze were commonly lumped together as "copper".⁶⁴ Thirdly, the risk of coming across shipments of "sour" plate may suggest relatively arsenic-rich batches. Arsenic, as is well known, imparts greater strength to copper at high temperatures (while also raising the annealing point from 190°C to around 550°C), but elevated arsenic (above 0.5 per cent) embrittles the metal.

Relatively zinc-rich "copper" partly flawed through inclusion of appreciable traces of arsenic certainly readily evokes the copper-arsenic-antimony fahlores exploited in various parts of Europe intermittently ever since the Early Bronze Age. The literature relating to fahlores and their prehistoric and historic exploitation is substantial and growing and there is no need to review it here, but it might nonetheless be good to recall the ores' basic typology. Fahlore ("pale ore" or gray copper ore, Agricola's *argentum rude album* (1547)) represents one of the two key groups of gray copper sulphosalts, namely the tetrahedrite group. The second is the enargite group, much less relevant here. Fahlores range in composition between the tetrahedrite and tennantite types (darker steel-gray tetrahedrite $(\text{Cu}, \text{Fe})_3\text{SbS}_{3,25}$ or $(\text{Cu}, \text{Fe})_3\text{AsS}_{3,25}$ and lighter gray-black metallic-lustre tennantite $(\text{Cu}, \text{Ag}, \text{Fe}, \text{Zn})_{12}\text{As}_4\text{S}_{13}$). Copper may be substituted in the ores, in widely varying proportions, by a range of metals, from Fe to Ag, Bi, Co, Hg, Ni, Pb, Zn, Ge, and Sn. Zinc, silver, arsenic and antimony, in particular, as well as bismuth, tend to carry over into any unrefined metal smelted from fahlore.

⁶³ Pegolotti, *Pratica*, 381.

⁶⁴ For the question of metallic zinc, see P. T. Craddock, *Early Metal Mining and Production* (London: Edinburgh University Press, 1995). There have been hints, however, of an unusually advanced production of zinc and of small zinc liturgical items in Bohemia in the thirteenth century. See Karel Nováček, "Neroštne suroviny středověkých Čech jako archeologický problém (bilance a perspektivy výzkumu se zaměřením na výrobu a zpracování kovů)," *Archeologické rozhledy* 53 (2001): 279-309, and K. Charvátová, J. Valentová, and P. Charvát, "Sídliště 13. století mezi Malínem a Novými Dvory, o. Kutná Hora," *Památky archeologické* 76 (1985): 101-67.

From the point of view of metal source attribution, unfortunately, the difficulty with fahlores is threefold. Firstly, fahlores are very common among almost all hydrothermal sulphide ores (*e.g.* meso- and epithermal deposits), in sedimentary exhalative deposits, in polymetallic veins and skarns, in veins associated with S-type granites, and often also in copper porphyry deposits, while occurring as accessory minerals in volcanogenic sulphides. Recent research has also shown that despite their reputation for poor smelting (related to modern, not pre-modern processes) fahlores were smelted in Europe far earlier than previously thought. Secondly, the chemical composition of fahlore metal is not very indicative of provenance, as it depends on the actual smelting sequence, at least with respect to arsenic and antimony content. Lead isotope ratios are a better guide, but as late as 2005 these were lacking for some areas of interest, particularly Slovakia.⁶⁵ Thirdly, as R. A. Ixer pointed out in a Bronze Age context, too much work yielding geochemical and isotope data has tended to focus on notable specimens (the “magpie school of provenancing”), not on mundane orebodies smelted in the past.⁶⁶ For medieval fahlore research, the greatest bottleneck lies in a certain lack of informed comprehension between archive and laboratory.

The following brief survey of European copper sources is necessarily quite sweeping, given the relative prominence in all the likely extraction areas of both fahlore bodies and related secondary mineral assemblages within the upper oxidised zones (gossans). To the best of my knowledge, however, no such compact overview is readily available, or at least none bridging the recent historical and geological literature.⁶⁷ Whatever its limitations, the exercise may

⁶⁵ B. Höppner *et al.*, “Prehistoric Copper Production in the Inn Valley (Austria), and the Earliest Copper in Central Europe,” *Archaeometry* 47 (2) (2005): 297, 306. For 2003 lead isotope data from the Erzgebirge and nearby areas, see E. Niederschlag *et al.*, “Determination of Lead Isotope Ratios by Multiple Collector ICP-MS: A Case Study of Early Bronze Age Artefacts and their Possible Relation with Ore Deposits of the Erzgebirge,” *Archaeometry* 45 (2003): 61–100.

⁶⁶ R. A. Ixer, “The Role of Ore Geology and Ores in the Archaeological Provenancing of Metals,” in S. M. M. Young *et al.*, *Metals in Antiquity*. BAR International Series 792 (1999): 43–52; R. A. Ixer, “Copper-arsenic Ores and Bronze Age Mining and Metallurgy with Special Reference to the British Isles,” online study retrieved from <http://www.goodprovenance.com>.

⁶⁷ Blanchard’s valuable *Mining, Metallurgy and Minting*, 3, *Afro-European*

prove worthwhile, especially should it eventually help to spotlight otherwise innocuous snippets of information in archival tracks concatenating from the Datini material, snippets that might permit the circle to be closed around the Venetian/Balearic trans-Saharan copper trade.⁶⁸

Some of the relatively buyer-deprecated copper reaching Honein by way of Flanders in the Datini years clearly moved through Hanseatic channels (especially following the return of the Hanse Kontor to Bruges from Dordrecht in 1392, which ended the 1388–1392 Hanseatic boycott [*Handelssperre*] of Flanders). Two main supply streams merged here: Swedish and Slovak/Hungarian. The Swedish metal came, partly by way of Visby (on the island of Gotland), from Central Sweden's massive copper sulphide deposits at Falun (*Stora Kopparberget*) between Lakes Runn, Varpan and St. Vällan.⁶⁹ The Slovak/Hungarian metal came from areas and localities discussed further on, mainly via Kraków, the Wisła River valley (Thorn [Pol. Toruń]), Lübeck and Danzig (Gdańsk). The third source, if already worked around 1400, as tenuous indications of early smelting activity in nearby Allenbach may suggest, could have been the Hosenberg mines in the Hosenbachtal near Fischbach an der Nahe in the Hunsrück. *Kupferkies* and fahlore copper was easily shipped from here to the Low Countries through Cologne, Aachen, and Maastricht, at least after 1460.⁷⁰

Supremacy, Part 3, “Base Metal Production,” unfortunately does not fill the gap as fully as might have been hoped for.

⁶⁸ Recapitulating the orebodies in a joint historical and geological/mineralogical context may be also of some use for future metallographic and isotope work on African copper artefacts, apparently stalled as far as historical provenancing is concerned. See the “1994 Annual Report” of the Smithsonian Center for Materials Research and Education, Lead Isotope Program (at <http://www.si.edu/scmre>).

⁶⁹ See e.g. Göran Dahlbäck, “Eisen und Kupfer, Butter und Lachs. Schweidische Produkte im hansischen Handel,” in Rolf Hammel-Kiesow, ed., *Vergleichende Ansätze in der hansischen Geschichtsforschung*, Hansische Studien 13 (Trier: Porta Alba Verlag, 2002), 163–74. For site analyses, soil chemistry, and brief historical overviews of Falun mining, see Elin Carlsson *et al.*, “Historical Atmospheric Deposition in a Swedish Mining Area Traced by S Isotope Ratios in Soils,” *Water, Air, and Soil Pollution* 110 (1999): 103–18, and Jemt Anna Eriksson and Ulf Qvarfort, “Age Determination of the Falun Copper Mine by ¹⁴C-datings and Palynology,” *Geologiska Föreningen i Stockholm Förhandlingar* 118 (1996): 43–7.

⁷⁰ Hosenberg is not far from Idar-Oberstein. The later fifteenth-century works are discussed in Rosemarie Homann *et al.*, “Territoriale und bergbau-

Some copper, however, may also have been brought to Flanders from the Harz Mountains, the Erzgebirge (Saxon and Bohemian Ore Ranges) or from the Saxon Erzgebirgsvorland. In the Harz (a modest 90 by 30 km northernmost outcropping of the Variscan orogen), Rammelsberg near Goslar had long been supplying north-western Europe with copper from massive syn-sedimentary polymetallic sulfide ore formations in the local Wissenbacher slates.⁷¹ Harz mining nonetheless suffered crippling setbacks in the mid-fourteenth century. Both in Goslar and in the Oberharz ore extraction came to a virtual standstill after 1360, partly owing to the exhaustion of the deep veins, as well as of smaller mineral bodies in the upper oxidation layer that did not require work to a depth greater than c. 20 m and therefore not much up-front investment. This was coupled with deforestation, rising labour costs aggravated by plague mortality, shaft flooding partly compounded by climate change, and investment bottlenecks reflecting old legal and institutional patterns. Yet it is less than clear, at present, how prolonged the mining complications really were. In particular, the extent and impact of the deforestation “energy crisis” would seem to have varied notably from region to region.⁷²

liche Grenzziehungen auf dem Hosenberg bei Fischbach/Nahe 1473-1712,” *Zeitschrift für Berg- und Hüttenwesen* 9 (2003), Beiheft 4. For regional context, see e.g. H. Pohl, “Die Montanunternehmer im Rheinland vom 13.-18. Jahrhundert,” in Simonetta Cavaciocchi, ed., *Miniere e metallurgia. Secoli XIII-XVIII. Diciottesima Settimana di Studi, Istituto Internazionale di Storia Economica “F. Datini” di Prato, 11-15 aprile 1986. Atti in CD-Rom* (Prato: Istituto Internazionale di Storia Economica, 1999).

⁷¹ A concise overview of the relevant geology is available in H. Kulke, “Der Harz (Norddeutschland): Geologisch-Lagerstättenkundlicher Überblick, Historische Baumaterialien (Natursteine, Gipsmörtel, Schlackensteine, Blei),” *Mitteilungen der Österreichischen Mineralogischen Gesellschaft* 142 (1997): 43-84. K. Mohr, *Geologie und Minerallagerstätten des Harzes*, 2d ed. (Stuttgart: E. Schweizerbart, 1993), remains an essential reference work. The standard historical works include e.g. Gerhard Laub, “Zur Technologie der Kupfergewinnung aus Rammelsberger Erzen im Mittelalter,” *Harz-Zeitschrift* 32 (1980): 15-76; Franz Irsigler, “Über Harzmetalle, ihre Verarbeitung und Verbreitung im Mittelalter. Ein Überblick,” in C. Meckseper, ed., *Stadt im Wandel. Kunst und Kultur des Bürgertums in Norddeutschland 1150-1650* (Stuttgart-Bad Cannstatt: Edition Cantz, 1985), 3: 315-21; and C.-H. Hauptmeyer, “Bergbau und Hüttenwesen im Harz während des Mittelalters,” in K. H. Kaufbold, ed., *Bergbau und Hüttenwesen im und am Harz* (Hannover: Hahn, 1992), 11-20.

⁷² The established view of the mining crisis is outlined for instance in H. Steuer, “Bergbau auf Silber und Kupfer im Mittelalter,” in H. Steuer and U. Zimmermann, eds., *Alter Bergbau in Deutschland. Sonderheft von Archäologie in*



Map 3. Selected European Copper Mining Centers

The evidence of flooding is more consistent, and there is little doubt that the *Rathstiefster Stollen* at Rammelsberg, for instance, could not handle peak waterflows by 1360. Moreover, known copper-rich reserves (mainly chalcopyrite, CuFeS₂) in the 300 m deep Old Orebody seem to have been severely overexploited.⁷³ In the Oberharz the *Alte Mann* silver/lead fields of the Clausthal-Zellerfeld area (former Celle), flourishing in the thirteenth century, were now abandoned. Those peripheral Oberharz smelting settlements that worked up Rammelsberg copper ore also declined, through a knock-on effect.⁷⁴ Yet recent studies of metal traces from atmospheric deposition in the peats of the Sonnenberger Moor (Oberharz) suggest an intriguing cyclical spike of moderate importance in copper/silver processing, with a peak around 1400 (at peat layer depth c. -900 to -1,000 mm).⁷⁵ A revival of activity at the turn of the century, promoted by the town of Goslar and the Welf overlords, thus appears likely.

Small fahlore workings (albeit extracting mainly silver) were also active in the Mittel- and Unterharz, in the vicinity of Harzgerode

Deutschland (Stuttgart, 1993; Sonderausgabe, Hamburg: Nikol Verlagsgesellschaft, 2000), 75-91. See also Christoph Bartels, *Das Erzbergwerk Rammelsberg. Die Betriebsgeschichte 1924-1988 mit einem Abriß der älteren Bergbaugeschichte* (Goslar: Preussag AG Metall, 1988), 15. For further aspects of the mid-fourteenth-century problems in the Oberharz, see Götz Alper, "Mittelalterliche Blei-/Silberverhüttung beim Johanneser Kurhaus, Clausthal-Zellerfeld (Harz)," *Nachrichten aus Niedersachsens Urgeschichte* 67 (1998): 87-134, and Götz Alper et al., "Johanneser Kurhaus." Ein mittelalterlicher Blei-/Silbergewinnungsplatz bei Clausthal-Zellerfeld im Oberharz (Rahden [Westfalen]: Verlag Marie Leidorf, 2004). Revisionist approaches appear in Christoph Bartels, "Der Historische Bergbau und das Hüttenwesen im niedersächsischen Harz," unpublished lecture, Deutsches Bergbau-Museum Bochum, 7 April 2005. For deforestation effects and charcoal supply, see e.g. M.-L. Hillebrecht, *Die Relikte der Holzkohlewirtschaft als Indikatoren für Waldnutzung und Waldentwicklung. Untersuchungen an Beispielen aus Südniedersachsen* (Göttingen: Goltze Druck, 1982).

⁷³ For Rammelsberg's two main orebodies, with clear diagrams, see D. Large and E. Walcher, "The Rammelsberg Massive Sulphide Cu-Zn-Pb-Ba-Deposit, Germany: An Example of Sediment-hosted, Massive Sulphide Mineralisation," *Mineralium Deposita* 34 (1999): 522-38.

⁷⁴ Alper, "Johanneser Kurhaus," 94-7.

⁷⁵ The deposits were studied by Burkhard Frenzel und Dr. Heike Kempter (Universität Hohenheim). The c. 1400 C.E. spike is much more modest than the one characterizing the periods 1150-1250 C.E. and c. 1500 C.E.. For methodology and caveats see Kempter's Work Group webpage at <http://www.rzuser.uni-heidelberg.de/~i12/emooremetall-index.htm>, "Peat Bog Archives of Atmospheric Deposition—Ombrotrophic Peat Bogs as Archives."

(Hagenrode) and Neudorf, although the meagre evidence is inconclusive regarding conditions around 1400. To the east and south-east of the Harz, copper had been mined since the thirteenth century from the stillwater sediments containing the black bituminous polymetallic marl slates (shales) (*Kupferschiefer*) of the Mansfeld basin and the Sangerhausen Revier. Hydrothermal processes whose exact geology is still debated had left behind mainly bornite (*Buntkupferkies*), chalcopyrite, *Kupferglanz* (Cu₂S), and tennantite fahlore, encased between the Zechstein conglomerate base and the overtopping *Zechsteinkalk*. The main early focal area lay in the north-western corner of the Mansfeld field, at the Kupferberg near Hettstedt.⁷⁶

Erzgebirge copper may also have found its way into ingot batches reaching Flanders and from there the Western Mediterranean. Copper was here a companion product of silver and lead extraction from post-Variscan hydrothermal vein-type ores occurring for instance in the Freiberg gray gneiss and yielding among other copper sulphides and arsenides in association with chalcopyrite. The mid-fourteenth century troubles afflicting the mining sector clearly did not spare the Saxon Erzgebirge (Saxon Ore Range). Just like in the Oberharz, smaller mining operations proved relatively more vulnerable. The single archaeologically best documented settlement thus far, Bleiberg on the Treppenhauer (above the Zschopau Valley near Sachsenberg, NE of Chemnitz), was permanently abandoned at this juncture.⁷⁷ How long production remained in decline in the Erz-

⁷⁶ For an overview see Dieter Beeger, *Das Sächsische Erzgebirge: Geologie, Bergbau und Kultur* (Vienna: Naturhistorisches Museum, 1988), and the Osthartz chapter in Gerd Seidel, ed., *Geologie von Thüringen*, 2nd updated ed. (Stuttgart: Schweizerbart, 2003); further also J. Rentzsch *et al.*, “Die laterale Verbreitung der Erzmineral-assoziationen im deutschen Kupferschiefer,” *Zeitschrift der geologischen Wissenschaften* 25 (1997): 1-6. For general estimates of total copper extraction at Mansfeld from c. 1200 to 1990, see G. Knitzschke, “Metall- und Produktionsbilanz für die Kupferschieferlagerstätte im südlichen Harzvorland,” in G. Jankowski, ed., *Zur Geschichte des Mansfelder Kupferschiefer-Bergbaus* (Clausthal-Zellerfeld: Gesellschaft Deutscher Metallhütten- und Bergleute, 1995), 270-84.

⁷⁷ W. Schwabenicky, “Hochmittelalterliche Bergstädte im sächsischen Erzgebirge und Erzgebirgsvorland,” in *Siedlungsforschung: Archäologie—Geschichte—Geographie* 10 (1992): 195, 206-7; W. Schwabenicky, “Der mittelalterliche Silber-, Blei- und Kupferbergbau im mittleren und westlichen Erzgebirge sowie Erzgebirgsvorland unter besonderer Berücksichtigung der Grabungsergebnisse vom Treppenhauer bei Sachsenburg,” Doctoral Dissertation (Berlin, 1992), 20, 22-3, 95; H. Douffet, “Erzgebirgische Bergstädte,” in Dieter Dolgner, ed., *Stadtbaukunst im Mittelalter*, (Berlin: Verlag für Bauwesen, 1990), 182-4.

gebirge region as a whole, however, depended on a number of variables, and localized turnarounds can be detected as early as the 1380s.

In 1379 the Bohemian miner Jan Čechoslav was invited to Freiberg to oversee the construction of a water-raising device, and the opening of Freiberg's *Bergamt* (Mine Office) in 1400 hints at a sustainable revival by the turn of the century. In the Erzgebirgsvorland, silver and copper mining may have been under way at Wolkenburg in the Zwickauer Mulde valley sometime after 1351. New copper and silver works were also starting up in the Gottleuba area, near Erdmannsdorf, from 1386 onward, attracting miners from Freiberg and Ehrenfriedsdorf.⁷⁸ In the Czech Erzgebirge (Krušné Hory) the results of prospecting remained rather limited, although silver and copper were smelted at Přísečnice from 1380. The only significant source of copper was found, however, near Kraslice. The locality experienced pre-urban to urban growth in 1357-1370, but its recognizable role in long-distance trade was largely confined to the late sixteenth and early seventeenth centuries. The copper ore deposits at Měděnec (Kupferberg) and Hora Svaté Kateřiny (St. Katharinaberg) do not seem to have fully entered into play until 1450-1550.⁷⁹

⁷⁸ Beeger, *Sächsische Erzgebirge*, passim.

⁷⁹ Petr Jančárek, "Vývoj báňské oblasti v české části Krušnohoří v předbělohorské době," in Richard Marsina, ed., *Banské mestá na Slovensku* (Žiar nad Hronom: Osveta, 1990), 160-2. Unfortunately, when it comes to the exploitation of polymetallic ores (Pb-Ag-Zn-Cu) in Bohemia and in borderlands within the former obedience of the Bohemian Crown, current knowledge is uneven and partly outdated (as exemplified for instance by J. Kořan, "Kapitoly z dějin hutnictví barevných a drahých kovů, I," *Studie z dějin hornictví* 12 (1984): 62-73). The literature (1954-1999) remains scattered and suffers from a neglect of archival and fieldwork opportunities. From an archaeological viewpoint the period since the early 1990s has been disastrous, owing to (a) the deregulated and undocumented closure of various historic shaft complexes after the fall of communism (this applies even to medieval works in the famous Kutná Hora area), (b) wildcat prospecting and mineral hunting, and (c) amateur treasure-hunts and crude shaft "cleanups" aimed at achieving tourist-friendly access. Regional exploration of old mineworks has been largely left to amateur speleological clubs with minimal means. The publication of past and present results and artefact collections is lagging. The situation has been aggravated through occasional uninformed cost-cutting destruction of already collected diagnostic finds (slag and charcoal samples, crucibles, etc.). See Nováček, "Nerostné suroviny," 280-3.

It is unfortunately difficult to establish, at this point, which copper types—“Polish” (*i.e.* Slovak), Swedish, Harzer, Erzgebirger, or eventually Hunsrücker—were most heavily traded in Bruges at any given juncture and in what proportion. Even tentative answers would help shed more light on the late fourteenth- and early fifteenth-century trans-Saharan caravan trade’s predilection for “Venetian” as opposed to “Flemish” copper, but the issue must be left open for now. The problem is further compounded by the fact that linkages between less known mines and the commercial “catchment areas” of specific trade centers such as Bruges or Venice remain vague. This is true for instance for Bavaria’s Kupferberg in Oberfranken, near Kulmbach. Mining was probably in progress here by the 1320s, and in 1340 the works already suffered from severe flooding. The outlook possibly improved as early as 1364, but it is difficult to say whether copper from the relatively high-yield local ore travelled rather south or north-west, if indeed it possessed greater than regional importance.

The detailed structure of the Venetian copper trade “catchment area” around 1400 remains correspondingly blurred. The closest regional sources lay in the upper Veneto, among the Belluno dolomite rocks, and in the Valle del Fersina (Trento, *Ger. Fersental*), where families of immigrant miners from the Tirol and Carinthia had settled already in the thirteenth century.⁸⁰ The first securely documented copper mining operations in the Valle Imperina near Agordo (Parco Nazionale Dolomiti Bellunesi), however, date at best to the early 1400s, and given current evidence they are not very likely to have contributed much of the metal refined in Venice for shipping to the Western Mediterranean between 1390 and 1410.⁸¹ The orebodies of Austria’s Salzach Valley also do not seem a likely provenance.⁸² Copper, mainly from *Kupferkies* and fahlore, may have

⁸⁰ Salvatore Piatti, *Palù-Palae: frammenti di storia* (Palù del Fersina: Comune di Palù del Fersina, 1996), and Anthony R. Rowley, *Fersental (Val Fersina bei Trient/Oberitalien): Untersuchung einer Sprachinselmundart* (Tübingen: Niemeyer, 1986).

⁸¹ Raffaello Vergani, “Technology and Organization of Labour in the Venetian Copper Industry (16th-18th Centuries),” *Journal of European Economic History* 14 (1) (1985): 173-86.

⁸² The relevant localities are Mühlbach am Hochkönig, Hüttau-Larzenbach (yielding *Kupferkies* and antimony-rich fahlore by the fourteenth century), Brenntalwald (securely documented only from 1425), and Kupferplatte (documented from 1447).

come to Venice, however, from the Austrian Walchen and the Ober Enns Valley of north-western Styria (between Öblarn and Schladming). Inferential data suggest local mining activity from c. 1230, although clear evidence relates only to 1432-1434.⁸³ It is unfortunately a moot point whether the term *rame dell'ene* in the Frescobaldi redaction of Pegolotti's *Pratica della mercatura* refers to the Enns Valley or not. If it does, the Enns would have constituted the second highest quality source of Venetian red copper, at least up to c. 1350.⁸⁴

The next most prominent nearby provenance likewise raises dating issues. The dolomite and limestone fahlore mineralizations of the Schwaz-Brixlegg area and adjacent orebodies (e.g. Falkenstein, Klein- and Großkogel) in the Unterinntal (some 40 km north-east of Innsbruck) appear to fit the mixed characteristics of the Venetian copper *in tavole* quite well. The local ores do contain significant concentrations of zinc. The smelting of secondary copper minerals in the host rock would have given a copper rich in arsenic and antimony, while metal with relatively low arsenic, antimony and sulphur ("sweet" copper) could have come from a mixture of fahlores and secondary copper minerals containing nickel.⁸⁵ Such variation would not be surprising during early mining stages, before shafts and galleries were driven deeper. But although fahlores were worked extensively here during the Bronze Age, tradition cites only 1409 for the rediscovery of outcroppings, a year later than the commonly accepted date of the *Schladminger Brief* that became the basis of Tyrol's mining law. According to the *Schwazer Bergchronik*, the Falkenstein veins were opened in 1420, attracting the first large wave

⁸³ Gerald Fuchs, "Montanarchäologische Untersuchungen in der Walchen bei Öblarn," Report—ARGIS Archäologie Service (<http://www.argis.at>). See also Karl A. Redlich, "Die Walchen bei Öblarn. Ein Kiesbergbau im Ennstal," *Berg- und Hüttenmännisches Jahrbuch* 51 (1903): 1-62; Hans Jörg Köstler, "Neuzeitliches Montanwesen im Bezirk Liezen," in *Bergbau und Hüttenwesen im Bezirk Liezen (Steiermark). Kleine Schriften der Abteilung Schloß Trautenfels am Steiermärkischen Landesmuseum Joanneum* (Trautenfels: Verein Schloß Trautenfels, 1993), 24, 69-75, 78; J. Wichtner, "Kloster Admont und seine Beziehungen zum Bergbau und zum Hüttenbetrieb," *Berg- und Hüttenmännisches Jahrbuch* 39 (1891): 111, 129-30, 135-6, 142-3, 146, 149, 153-4. For the mineralogy see Heinz J. Unger, "Der Schwefel- und Kupferkiesbergbau in der Walchen bei Öblarn im Ennstal," *Archiv für Lagerstättentforschung in den Ostalpen* 7 (1968): 2-52.

⁸⁴ Pegolotti, *Pratica*, 381.

⁸⁵ Höppner, "Copper Production," 301.

of miners from Bohemia, Saxony, and elsewhere, and the still viable old works in the *Alte Zeche* orebody were rediscovered in Schwaz only in 1426.⁸⁶

On the face of it, Inn Valley copper thus enters into play too late to fit the Datini timeframe. On the other hand, much older (prehistoric) mines are known to have existed at the top of the Schwaz deposits (Schwaboden and Eiblschrofen), but unfortunately many of the locations have been obliterated or made inaccessible in the giant rockslide of 1999. Secondly, the recorded Schwaz chronology fits all too closely a pattern of single-date eponymous “rediscovery” almost simultaneous with legislative ordering. Such patterns typically serve to formalize in human memory more drawn-out processes, in this case perhaps distorted by the fact that the eyecatching element was silver, not the much more mundane copper. Inn Valley copper may well have traded in Venice at the end of the fourteenth century, just a few years before the farm maid Gertrud Kandlerin drove out to pasture the legendary bull who by accident rooted up some silver ore.

The 1409 “find” is quite likely to have been preceded by a good few decades of prospecting and small-scale smelting in which copper would have been the most obvious product suited to cover the costs of searching for silver. Should this scenario prove correct, then some of the copper refined by the makers of Venetian *tavole di rame* in the 1390s and early 1400s could indeed have been extracted from either the Schwaz dolomite primary ores (arsenical argentiferous tetrahedrite with a generic formula $(\text{Cu},\text{Ag})_{10}\text{Zn}_2(\text{As},\text{Sb})_4\text{S}_{13}$, from the Brixlegg area Triassic limestone tennantite (with a generic formula $(\text{Cu},\text{Ag},\text{Fe},\text{Zn})_{12}\text{As}_4\text{S}_{13}$), or from other nearby rock formations contain-

⁸⁶ For background see Robert Krauß, “Kupfer und Silber—ein verlorener Reichtum,” in *Schwazer Silber—vergeudeter Reichtum? 1. Internationales Bergbau-symposium Schwaz 2002* (Schwaz: Berenkamp, 2003), 139-42; Lothar Suhling, “Rattenberger und Schwazer Schmelzen auf Silber und Kupfer vor und um 1500. Zu den Verhüttungsverfahren nach Quellen des späten 15. und frühen 16. Jahrhunderts,” in *Schwazer Silber*, 209-24. Concerning the *Brief*, see Karl Stadlober, “Der Schladminger Bergbrief,” *Res Montanarum* 30 (2003): 5-10. The *Schladminger Bergbrief* of Lienhart der Egkzhaim, Richter zu Slennig, of course poses challenges of its own, given that the 1764 edited text is dated “nach Christi Geburde dreyzehenhundert Jahr, und in dem achtenden Jahr an Montag nach St. Margarethe Tag,” i.e. 1308 and not 1408 as commonly accepted.

ing fahlore. Further research into possible pre-1409 copper mining in the Inn Valley is necessary.

This leaves as an acknowledged and much less problematic source of Venetian exports the “Hungarian” Slovak copper, which also flowed into Hanseatic trade channels through Poland, as already noted. The metal normally reached Venice along three alternative routes: (a) the so-called Pettauer Weg (through Ptuj on the Drava River) across the Karst to Trieste; (b) the Semmeringstraße, with Vienna as transit hub; and (c) the road from Buda to Croatia’s Zagreb and then to the port of Senj (*It. Segna*) (opposite the island of Krk, in the Velebitski Kanal (*Canale della Morlacca*, also known as *della Montagna*, on the landward side of the Kvarnerić Embayment), and from there by ship to the Venetian lagoon.⁸⁷ The three

⁸⁷ Günther Frh. v. Probszt, *Die niederungarischen Bergstädte. Ihre Entwicklung und wirtschaftliche Bedeutung bis zum Übergang an das Haus Habsburg* (1546) (Munich: R. Oldenbourg, 1966), 260-1, and Z. Pál Pach, “Die Verkehrsroute des Levantehandels nach Siebenbürgen und Ungarn zur Zeit der Könige Ludwig von Anjou und Sigismund von Luxemburg,” in Werner Mägdefrau, ed., *Europäische Stadtgeschichte im Mittelalter und früher Neuzeit* (Weimar: Böhlaus, 1979), 60-91. For the old toponymy around Senj, see e.g. the III^d Military Mapping Survey of Austria-Hungary, 1:200,000 (sheet 33-45, “Zengg”). The late fourteenth century Venetian link has been recently highlighted in depth by Martin Štefánik, “Pramene o banskobystričkej medi v Benátkach z druhéj polovice 14. storočia,” in *Štúdie z dejín baničtvia a banského podnikania. Zborník k životnému jubileu Mariána Skladaného* (Studien zur Bergbau- und Bergunternehmengeschichte. Festschrift für Marián Skladaný zum 60. Geburtstag), Acta historica posoniensia I, ed. Miroslav Daniš (Bratislava: Katedra všeobecných dejín FF UC, 2001), 48-63. See also Martin Štefánik, “Kupfer aus dem ungarischen Königreich im Spiegel der venezianischen Senatsprotokollen im 14. Jahrhundert,” in R. Tasser and E. Westermann, eds., *Der Tiroler Bergbau und die Depression der europäischen Montanwirtschaft im 14. und 15. Jahrhundert. Akten der internationalen bergbaugeschichtlichen Tagung Steinhau*. Veröffentlichungen des Südtiroler Landesarchivs 16 (Innsbruck: Studien Verlag, 2004), 210-26, and Martin Štefánik, “Pramene k stredovekým dejinám Uhorska a Slovenska v benátskom archíve,” *Slovenská archivistika* 39 (2004): 40-58. For the Venetian-Hungarian historical and commercial context from 1409-1412 onward, just astride and beyond the present study’s time limits, see W. von Stromer, “Die Kontinentalsperre Kaiser Sigismunds gegen Venedig 1412-1413, 1418-1433 und die Verlagerung der Transkontinentalen Transportwege,” in A. V. Marx, ed., *Trasporti e sviluppo economico, secoli XIII-XVIII*, Istituto Internazionale di Storia Economica “F. Datini” di Prato, no. 5 (Florence, 1986), 61-84, and Martin Štefánik, *Obchodná vojna kráľa Žigmunda proti Benátkam* (*Handelskrieg König Sigismunds gegen Venedig*) (Bratislava: Historický Ústav SAV, 2004), which usefully expands the relevant sections of the well-known Elemér Mályusz, *Kaiser Sigismund in Ungarn, 1387-1437* (Budapest: Akadémiai Kiadó, 1990).

routes carried both raw copper (probably *Schwarzkupfer*) and refined metal (“afinato in Ungheria”).⁸⁸

The Slovak orebodies were located in two discrete zones in the Western Carpathian (Západné Karpaty) geological sub-province of the extensive Carpatho-Balkan metallogenic area.⁸⁹ The first one, Central Slovakia, supplied copper mainly from two regions: (a) the Veporské Vrchy, forming part of the Veporské Pásмо geological belt (locality of Ľubietová [Lybetha, Ger. Libethen]), and (b) the Starohorské Vrchy, an extension of the Ďumbierské Tatry portion of the Lower Tatra (Nízké Tatry) mountain chain (town of Banská Bystrica [Ger. Neusohl, Hung. Besztercebánya]). Both of these extraction and smelting centres ranked in the early fifteenth century among the key members of the so-called *niederungarischen Bergstädte* (the mining towns of Lower Hungary: Kremnica, Banská Štiavnica, Banská Bystrica, Nová Baňa, Pukanec, Ľubietová and, a little later on, Banská Belá).⁹⁰

Ľubietová is located geologically in the north-eastern sector of the Central Slovakia Neogene Volcanic Field, between Banská Bystrica and the cone and fluvial apron of the Poľana andesite stratovolcano and to the north-east of the giant Štiavnica stratovolcano of almost 50 km in diameter, with a 20 km caldera (16.4 to 10.5 million years ago). The c. 6 km broad Ľubietová mineral zone lines the north-western edge of the Veporské Vrchy, between Podbrezová

⁸⁸ E.g. ASP, D. 549, *Venice-Pisa*, Zanobi di Taddeo Gaddi to Datini Co., 8 Aug. 1393, fol. 1r.

⁸⁹ S. Janković, “The Carpatho-Balkanides and Adjacent Area: A Sector of the Tethyan Eurasian Metallogenic Belt,” *Mineralium Deposita* 32 (1997): 426-33, and in particular 430.

⁹⁰ Originally the towns were only six: Banská Belá joined them in 1453, and the usual blanket mentions of “seven mining towns” are thus inaccurate. Useful regional overviews are found in Miroslav Kamenický, “Baníctvo v stredoslovenskej banskej oblasti,” *Historický časopis* 45 (1997): 173-4; see also Stefan Kazimir, “Zur Versorgung mittelslowakischer Bergstädte mit Nahrungsmittern und anderen Verbrauchsgütern vom 14. bis 18. Jahrhundert. Reflexionen über dauerhafte Elemente in der langen Frist,” in Ekkehard Westermann, ed., *Bergbaureviere als Verbrauchscentren im vorindustriellen Europa. Fallstudien zu Beschaffung und Verbrauch von Lebensmitteln sowie Roh- und Hilfsstoffen (13.-18. Jahrhundert)* (Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte, Beihefte, 130) (Stuttgart: Franz Steiner, 1997), 295-305. A handy tool for place name concordances are the 1900-1914 topographic maps of the III^d Military Mapping Survey of Austria-Hungary, 1:200,000 (sheets 37-49 “Neusohl”; 38-49 “Leutschau”; 39-49 “Kassa (Kaschu)”).

and Ľubietová (partly in the Čierňaž mountain chain).⁹¹ The first written records of local mining activity date to c. 1340. Recognized as a community c. 1350 and endowed with the Štiavnica *Bergrecht* (*Schemnitzer recht*) in 1379, Ľubietová produced fine copper (ranked so at least in the seventeenth century) rivalling that of neighbouring Banská Bystrica.⁹² Trivial amounts of the fourteenth-century metal may have come from upper oxidation zones with inclusions of cuprite (Cu_2O) and low impurity copper, but the primary ores consisted of base-metal sulphides (mainly chalcopyrite), with associated tetrahedrite, tennantite, arsenopyrite, and siderite.⁹³ The three key copper deposits, within 1 to 6.5 km of the settlement, were located at Podlipa, Svätodušná, and Kolba. Copper mining began to wane gradually in the seventeenth century, and all work ceased in 1863.

In Banská Bystrica, the core zone of medieval copper and silver extraction lay north of the town, in the Špania Dolina, under the Pánský Diel peak (in the *Vallis dominorum*, Ger. Herrengrund valley), and in the Staré Hory hills (Ger. Altgebirg, localities of Richtárová and Piesky [Ger. Sandberg]).⁹⁴ Intrusion-related and epithermal vein precious metal/base metal mineralizations associated with calc-alkaline rocks are usually identified as the economically viable metal source here, with richer copper content in greater depth on base metal veins. The degree of medieval exploitation of porphyry/skarn copper deposits remains unclear.⁹⁵ The polymetallic works at Poníky

⁹¹ J. Lexa, J. Štohl and V. Konečný, "The Banská Štiavnica Ore District: Relationship Between Metallogenetic Processes and the Geological Evolution of a Stratovolcano," *Mineralium Deposita* 34 (1999): 639-54.

⁹² Martina Kalabová, "Venné majetky uhorských královien v stredoslovenskej banskej oblasti do roku 1478," *Historický časopis* 52 (2004): 3-30, sets Ľubietová and Banská Bystrica into a broader historical and administrative context, mainly after 1405. See also V. Bolerázsky, "Príspevok k vzniku a najstarším dejinám slobodného královského banského mesta Ľubietová," *Historický zborník kraja* 4 (1968): 363-8.

⁹³ Too much economic significance should not be attributed to the secondary mineral libethenite ($Cu_2[(OH)PO_4]$) from the local oxidation zone, first described in 1823 on the basis of samples from the abandoned works at Ľubietová, even though it alone was mentioned in the context of pre-modern local mining by Probszt, *Die niederungarischen Bergstädte*, 252.

⁹⁴ J. Mazúrek, "Tažobný prírodnno-technický systém v banskej oblasti Špania Dolina—Staré Hory," in *Stredné Slovensko—Prírodné vedy* [Stredoslovenské muzeum, Banská Bystrica] 8 (1989): 23-68. For useful local observations see Josef Marko, "Altgebirg—Bergbau- und Wallfahrtsort," *Karpaten Jahrbuch* 53 (2002) [2001]: 156-9.

⁹⁵ The geology of the Štiavnica, Javorie, Polana and Vtáčnik volcanic

(Drienok, Predbane) (*c.* 12 km ESE of Banská Bystrica) were more important as a source of silver, lead and zinc than of copper, generally present in uneconomic concentrations. The local copper ores include mainly chalcopyrite and occasional small veins of tennantite, in dolomite and in Triassic limestone. Exploitation largely stopped *c.* 1609. It is uncertain whether the chalcopyrite, tennantite and tetrahedrite ores east of Drienok, in the area of Ponická Lehôtka and Farbište (in the direction of Ľubietová) were at all exploited in the middle ages. Hitherto documented mining and prospecting activity seems to date only from the later eighteenth century.⁹⁶

The Central Slovak mining zone was economically cross-connected by the 1380s with the second discrete source zone, Eastern Slovakia, through *verleger* activities and the ownership of mining-shares in Banská Bystrica by eastern merchants from the Spiš (*Ger.* Zips) area. Located in the Spišsko-Gemerské Rudohorie and conjoined formations (Slánske Hory—Hungarian Tokaj Mountains), the most significant Eastern Slovak extraction centres coalesced in the league of Upper Hungarian mining towns (*oberungarischen Bergstädte*), which included Gelnica, Smolník, Rudabánya, Jasov, Telkibánya, Rožňava, and Spišská Nová Ves.⁹⁷ The oldest and most prestigious mining hub was Gelnica (Hnilec, *Hung.* Gölniczbánya), often simply referred to as “The Mine” (Bánya, Baňa). A local shift from an earlier emphasis on precious metal extraction to the exploitation of copper and iron can be dated to the 1360s, and by the end of the fourteenth century Spiš (*Zipser*) copper had carved out a competitive niche in northern European markets.

Smolník (*Hung.* Szmolnokbánya, *Ger.* Schmöllnitz), located to the south-west of Gelnica, in the area of the Volovské Vrchy (Volovec, *Ger.* Ochsenberg), lay closest to the most significant copper deposits.

mineral-bearing zones is covered in Lexa *et al.*, “Banská Štiavnica Ore District,” 641 (Fig. 4). Regarding skarn deposits see *ibid.*, 648-9.

⁹⁶ For contextual area geology see *e.g.* M. Slavkay and M. Chovan, “A Review of Metallic ore Mineralization of the Nízké Tatry Mts.,” in P. Grecula, ed., *Váriscan Metallogeny in the Alpine Orogenic Belt*, Mineralia Slovaca monograph (Bratislava: Geocomplex, 1996), 239-50.

⁹⁷ As general background see *e.g.* Rainer Slotta, “Das Slowakische Erzgebirge und seine Denkmäler,” in R. Slotta *et al.*, eds., *Bei diesem Schein kehrt Segen ein. Gold, Silber und Kupfer aus dem Slowakischen Erzgebirge*, Veröffentlichungen aus dem Deutschen Bergbau-Museum Bochum 69 (Bochum, 1997), 71-96.

The copper came from massive beds of chalcopyrite and pyrite in metamorphic dark schists layered with alkaline volcanic rock, with some admixture of arsenopyrite, tetrahedrite, sphalerite (ZnS) and galena. *Smellenczer kopper* and its regional complements from Gelnica and elsewhere loomed large among the Slovak and Hungarian metal exports and enjoyed a solid reputation. Smolník received urban rights in 1327, higher criminal justice rights in 1339, and by 1338 was already expanding its communal authority to the outlying communities of Švedlár (*Ger.* Schwedler) to the north and Mníšek nad Hnilcom (*Hung.* Meczenzéf) to the east. The source of the so-called *Stillbacher kopper*, Tichá Voda (*Ger.* Stillbach, WNW of Smolník), was administratively annexed by Smolník in 1344. Until the 1360s, and thus before the Datini period, another nearby source of copper was exploited at Rudňany (on the Měděný Potok stream, *Ger.* Kufurbach or Kupperbach).⁹⁸

To conclude, it is necessary to put the Venetian/Majorcan copper trade into a broader quantitative perspective. Aggregate figures for Slovak copper output prior to the period of the early Fugger-Thurzo partnership (1494-1525) are scarce.⁹⁹ According to some estimates, Smolník produced c. 182 tons of copper per annum during the first third of the fifteenth century.¹⁰⁰ Other tentative figures are available for the operations of Nürnberg merchants, mainly based in Banská Bystrica. The local orebodies yielded c. 2,000-2,500 *zentners* of refined copper and c. 8,000-10,000 *zentners* of *Schwarzkupfer* in the early fifteenth century, shipped mostly to Venice, plus perhaps around 2,500 *zentners* of copper sold directly to Nürnberg.¹⁰¹ This

⁹⁸ Eugen Kladivík, "Zur Geschichte des Edel- und Buntmetallbergbaus im slowakischen Erzgebirge," *Der Anschnitt* 50 (1998), 13-19; Ivan Hercko, "Die Gold-, Silber- und Kupfererzlagerstätten im Slowakischen Erzgebirge," in Slotta et al., *Bei diesem Schein*, 19-27; Ľubomír Juck, "Výsady banských miest na Slovensku v stredoveku," in Marsina, *Banské mestá*, 95, 98-9; Ivan Chalupecký, "Postavenie banského majstra vo východoslovenských banských mestách v 15.-16. storočí," in Marsina, *Banské mestá*, 141; Michal Popovič, "K 655. výročiu baníctva v Rudňanoch," in Marsina, *Banské mestá*, 210.

⁹⁹ Marián Skladaný, "Prvé turzovsko-fuggerovské zmluvy o spoločnom mediarskom podniku," *Historický časopis* 43 (2) (1995): 215-29.

¹⁰⁰ Vladimír Segeš, "Stredoveké mestá na Slovensku. Tepny spoločenského pokroku," *História. Revue o dejinách spoločnosti* 1 (4) (2001): 6-9.

¹⁰¹ W. von Stromer, "Nürnberger Unternehmer im Karpatenraum. Ein oberdeutsches Buntmetall-Oligopol 1396-1412," *Kwartalnik Historii Kultury Materiałnej* 16 (4) (1968): 641-62; idem., "Das Zusammenspiel oberdeutscher und Florentiner Geldleute bei der Finanzierung von König Ruprechts Italien-

amounts respectively to 100-125, 400-500 and another 125 metric tons (taking a standard *zentner* of 110.23 pounds avoirdupois, equivalent to 0.05 metric tons)—overall some 625 to 750 tons over what seems to have been a six-year extraction run. Assuming the capacity of Banská Bystrica, Ľubietová, Gelnica, and Smolník together with its dependencies to be a conservative 120 tons per annum each (no more than a guess based on the current data ranges), the yearly output may have reached *c.* 480 tons around 1400.

As a working average, the 400 to 500 ton mark is not at all unreasonable. The readily accessible quinquennial aggregates for Central European copper production compiled by John Munro suggest that a century later, when the Thurzo-Fugger partnership was on the upswing, output hovered in the range of 396 tons per annum in 1491-1495, 541 tons in 1496-1500, and 608 tons in 1501-1505. At their peak, the early sixteenth-century aggregate figures resolve to *c.* 1093 tons per annum (1511-1515). The corresponding annual exports to Antwerp and Venice were 194 and 60 tons. At the initial documented low point (1496-1500), these exports stood at 14.5 tons (Antwerp) and 89 tons (Venice).¹⁰² The Munro aggregates, ostensibly of an order of magnitude matching quite well the tentative late fourteenth- to early fifteenth-century outputs given above, might in fact be on the low side as far as Slovakia is concerned, for they seem to cover a broader range of sources than just the core Slovak orebody areas. But, be this as it may, a comparison with the documented volumes of Datini era Venetian copper exports to the Western Mediterranean is useful.

The Venice-Majorca-Tuat circuit, as we have seen, was able to absorb between 20 to 80 tons of copper in one trading season through the Datini network alone, and it was normal to see sales

feldzug, 1401/2,” in Hermann Kellenbenz, ed., *Öffentliche Finanzen und privates Kapital im späten Mittelalter und in der ersten Hälfte des 19. Jahrhunderts*, Bericht über die 3. Arbeitstagung der Gesellschaft für Sozial- u. Wirtschaftsgeschichte in Mannheim (Forschungen z. Sozial- u. Wirtschaftsgeschichte 16) (Stuttgart, 1971), 50-86. For the activities of the Kammerer-Seiler and Flextorfer-Zenner companies, see also Blanchard, “Egyptian Specie Markets,” 392, in this volume.

¹⁰² John Munro, “The Monetary Origins of the ‘Price Revolution’: South German Silver Mining, Merchant-Banking, and Venetian Commerce, 1470-1540,” Department of Economics and Institute for Policy Analysis, University of Toronto, Working Paper No. 8 (UT-ECIPA-MUNRO-99-02) (rev. 21 March 2003), 44 (Table 4).

of 2.5 to 9 metric ton batches per single Venetian supplier. The emerging pattern also seems to suggest that at least half the amount shipped to Honein was indeed carried south, in a good year, using an annual trans-Saharan caravan to the Tuat and the Niger Bend. This is the realm of actual transactions. When it comes to contemporary estimates, Niccolò di Giovanni Mazzuoli argued in 1406 that as far as prospects for Datini sales were concerned the Honein-Ghaṣṣāṣṣa market should be deemed worth about 1,000 quintals of copper yearly, or about 40 metric tons.¹⁰³ A realistic although somewhat conservative guess, Niccolò's estimate lies in a "sweet spot" between the documented low and high figures from the Datini letters and ledgers.

To reach an overall impression of the potential annual demand for copper re-exported from Venice in 1400-1410, one would have to take the *c.* 40 ton capacity of the Honein-Ghaṣṣāṣṣa gateway as a starting point, and add the hitherto unknown aggregate demand of the Iberian market (Spain and Portugal), the rest of Italy, and the Levant (mainly Egypt).¹⁰⁴ In the realm of pure conjecture, had each of these been able to absorb a mere 20-30 tons (surely an underestimate), Venice would have had to supply 100-130 tons of copper annually to satisfy these Mediterranean outlets. This would have been just 30 to 60 tons shy of a full one third of the conjectural output of the Slovak copper mines around the year 1400. Slovak copper, however, also travelled in sizeable quantities to Nürnberg, Poland, and the Low Countries. The conclusion that seems to impose itself, therefore, is that in years such as 1409, when the Datini correspondence documents a drastic temporary disruption

¹⁰³ ASP, D. 998, *Majorca-Valencia*, Datini Co., 23 Jul. 1406, fol. 1r.

¹⁰⁴ The quantities of copper imported to Egypt in the fifteenth century, partly to feed the mints' production of copper coinage, have been generally rated as very large or "astounding." See Lane and Mueller, *Money and Banking*, 1: 560; Boaz Shoshan, "From Silver to Copper: Monetary Change in Fifteenth Century Egypt," *Studia Islamica* 56 (1982): 97-116. Boaz Shoshan, "Money Supply and Grain Prices in Fifteenth-Century Egypt," *The Economic History Review*, NS, 36 (1) (1983): 61-2 operated, however, with a starkly simplified and no longer applicable outline of the Central European "mining crisis" (1350-1450), ignoring the Slovak mines. For aspects of the Venetian-Byzantine-Egyptian copper trade in the late 1430s, see e.g. Cécile Morrisson, "Coin Usage and Exchange Rates in Badoer's *Libro dei Conti*," *Dumbarton Oaks Papers* 55 (2001): 217-45.

in the flow of Slovak/Hungarian copper to Venice,¹⁰⁵ other sources would have had to fill the gap. Which alternatives played this role at any given point remains an open question—and so does the issue of whether we might have to move back to the late fourteenth century the beginning of effective and sustained copper extraction at Schwaz, Brixlegg, Fersina and Imperina, or other orebody locations typically associated only with fifteenth-century advances in mining technology.

¹⁰⁵ ASP, D. 930, *Venice-Barcelona*, Lamberti to Datini Co., 3 Aug. 1409, quoted in Lane and Mueller, *Money and Banking*, 1: 562.

APPENDIX

The following is a transcription of what may be considered the quintessential “Tuat” letter from the Datini archive in Prato. For consistency, the transcription norms are those adopted for the Majorcan *carteggio* in Giampiero Nigro’s *Mercanti in Maiorca*, but expanded abbreviations are marked here in italics and lacunae in square brackets.

ASP, D. 668, *Majorca-Florence*, Datini Co. to Francesco Datini,
25 Mar. 1408

Al nome di Dio, a dì 25 d’marzo 1408

Scrittovi a dì passati il bisongno. Dipoi n’abbiamo 2 vostre, che ll’una chon-
tiene quello che l’altra. Faremo *risposta* al bisongno.

Quanto dite del vostro rame abiamo inteso. Mai non potemo sapere a punto
quanto si pesò in Vinega il vostro, né quanto quel’ d’Antonio d’Lapacc[i]o,
che se l’avesimo saputo l’aremo partito: ora c’era detto d’chostà a uno
modo, e da Barzalona c’era detto innaltro, e ora utimamente quando
avemo il vostro conto ce’l disono innaltro modo, or noi l’abbiamo achonco
chome c’avete detto, che dite dovete avere lb. 2108 s. 4 e Lapacc[i]o lb.
363 s. 6. Caschuno abbiamo fatto creditore chome dite.

Quando que’ d’Valenza ci chonterano le spese arano fatte per voi e per
Lapacc[i]o partiremo a caschuno la sua erata e ve n’avisero.

Abiamo avisato Lucha chome abiamo *rimetuto* per voi in più partite a Barzalona
a nostri *reali* 500, che ve n’a[b]ja[n] avisato. Tutti sono a vostro conto.
E ora novellamente n’abbiamo rimesso *reali* 250 a s. 14 d. 8 1/2 per reale,
anche ne gl’abbiamo avisati. Da lloro l’arete saputo. Chome verremo
rischotendo, di fatto rimetteremo.

Non vi maravigl[i]ate perché si risquotti [*sic*] chosí a stento, che questi che
chonperarono il chovero lo mandavano a Tuet e una chonpagn[i]a
d’Ar[a]bi l’à[n]o tutto rubato e stavasi sopra rischato, che pens[i]amo alla
g[i]ornata d’ogi sia rischattato. Ongni dì ci s’atende *una* nave da Une,
che sapremo chome sarà rischattato. Dio ne li traghia cho’ meno dano si
può, e simile il Tosingho, che per *reali* 600 n’è stato rubato del suo chon
quello d’Antonio d’Quinto, che per *reali* 2000 vi sono tra l’Tosingho e
l’Quinto, che l’Tosingho v’è per 2/7 e Anto[n]io d’Quinto per 5/7. Siate
avisati.

Delle 14 balle ch’abbiamo qui di vostro niente si truova da fare per anchora.
Chome vedremo da darli fine lo faremo. Noi n’abbiamo fidato 1 chostale
a uno giudeo che ll’è mandato in certo luogho in Barberia per provare:
se gl’verà ben fatto prenderà d’altro. Lb. 9 1/2 gl’abbiamo contato il
chintale. Siate avisati.

Voi dite vero che da *reali* 76 e s. 0 [*s. sum blank in text*] restate avere del
chonto da noi a voi. Noi restamo avere d’Andrea Riera per 2 vostre

sanghuinee gli vendemo più tempo fa *reali* 61 s. 0 [s. sum blank in text], e d'altra banda dovavamo avere per lo chonto tinto *reali* 18 e s. 0 [s. sum blank in text], siché sarebe intorno alla somma del chonto. Ne siamo pressoché paghati delle sanghuinee: siamo per torre vino bianco dal detto e rivenderlo, che miglore vale dal mal paghatore prenderne quello che l'uomo può che perdere tutto; ma l'amicho c'è l'huole tropo sopramettere. Nondimeno noi faremo il migl[i]ore che potremo per paura d'non perdere tutto, che indug[i]o pigl[i]a vizio.

Della morte d'Giovanni Tosinghi ci pesa asai: non si può più che Dio voglia.
Dio abi miserichordia della sua anima. Altra volta tocherà a noi, e chosí ci trameiamo.

Dio il sa la fatica abiamo durato nello sparviere vi mandavamo, che se l'avessi auto salvo n'aresti auto gran piacere. Mai vidi il più ardente, e ora n'abbiamo donato uno a Pagholo Biliotti e dettoli si richordi d'voi, alle quagle fateglele richordante [sic] ch'è un bel dono.

Per questa non vegiamo che più dirvi al presente. *Christo* vi ghuardi.

Francescho e Christofano in Maiolicha

THE BORROMEI BANK RESEARCH PROJECT¹

Francesco Guidi Bruscoli
James L. Bolton

The Borromei family

The Borromei were Tuscan by origin, from the town of San Miniato al Tedesco, located between Florence and Pisa. After a failed rebellion against Florentine rule in 1370, when Filippo di Lazzaro Borromei was hanged as one of the ringleaders, they fled the town and settled in other parts of Italy. By the late fourteenth and early fifteenth centuries, there were three main branches of the family, one in Milan, a second in Venice and a third in Florence. There were also major banking companies in all three places headed by a member or members of the family.²

¹ The Borromei Bank Research Project came into existence on 1 July 2001, following a successful application to the Economic and Social Research Council made by Professor James L. Bolton (Award R000239125). Dr Francesco Guidi Bruscoli joined on 1 January 2002. The main outcome of the project will be the publication of a study of the activity of the Borromei companies in the North of Europe in the first half of the fifteenth century, accompanied by a CD-ROM containing a database with all the information contained in the two ledgers kept by Borromei companies in London (1436-1439) and Bruges (1438). This is possible because in November 2000 permission was granted to the Project by Principessa Bona Borromeo-Arese for the exclusive use of the ledgers and other allied material for research and publication. In order to create the database, specific software (Historic Accounts I®) was developed by Roundhouse Software of Winchester. This piece of software can be used for any ledger or account book kept in double entry and in money of account, medieval, modern or contemporary. It will be marketed, under licence, by Queen Mary and Roundhouse Software. Another piece of software (Historic Accounts Enquiry®) was constructed, also by Roundhouse Software, for the navigation of the database and will be inbuilt in the CD-ROM. This paper is the result of research and analysis undertaken jointly by Dr Francesco Guidi Bruscoli and Prof. James L. Bolton. However, paragraphs 1, 3 and 4 were written by Guidi Bruscoli and paragraph 2 by Bolton.

² Unfortunately no comprehensive study of the family exists for the period with which we are concerned. If not otherwise stated, information on members of the family for this period (with different degrees of detail and of reliability) has been drawn from *Dizionario Biografico degli Italiani* (Rome: Istituto della Enciclopedia Italiana, 1960), 13: by name (in particular essays by Giorgio Chittolini and Florence Edler de Roover at pp. 45-46, 48-49, 53-55, 63-64, 72-75); Piero Canetta, *La famiglia Borromeo* (Milano: Tamburini, 1937); Pompeo Litta, "Borromei di S. Mini-

Milan. Before 1393, Borromeo and Giovanni, sons of Filippo di Lazzaro, had established a very profitable business in Milan that was to last until at least 1450. They owed much of their initial success to service to the Visconti dukes. Giovanni was for some time Treasurer General of the city and his nephew and adopted son and heir Vitaliano was also ducal Treasurer at various times between 1418 and 1430.³ He and his uncle made loans to the Visconti in anticipation of taxation and in return obtained widespread privileges, fiefs and estates, most notably around Lake Maggiore, to the north-west of the city.

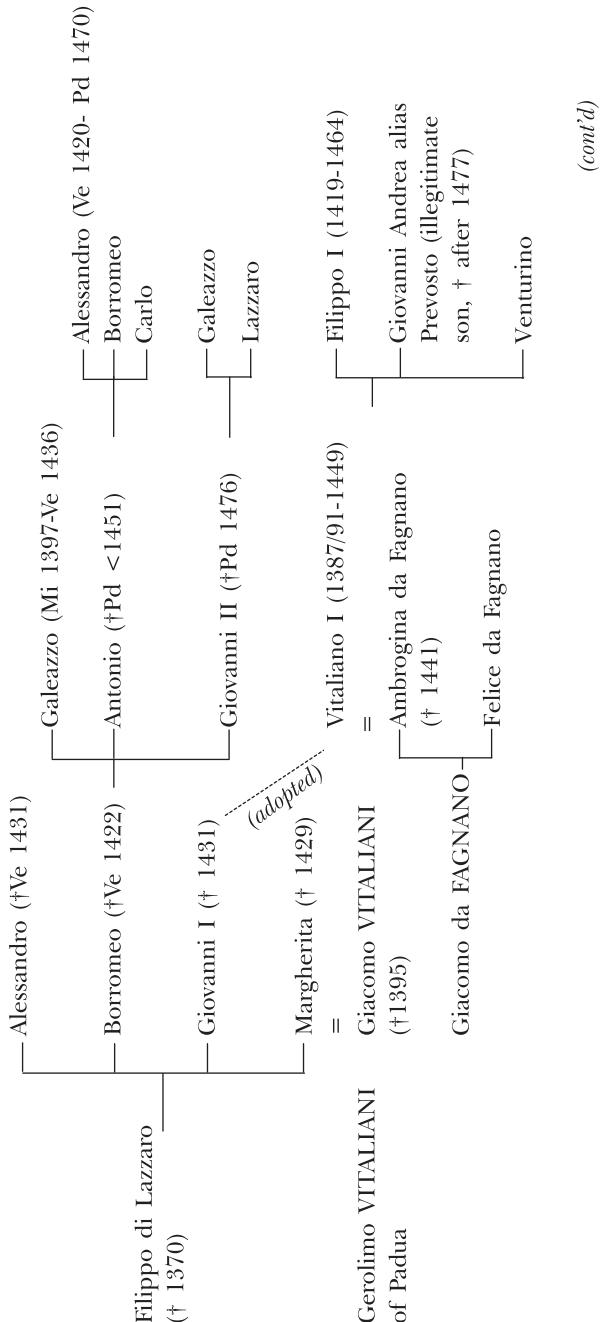
Florence. Another branch of the family, the descendants of Bartolomeo di Francesco, settled in Pisa soon after the expulsion from San Miniato and by 1395 Ludovico, Francesco and Piero di Bartolomeo had their own company there. The partnership was dissolved when Francesco moved to Genoa in 1404, and around 1409 Ludovico and Piero were allowed to return to Florence. This important Florentine branch of the family has largely been ignored by genealogists and historians and it is hard to place it correctly in the family's genealogical tree. In 1420 Piero Borromei was Treasurer

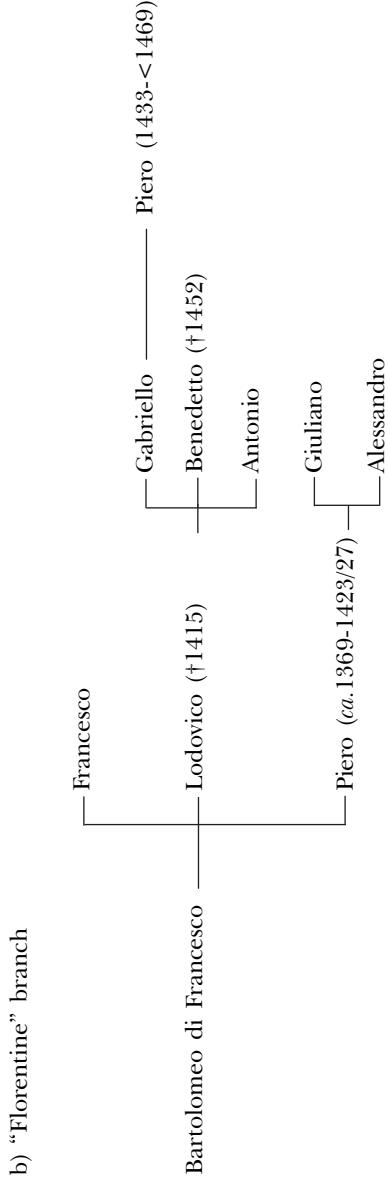
ato," in *Famiglie celebri italiane* (Milan: Typ. del dottore G. Ferrario, 1819-1874), 4: by name. For manuscript sources, see: Archivio Borromeo, Isola Bella (ABIB), in particular Box file 661 and Box file 1051; and Archivio di Stato, Florence (ASF), Manoscritti 593, *Carte Pucci*, sc. III, folders 14, 25; ASF, Ceramelli Papiani 915; ASF, *Catasto*, 81, fols. 508r-513r; ASF, *Catasto* 405, fols. 78-84. For the Borromei companies until the beginning of the fifteenth century, see Federigo Melis, *La banca pisana e le origini della banca moderna*, ed. Marco Spallanzani (Florence: Le Monnier, 1987), in particular 224-32; for the 1420s, 1430s and 1440s see Girolamo Biscaro, "Il banco Filippo Borromei e compagni di Londra (1436-1439)," *Archivio Storico Lombardo*, ser. 4, 19, anno 40 (1913): 37-126, 283-386; Tommaso Zerbi, *Le origini della partita doppia* (Milano: Marzorati, 1952), 311-68, 413-46; Patrizia Mainoni, *Mercanti lombardi tra Barcellona e Valenza nel basso medioevo* (Bologna: Cappelli, 1982), 90-110; Philip Jacks and William Caferro, *The Spinelli of Florence. Fortunes of a Renaissance Merchant Family* (University Park: Pennsylvania State University Press, 2001), 39-51. In the family archive at Isola Bella there are eight surviving ledgers for Borromei companies across Europe: *Mastri* n. 4 and 5 for Giovanni Borromei & Co. of Milan (1427, 1428); n. 7 for Filippo Borromei & Co. of London (1436-1439), which will be here referred to as BLo; n. 8 for Filippo Borromei & Co. of Bruges (1438), which will be referred to as BBr; n. 9, 10, 11 and 12 for Filippo Borromei & Co. of Milan (1445, 1446, 1451-52, 1453-55). This is a brief account of the family's history because the main focus of this paper lies elsewhere. A more detailed study of the family and its banking companies will appear in the forthcoming volume.

³ The transcription of one of the ledgers kept by Vitaliano Borromei as ducal Treasurer has been published: Pier Giacomo Pisoni, ed., *Liber tabuli Vitaliani Bonromei: mastro contabile del tesoriere ducale Vitaliano Borromeo (1426-1430)* (Intra, Verbania: Alberti, 1995).

Figure 1. The Borromei Family (Selected Genealogy)

a) "Milanese" and "Venetian" branches



(Figure 1 *cont'd*)

of Bologna, following a loan of 15,000 florins to Pope Martin V, and in the same year he was dealing with iron mines in Elba.⁴ The Florentine Catasto of 1427 shows Giuliano di Piero with assets of about 21,000 florins and Tommaso di Matteo [?] with less than 2,400. Corporate activities in Florence continued in the names of Piero di Bartolomeo and Gabriello di Lodovico, then of Gabriello, followed by Gabriello and Benedetto di Lodovico and eventually, after 1425, of Antonio (? di Lodovico). During these years there may have been yet another Borromei company there, in association with Antonio Corbinelli. Piero di Bartolomeo also became a partner in Galeazzo di Borromeo Borromei & Co. of London, which had recently been established by the Venetian branch of the family.

Venice. By 1395 Alessandro di Filippo Borromei had already created a company in Venice together with Domenico d'Andrea, a Venetian citizen of Sienese origin. By 1422 the partnership had changed and become Alessandro Borromei and Lazzaro di Giovanni & Co., the latter being originally from Volterra in Tuscany. During the 1420s, it was this branch which showed most signs of vitality. Around 1420 Galeazzo, nephew of Alessandro di Filippo, created two companies in the north of Europe, in Bruges and London, both in partnership with Antonio di Francesco. Unfortunately hardly anything is known about them, nor about Alessandro's activity in Venice.⁵ However, they must have been very successful, because in the Florentine Catasto of 1427 Alessandro was the fourth richest man in the city, being assessed at 57,000 florins, 50,725 of them in *luoghi* of the *Monte Comune* (shares of the public debt) and the rest in houses, shops and pieces of land. At his death in 1431, his three nephews, Galeazzo, Antonio and Giovanni, inherited all this wealth, along with shares in the Venetian, Bruges and London companies. In the mid-1430s the Venetian branch of the family also established its own company in Florence, under the name of Galeazzo and Giovanni di Borromeo, and this was to last until the late 1470s. After Galeazzo's death in 1438, both companies in northern Europe were re-formed in the name of his nephew

⁴ Peter Partner, *The Papal State under Martin V: The Administration and Government of the Temporal Power in the Early Fifteenth Century* (London: The British School at Rome, 1958), 67 (n. 4), 70 (n. 2), 177 (n. 4).

⁵ Scattered information drawn from Venetian Archives can be found in Reinholt C. Mueller, *The Venetian Money Market: Banks, Panics, and the Public Debt, 1200-1500* (Baltimore and London: Johns Hopkins University Press, 1997), 272-3, 560-1.

Alessandro, with Antonio di Francesco still as a partner. Galeazzo had also established a company at the Papal Court in partnership with Tommaso Spinelli who in 1435 was in Basel, where the Great Council of the Church had just opened. On Galeazzo's death the company passed to his nephew, Borromeo di Antonio. Profits of 7,937 cameral florins were made between 1437 and 1441, but compared to those to those enjoyed by the Medici they were relatively small.

On the death of Alessandro di Filippo in 1431, two new partnerships were created in Venice, both with Lazzaro di Giovanni, one in the name of Alessandro's nephew, Antonio di Borromeo, the other with Antonio's son, Borromeo. Gabriello Borromei was still working in Florence in 1438, whereas other members of this branch of the family were active elsewhere, notably Gabriello's cousins Giuliano and Alessandro di Piero who in 1433 were employees of Tommaso Spinelli in Venice.

However, in the 1430s the most significant developments were in Milan. Vitaliano Borromei and his Milanese partners had undertaken their foreign operations before then through the companies of the Venetian branch of the family; but around 1434, they decided to expand. Vitaliano was no longer Treasurer of the Duchy, an activity which had undoubtedly brought him wealth and prestige but which also made it difficult to use his resources for other ventures. A single cash loan to the Visconti had cost him almost £20,000 imperial of Milan, for example.⁶ So the Milanese branch decided to open its own companies in the north of Europe in Bruges and London and then, just a year or two later, in Barcelona. The Borromei Bank Research Project focuses on the activities of the two companies in London and Bruges, from 1436 to 1439 and does so because of the survival in the Borromeo-Arese family archive of two ledgers, one for Bruges for the year 1438 and the other for London for the years 1436 to 1439.⁷

⁶ Zerbi, *Le origini*, 339.

⁷ The London ledger was studied almost a century ago by Biscaro. His was a pioneering study which, despite its use as reference source by some leading scholars (de Roover, Mueller), has proved to be not always accurate and complete. Our work on the Borromei ledgers is still in progress: the Bruges ledger has been fully analyzed, whereas we are still in the process of inputting material for the London ledger. There are no surviving ledgers for Barcelona: a short account of this company is given below.

Filippo Borromei & Co. of Bruges and London

The first company was established at Bruges, under the name of Vitaliano's teenage son, Filippo, hence its name, Filippo Borromei & Co. It was opened for business on 1 January 1435 and, according to the contract establishing it, was to last for five years. The initial capital was £3,000 flemish which was entirely provided by count Vitaliano Borromei. But the profits were to be divided between Vitaliano (75 per cent), Paolo di Antonio da Castagnolo of Florence and Giovanni di Michele Micheli of Lucca (12.5 per cent each), and it was they who had to go to Bruges.⁸ Towards the end of 1435 Giovanni Bindotti moved from Milan to London, and began organizing the imminent opening of a branch there. During the first months of his stay he seems to have kept all the accounts in a small ledger, his *quadernetto*, until 8 March 1436 when Giovanni Micheli moved to London from Bruges and took over the management of the company. It was clearly a branch of the company at Bruges and again in the name of Filippo Borromei: both ledgers record the transfer of £1,600 flemish (or 16,000 flemish écus), equivalent to £1,431.17.1 sterling at an exchange rate of sterlings 21 5/12 per écu, from Bruges to London. As the money came from Bruges, the initial capital of £3,000 flemish must have been used to establish both banks, and cannot be taken as the capital for Bruges only. From the ledgers it is also clear that at the end of each year all the profits from the London branch had to be transferred to Bruges, where they were then credited to the Profit and Loss account of the main bank.⁹ Around 1436-1437 a third

⁸ For the contract, written on July 1434, see ABIB, Box file 1051 (b) and Box file 661 (a). A substantial contribution to the capital of the company was also given by the heirs of Giovanni Del Barza of Milan. On 1 January 1438 they had a credit from the previous year of £915.19.7 flemish. On 31 December they were credited with the interest on that sum (the *discrezione*). They were holding what is known as a *deposito a discrezione*, but this time the total sum was not carried forward to the *libro azzurro* 1439, but to the *libro segreto* which, unfortunately, has not survived.

⁹ "I quali denari abiamo chonsignati al detto Giovanni Micheli che in Londra li debi trafighare a nome di Filippo Boromei e compagni. E di tutto il guadagno si farà di netto de la detta compagnia in chapo de l'anno, il detto Giovanni ne de' fare creditore la compagnia di Brugia e Paulo da Castagnolo ghovernatore di detta compagnia di Bruggia de' ridure tutti li avanzi di Brugia insieme con quelli di Londra e quie partire il guadagno secondo sono d'achordo per la charta à domino Vitaliano Boromei del detto Giovanni e del detto Paulo da Castagnolo" (ABIB, BBr fol. 153.1, BLo fol. 47.7). For Bindotti's arrival in London, BLo fol. 17.1*dare* (payment for the rent of the house for one year until 29 September 1436); for his

bank called Filippo Borromei & Co. was founded at Barcelona, but as there no surviving ledgers it is not known whether it had complete autonomy from the Bruges-London banks or from the main company at Milan.¹⁰ The same strategy of founding a main company in Bruges with a branch in London was also adopted by other Italian families: for example the Bardi, the Salviati and the Medici. Before opening their bank in London in 1446, with a capital of £2,500 sterling, the Medici had been operating through an office in London financed and staffed by the Bruges branch.¹¹

In what follows we will try to demonstrate why this was probably a common strategy, in the wider context of a discussion of the evidence from the Borromei ledgers on the balance of trade between northern and southern Europe. In Chapter VI “Banking and the Money Market” of his book on the Medici Bank, de Roover focuses on the difficulties in making settlements between the north and the south of Europe, because the balance of trade was consistently unfavorable to Flanders. Then, in Chapter XIII, “Bruges and London,” he quite rightly says that “in the fifteenth century London was [...] only a satellite that moved in the orbit of Bruges,” as far as banking was concerned, but that the Low Countries depended on England to settle their unfavorable balance of trade with all the Italian city states, because English

wool was the only commodity which the Italian were eager to buy and which could be used to restore the balance. [...] The economies of the Low Countries and England were thus linked by a common interest in the wool trade and were interrelated in still other respects, because Bruges needed credits in England in order to buy wool with which to pay Italian claims. The task of adjusting international balances fell upon the Italian banking houses, and it is no wonder that there were active relations between the *bourse* in Bruges and Lombard Street in London.¹²

quadernetto, BLo fol. 5.1.

¹⁰ See Mainoni, *Mercanti*, 90-3 on the first years of activity of the Borromei in Barcelona. An isolated reference to a Borromei company in Barcelona at the end of the XIV century is given in Jacks and Caferro, *The Spinelli*, 47, but no source is provided.

¹¹ Raymond de Roover, *The Rise and Decline of the Medici bank, 1397-1494* (New York: W. W. Norton, 1966), 62-3, 321.

¹² de Roover, *The Rise and Decline*, 317.

De Roover concentrated his attention on the wool trade, in which the Borromei also participated. Between 1436 and 1439 they bought 379 sacks of English wool for export for themselves and in partnership with a third party or parties, at a cost of £4,514.6.3 sterling, from a variety of suppliers in Burford (Oxfordshire) and from a Mr. Thomas of the March of Wales. Probably as a favor, the Borromei bought him an expensive bed and feather mattress in Bruges and had it shipped over to the Marches. They also purchased wool from London and Southampton merchants. Much of it was consigned directly to Southampton, to be loaded on the galleys by the Borromei agent there, Cristofano Cattano, but some was sent to Middleburg for forwarding by sea to Italy. The Borromei Bruges also bought wool directly from the Staple at Calais, but lesser grades from Lindsey (Lincs.), Nottingham, and elsewhere in the Midlands and Eastern England, not for export overland to Italy but for sale to local clothiers in Flanders and Brabant. The two branches of the trade were kept separate, however, with the fine wool going to Italy, to be sold on to *lanaiuoli* of Milan and Florence, as is clear from the ledger of the Borromei bank in Milan for 1445-1446. As usual, the wool was bought on credit, one third down and the other two thirds at specified dates, so that total payment could be spread over two or three years.¹³ By the time the wool reached the galleys or other ships and customs duties, inland transport costs and other expenses had been paid, then the total cost of the wool had risen to £6,377.5.8 sterling, from the initial £4,514.6.3 sterling. It is very unlikely that the Borromei could have covered these costs from the sale of their imports, as the Hosting Statute of 1439-40 required.¹⁴ Between 1436 and 1439 they sold fustian and cotton to the Londoners for about £2,000 sterling and silk cloth, velvets, satins, damask, and baldechins to the value of £1,859.12.1 sterling. These were their two main imports: the remainder followed the usual pattern of trade to London, some raw materials (madder), spices,

¹³ For exports of English wool by sea from Middleburg and Arnemuiden see: ABIB, BBr fols. 353.3, 356.2, 358.3, 378.1, 378.3, 381.2, 382.1. For purchases of wool in England and export via Southampton see: ABIB, BLo fols. 68.1 (1436), 101.1 (1437). For purchases at the Staples and subsequent sales in Antwerp and Malines see: BBr fols. 238.1, 248.1, 377.2, 379.1, 383.2, 386.1. For the export to Florence and to Milan see: ABIB, Mastri n. 9-10, *passim*.

¹⁴ 18 Henry VI c. 4.

needles from Milan, other cheap cloth from Holland and some mercery ware, but they did not amount to that much.

Moreover, to the value of the wool exports has to be added that of cloth exports which, as E. B. Fryde has already argued, de Roover almost entirely ignored in his analysis of the balance of payments.¹⁵ Between 1436 and 1439 the Borromei bought for export English cloth worth £1,415.6.10 sterling, which with expenses came to £1,847.15.9 sterling.¹⁶ Purchases of wool and cloth combined far outweighed the money received from the sale of imports in London, and that is true of the Italian trade with England generally for much of the fifteenth century, up to perhaps the 1460s. What the surviving royal customs accounts for 1422-1461 show is that it was the Florentine and Milanese merchants who were interested primarily in wool although, as has been seen, they also bought cloth, to about a third or more of the value of wool.

A complete record exists for the loading of the Venetian galleys in London in the autumn of 1438. In all, Italian merchants exported some 8,462 broadcloths or their equivalents in cheaper cloths, worth some £14,809 sterling by customs valuations, with the Venetians themselves being the main exporters with no less than 7,479 cloths. By contrast, in the same year, Michaelmas to Michaelmas (29 September 1438 to 29 September 1439), all Italian imports through London were valued at about £10,075 sterling, for customs' purposes. These import and export figures are taken from the Petty Custom accounts and so do not include those for wool exports. In 1438-1439 the Italians exported a total of 342 sacks from London, worth perhaps in all another £5,000 sterling, based on Borromei ledger valuations. These are the figures for London only. The Italians exported a further 4,307 cloths and 631 sacks of

¹⁵ Edmund B. Fryde, "Anglo-Italian Commerce in the Fifteenth Century: Some Evidence about Profits and the Balance of Trade," *Revue belge de philologie et d'histoire* 50 (1972): 350-3.

¹⁶ Biscaro, "Il banco Filippo Borromei," 92-5. Most of this was not the traditional English broadcloth, fulled, dyed and finished, and in bolts 24 yards long by 1-1 1/2 yards wide between the lists (the classic definition of a broadcloth), but lighter, half width, cheaper streits, narrow cloths from Essex and Suffolk and from the west country which were probably intended for a mass market in Italy and the Mediterranean world. It is clear both from the London ledger and from the royal customs accounts that many of the Italian exporters were doing the same, buying cheaper, lighter cloths which were then equated to the unit of a broadcloth, with two pieces of streits equaling one broadcloth, for the purposes of collecting the royal customs duties.

wool worth together about £20,000 through Southampton in 1438-1439 against imports valued at £14,540 sterling.¹⁷ Arriving at a figure for the Italian balance of trade in this year is difficult, involving as it does valuations from different sources, along with some estimates, but it was possibly about £15,000 sterling in England's favor. The Borromei ledgers and the royal customs accounts are at one here, and they show that the much-maligned Italians were a source of considerable profit to the English crown and to English wool suppliers and cloth producers.

How were these debits in London to be met? One way was through the transfer of papal revenues from England to Rome, a task traditionally carried out by Italian merchant-bankers. The Borromei ledgers show no operations of this type. Nor could they be covered by profits from the sale of imports in Bruges. The ledger for 1438 shows that their trade in that city was minimal. Most of the imported silk cloth went on to London, as did much of the madder and fustians bought mainly at Middleburg and Antwerp.¹⁸ Bruges may have been the international money market for the north, but London and its outports Southampton and Sandwich were the centers for both imports and exports. De Roover argued that the only way the apparently permanent imbalance in trade could be settled was by the eventual shipment of bullion from north to south. But was this really the case? The Borromei ledgers contain no records of the transfer of coin to Italy from Flanders or from England, where the export of bullion in any form was strictly forbidden. Écus were sent from Geneva to Milan, presumably to settle balances between these centers, but that was all.¹⁹ There is no reason to suppose that the Borromei would have disguised such transfers. They recorded all other payments and expenses in meticulous detail, especially transport costs, and the only secrecy was in reporting profits to the *libro segreto*.

¹⁷ James L. Bolton, "Alien Merchants in England in the Reign of Henry VI, 1422-61," unpublished Oxford B.Litt. thesis (1971), 140-1; Appendix 1, Tables 3, 8; National Archives, London, E 122/73/10, 11, 12, E 122/141/23; Eleanor M. Carus Wilson and Olive Coleman, *England's Export Trade 1275-1547* (Oxford: Oxford University Press, 1963), 60, 95.

¹⁸ On the trade of Bruges and Antwerp in the 1430s see our article "When Did Antwerp Replace Bruges as the Commercial and Financial Centre of North-Western Europe? The Evidence of the Borromei Ledger for 1438," forthcoming in *The Economic History Review*.

¹⁹ ABIB, BBr fols. 305.1dare, 331.1avere.

Bruges, London and the Mediterranean World

Bullion transfers were not at all necessary. What the Bruges and London ledgers also show is that this imbalance was met by moving money as distinct from coin or bullion across Europe by means of letters of advice (*lettere d'aviso*) or bills of exchange.²⁰ Thanks to the use of technology, we are now able to make some quantitative evaluations.

The letter of advice was a financial instrument whereby a merchant-banker asked his foreign correspondent to make someone creditor and someone else debtor at a certain date and at a specific exchange rate. The writers were often one of the parties involved, but that was not always the case. It was a way of transferring credits and debits across Europe without actually transferring bullion and there are, in the Bruges ledger for 1438, 204 letters of advice, for a total value of £22,754.15.8 flemish. A more widely used and better known financial instrument, however, was the bill of exchange.²¹ The Bruges ledger records 1,233 bills of exchange in 1438 where either the Borromei acted in one of the four main roles, deliverer, taker, payor or payee, or where a third party acted for them, to a combined value of £95,563 flemish and at an average of £77.10.0 flemish per bill. The dominating role of Venice is perhaps not surprising, and fits well with the recent account given by Mueller in his book on *The Venetian Money Market*.²² Bills to and from Venice, 387 in all, were 31.39 per cent of the total by number but 41.57 per cent by value, at £39,732 flemish. The average value of a bill sent to or from Venice was therefore almost £103 flemish. London came next in the ranking of bills sent and received, 239 to a total value of £16,634 flemish, respectively 19.38

²⁰ Money is taken to mean here book money, ledger credits and debits or paper money. Coin and bullion were used indiscriminately by contemporaries but the first refers to gold and silver coins, the second to ingots of precious metal.

²¹ No detailed account of the origins and workings of the bill of exchange is given here, because it is a subject on which much has been written. Good introductions will be found in Raymond de Roover's *Business, Banking, and Economic Thought in Late Medieval and Early Modern Europe*, ed. Julius Kirshner (Chicago and London: Chicago University Press, 1974) and the bibliography quoted there; and in Giulio Mandich's "Per una ricostruzione delle operazioni mercantili e bancarie della compagnia dei Covoni," in Armando Sapori, ed., *Libro giallo della compagnia dei Covoni* (Milan: Istituto Editoriale Cisalpino, 1970), CLXXVIII-CXCIII.

²² On the Rialto market and its patterns see Mueller, *The Venetian Money Market*, in particular 303-37.

per cent of the total number of bills and 17.4 per cent of their value, with the average bill worth almost £70 flemish. Barcelona was only just behind in number with 238 bills, 19.30 per cent of the total, but their value, at £18,261 flemish and 19.11 per cent of the whole, was higher and the average bill worth almost £77 flemish. By contrast, only a few of the transactions involved Geneva, which is slightly surprising, given the importance of the four fairs which every year were held in the Swiss town.

One of the functions of the bill of exchange was that of extending credit locally. This could be done in a variety of slightly different ways, but usually involved a re-exchange operation, with or without actual bills being written and sent. A bill, for example, would be sent from Bruges to Venice and then, when it matured or became payable, another would be sent back from Venice to Bruges. The same parties were involved in both bills and in practice this was a loan extended by the deliverer in Bruges to the taker in Bruges, for a four-month period, since the usance between Bruges and Venice is two months each way.

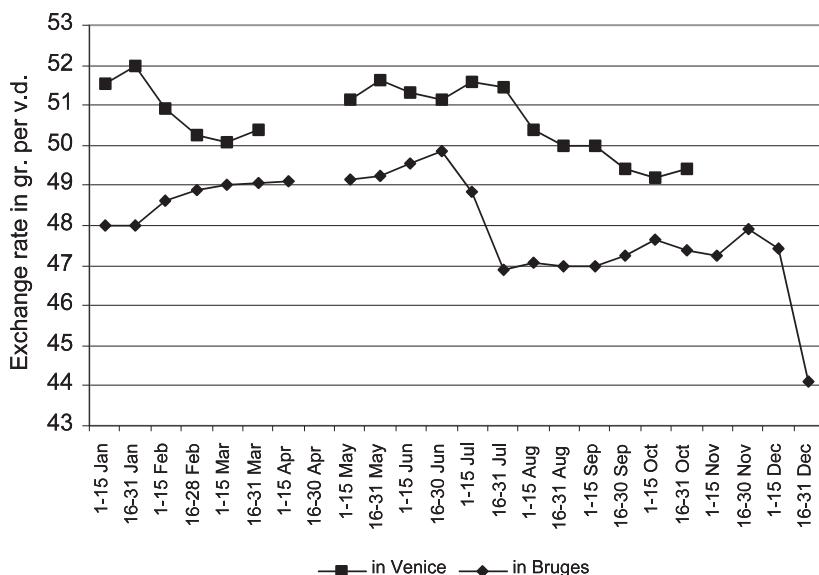
The profitability of delivering or drawing bills of exchange obviously depended on the exchange rate. Merchants-bankers were aware of the daily fluctuations in exchange rates, and tried to make the most of the information they received from their correspondents. The wider the difference between the two exchange rates Venice-Bruges and Bruges-Venice, the more profitable it was to lend money and accept repayment by way of re-exchange, and the more costly it was to borrow.

Mueller has shown that the first half of July saw exchange rates peak in Venice, when

merchants were scrambling for credit with which to pay their obligations as well as for the merchandise and bullion they wished to load onto the departing galleys [to the Levant] as exchange commodities [...] another maturity date that was commonly fixed was the Christmas fair, which it was hoped would coincide with the return of the galleys.²³

What really mattered, however, was not knowing the exchange rates between Bruges and Venice on the day but predicting what they

²³ Mueller, *The Venetian Money Market*, 306.

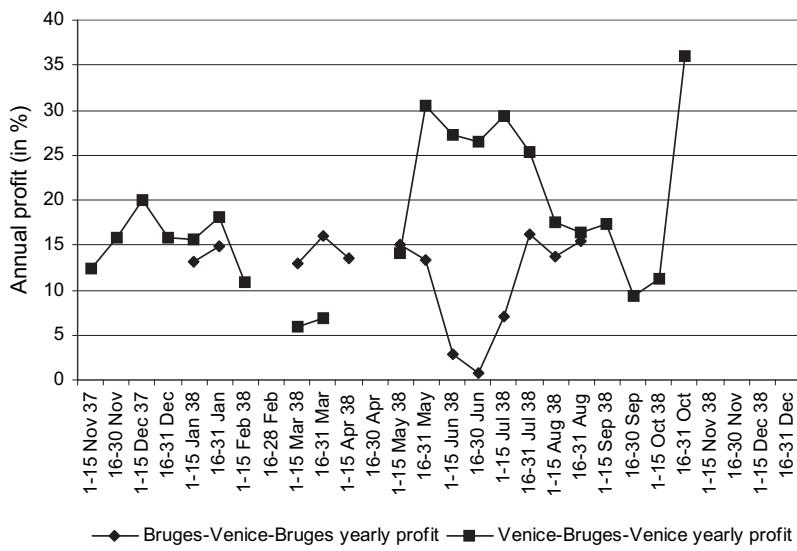


Graph 1. Exchange Rates between Bruges and Venice, 1438

would be in the other place two months later, when the bill matured. With the hindsight of the twenty-first century and the use of computer software it is relatively easy to do so, and Graph 1, above, shows the difference between the price of the ducat in Venice and in Bruges during 1438, and that gap between the two rates widened significantly in January, perhaps as a result of the Christmas Fair, and from the beginning of July to the beginning of October.

There is no doubt that the lender (*i.e.* the deliverer) usually made a profit, and the borrower (*i.e.* the taker) incurred a loss which was, in effect, the interest paid on the loan. Graph 1, above, shows the difference between the price of the ducat in Venice and in Bruges during 1438, and that gap between the two rates widened significantly in January, perhaps as a result of the Christmas Fair, and from the beginning of July to the beginning of October.

There are very few examples of exchange and re-exchange in the Bruges ledger, however, and protested bills of exchange are only slightly more common. When the payor received a bill, he had two possible courses of action. Either he accepted it and therefore became liable so that the payee could sue him if he did not pay. Or he could refuse it, and the payee could then draw up a formal



Graph 2. Annual Profit of Rechange between Bruges and Venice, 1438

protest before a notary and send it back to the deliverer. In this case, the payee had no right to act against the payor. This form of notarized protest was increasingly being substituting for exchange and re-exchange, or “dry exchange” and it required an initial agreement that the payee, who might sometimes also be the payor, would protest the bill, that is, send back to the deliverer a protest saying that the payor had refused to pay. The initial deliverer could then expect to be repaid by the taker at a more favorable (for him) exchange rate. But of course protested bills of exchange could also be reissued, thus doubling the duration of the loan. For example in June 1438 three bills delivered by the Borromei Bruges (for a total value of 429 genevan écus) were protested in Geneva at the fair of St. Peter. They were returned to Bruges at gr. 51 1/4 per écu, but then reissued at gr. 46 per écu with a settlement date at the following fair of St. Bartholomew (24 August).²⁴ But the number of these protested bills of exchange is limited: there are only 39 of them, with a total value of slightly less than £3,350 flemish.

²⁴ ABIB, BBr, fols. 313.1dare, 314.1dare.

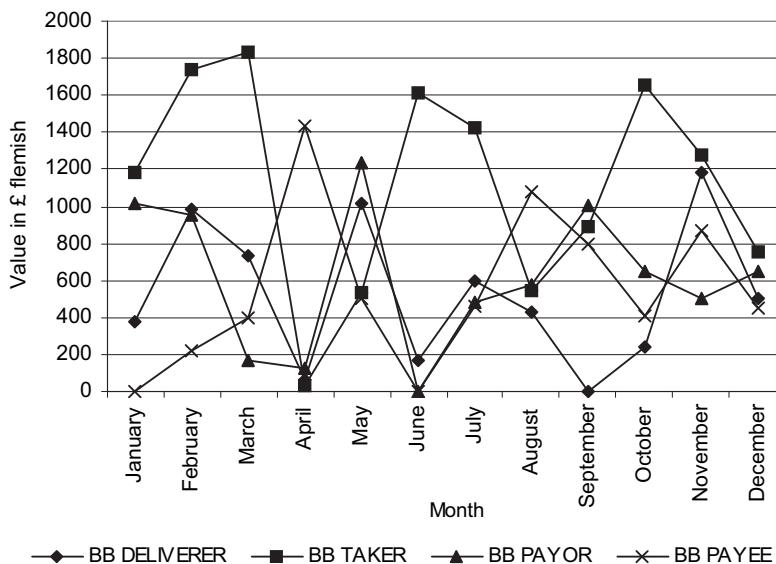
In the great majority of cases the Borromei were remitting to or drawing on various banking centers across western Europe in order to make their profits on the movement of funds. They could conduct these operations from Bruges itself, or by way of arbitrage, that is, by ordering one of their correspondents to draw or remit bills of exchange from another place. So, for example, on 15 December the Borromei Bruges credited the account of Cecco di Tommaso and brothers of Venice upon receipt of a bill of exchange for 500 ducats at gr. 49 1/4 per ducat (= £102.12.1 flemish). On 24 December, they wrote to London, to their branch there, instructing them to credit the account of Cecco di Tommaso for 1,023 flemish écus at st. 21 1/3 per écu (= £102.6.1 flemish). For this "service" they received three écus or six flemish shillings in commission. On 9 January 1438 Ventura & Co. of Barcelona drew 400 venetian ducats for the Borromei Bruges on Arrighino Panigarola of Venice. In the same month, and in February, he was drawing other bills on London for the Borromei Bruges. In other words, it was quite common for a correspondent to draw or remit bills for the Borromei Bruges between banking centers outside Flanders, between Venice and Barcelona, for example, or Geneva and Venice, at the same time as the Borromei Bruges was delivering money to him from Bruges.²⁵

A more detailed examination of their exchange operations with Venice shows that during 1438 the Borromei Bruges were takers of bills of exchange drawn on Venice to a value of almost £13,500 flemish, whereas they were deliverers for less than £6,300 flemish, as shown in Graph 3.

A comparison with Graph 1 shows that the Borromei in Bruges were well aware of the costs of borrowing in August and September and took up most of their loans in June, July and October. In all, they borrowed about £6,130 flemish by way of exchange with Venice in June-October 1438, but only delivered, or lent, about £1,430 flemish in the same period.

The value of exchange between Bruges and Barcelona was £15,945 flemish and the Borromei bank acted as payors, in Bruges, for as much as £7,367 flemish or 46.2 per cent of this sum. In general, Italian merchant-bankers in Barcelona were creditors in Bruges and debtors in Venice, whereas the substantial Catalan co-

²⁵ ABIB, BBr fols. 217.1*dare-avere*, 285.1*dare*.



Graph 3. Value of Bills of Exchange Sent to and from Venice in 1438, by Role of Borromei Bruges

lony in Bruges needed money there to buy Flemish cloth. Consequently, Barcelona was used by the Italians of Bruges as an intermediary between Flanders and Venice. The Borromei Bruges, thanks to its sister company at Barcelona, could easily have arranged direct transfers from Barcelona to Venice, as has already been seen. But during 1438 only about £1,000 flemish were drawn from Barcelona to Venice in this way and roughly the same amount was remitted in the opposite direction, making £2,000 flemish in all, only an eighth of the sum sent along the direct axis from Bruges to Barcelona.²⁶ It is difficult to say with any certainty whether this was because the bank at Barcelona needed to borrow money in Bruges, or whether Catalan merchants needed to transfer money to Flanders. The second seems the more likely explanation, given the huge imbalance between the amount of money paid to payees in Bruges and the amount of money received from deliverers.

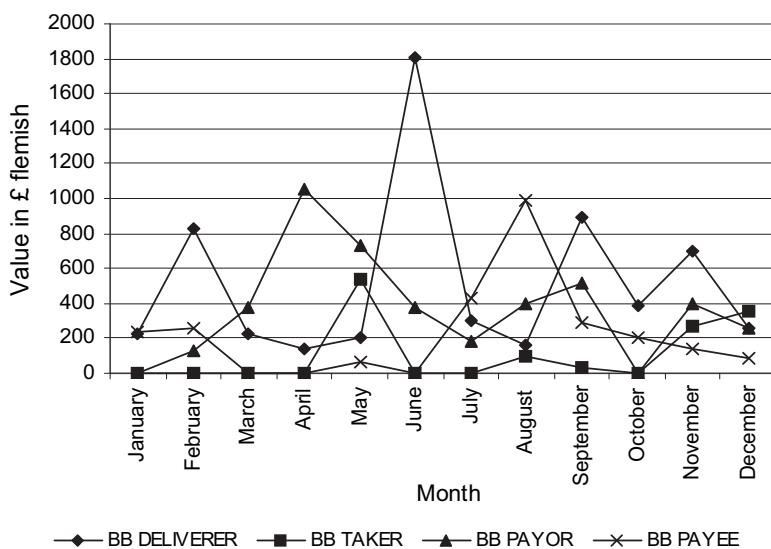
²⁶ ABIB, BBr fols. 272.2dare-285.1avere, 295.1dare-289.1avere, 321.1dare-322.1avere, 329.1dare-330.1avere.

The advantages of dealing directly with a sister company based in another major commercial city are obvious. Information could be exchanged easily, merchandise could be consigned to them for sale locally, and money transferred by simple book entries. But the relationship between the Borromei banks in Bruges and London was exceptionally close. They functioned almost as one unit, with the main purpose of exchange operations through Bruges being to realize the funds the London branch needed to buy English wool and cloth for export. As Munro and others have shown, in the trade between the Low Countries and England, both the Staplers (those exporting wool to Calais) and the Merchant Adventurers (who exported woollen cloth to the Low Countries) needed to remit money back to England, once their products were sold. The Mercers, who bought luxury cloths and other goods in the Low Countries and exported them to England, needed funds there in order to buy their imports. Bills of exchange met all these needs. Munro shows how the Staplers and Merchant Adventurers were lending to the Mercers (who were takers of bills), in the Low Countries, with the Mercers then repaying the loan in England, from the proceeds of their sales. For their part, Staplers and Merchant Adventurers could have their money transferred directly back to England by bill or letter of advice, or the Staplers could finance their own trade in England, by being takers of bills of exchange sold to the Mercers. The Mercers would then have their money back in the Low Countries, where they needed it to make their purchases.²⁷

The distinction between Mercers, Staplers and Merchant Adventurers is perhaps drawn too sharply here. One man could often be all three, but the Borromei ledgers show clearly how the arrangement worked in practice. London merchants, often acting through their factors or attorneys in the Low Countries, were takers and payors of bills of exchange where the Borromei banks of Bruges and London were respectively deliverers and payees. This occurs in 60 of the 96 bills delivered by the Borromei Bruges to the Borromei London but in none of the 47 bills delivered by the Borromei London to the Borromei Bruges. The Borromei Bruges did not draw on the Borromei London bills payable to London

²⁷ John H. A. Munro, "Bullionism and the Bill of Exchange in England, 1272-1663: A Study in Monetary Management and Popular Prejudice," in Fredi Chiappelli, ed., *The Dawn of Modern Banking* (New Haven: Yale University Press, 1979), 194-196.

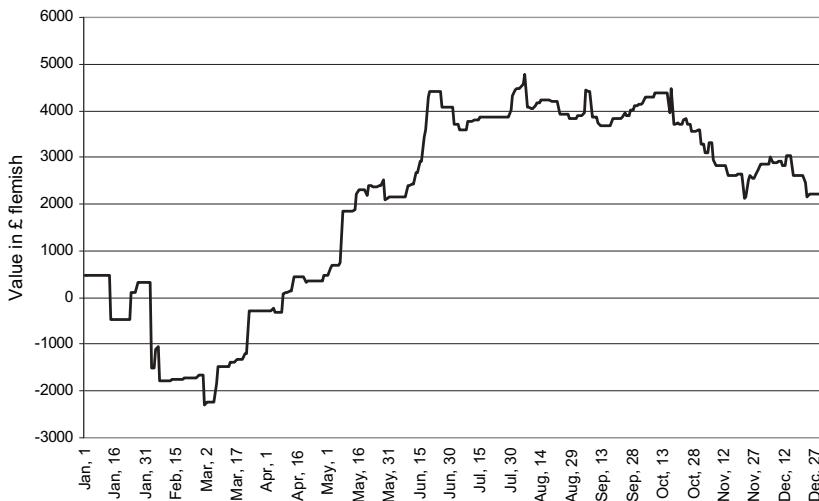
merchants, but were payors in 10 of the 66 bills drawn on them by the Borromei London, for a total value of about £980 flemish. So, in exchange relations between Bruges and London the needs of the Borromei companies and those of the London Mercers often coincided. The Mercers had to have funds in the Low Countries to buy imports, the Borromei funds in England to buy exports. So the one, the Borromei Bruges, lent money in the Low Countries to the other, the Mercers, in order to have money available in England for use by its London branch.



Graph 4. Value of Bills of Exchange Sent to and from London in 1438, by Role of Borromei Bruges

Graph 4 shows a peak of activity in the month of June when the Borromei delivered 25 per cent of the bills of exchange drawn on London, to the value of 29.5 per cent of the whole. There were two inter-related reasons for this. June was the month of Pinxtenmarkt at Antwerp, where the Mercers bought goods for export to England. They would be ready takers of bills to London and the Borromei could deliver cash to them at the Antwerp fair. In England, wool was mainly purchased in this period. Although it was then paid for by instalments spread over a longer period, this was the moment when the down payment, usually a third of the pur-

chase price, was due. For this reason, in the same month of June, the Borromei Bruges were borrowing heavily through exchange operations with Venice, as has already been seen. The relatively high sum which sees the Bruges branch in position of payors was part of the same strategy. The Borromei London were borrowing money by being taker for bills of exchange drawn in London on Bruges.

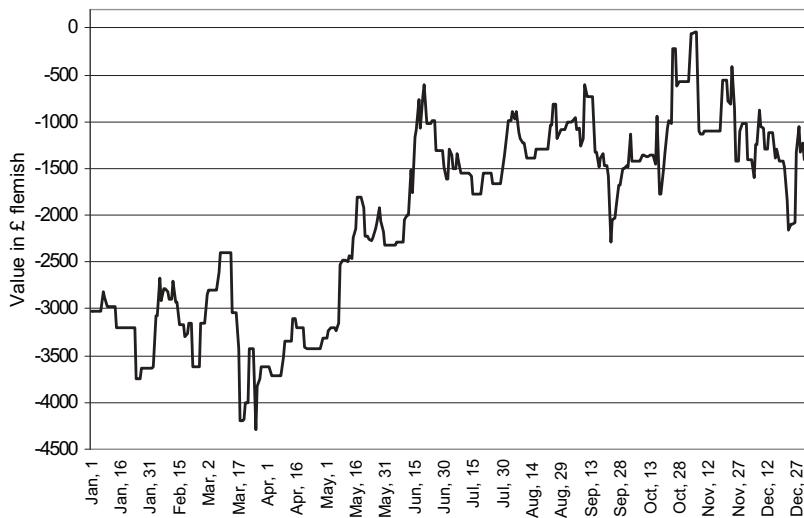


Graph 5. Movement of the Accounts of Filippo Borromei & Co. of London, as Clients of Filippo Borromei & Co. of Bruges, in 1438

The situation becomes even clearer when the movement of the accounts of Filippo Borromei & Co. of London as clients of Filippo Borromei & Co. of Bruges (Graph 5) is considered. The trend shows a clear seasonality. The Bruges company was in debit until 8 April, to the extent of £2,250 flemish in early March. After 8 April it was in credit for the remainder of the year, reaching a peak of £4,800 flemish on 6 August, but with an average between mid-June and late-October of some £4,000 flemish.

The discussion of the funding of Borromei exports from England must, however, be set in a much wider context. The movement of the Borromei Bruges's "*nostri*" accounts, kept for them by their correspondents abroad (Graph 6, below), shows that

they were constantly in debit. Put more simply, the bank owed very large sums in foreign currency to those correspondents. This was not something new in 1438, but was inherited from 1437, since debits of £3,000 flemish were carried over from that year. This is to look at the “*nostri*” accounts in general. Although the results are not shown here, further analysis of their dealings with London, Barcelona and Venice reveals an equally interesting pattern. With London they were in debit until May and thereafter in credit for the rest of the year. Almost the reverse is true for Barcelona, where they were in credit until July-August and in debit thereafter. However, with Venice there was almost permanent debit.



Graph 6. Movement of all the “*conti nostri*” of Filippo Borromei & Co. of Bruges, in 1438

This pattern is repeated in the analysis of the “*loro*” accounts, held by the Borromei in Bruges for their correspondents. Throughout 1438 the bank was in the position of debtor to all of them. There were fluctuations, with debits of about £2,100 flemish in January but only £1,500 flemish at the end of August. The combined “*nostro*” and “*loro*” accounts of their two main Venetian correspondents, Cecco di Tommaso and brothers and messer Antonio Borromei and Lazzaro di Giovanni, show an even worse situation. They were in debit to Cecco di Tommaso for nearly the

whole year, apart from two short spell between 30 August and 22 September and 6 and 28 November, and to the extent of more than £1,800 flemish on both 25 January and 8 May. But to *messer* Antonio and Lazzaro di Giovanni they were in debit for the entire year. By drawing on Venice so extensively the Borromei in Bruges were in fact drawing on the whole Italian money market, for the Republic was at its center.

Epilogue

The work of de Roover has to be a starting point for any analysis of Italian banking activities in northern Europe. His sources were different from ours, as he mainly based his research upon letters and made only limited reference to account books. This was an advantage in one sense, because it is much easier to determine the reasoning behind decisions and longer-term strategies from commercial correspondence than from a company's *libro mastro*. On the other hand, ledgers provide the details of the practical operations which are simply not obtainable from other sources and, thanks to computer technology, we are now able to make quantitative evaluations from them and analyze thoroughly the sources available to us. In terms of payments, Bruges was highly indebted to both Barcelona and above all to Venice, but only because it was transferring large credits to London to pay for exports of wool and cloth. The ledgers also demonstrate that, for the Borromei, Bruges and London must be treated as a single company in the years 1436-1439 and not as separate entities. But there are many questions that still need answers. The first must be, was the enterprise in north-western Europe profitable? What follow are the figures taken from the Borromei's own records of profits and losses, taking London first.²⁸

1436	profit	£st 24.17.8 = c. £fl 28
1437	profit	£st 318.13.7 = c. £fl 364 (£fl 392.12.6 for 1436-37)
1438	profit	£st 210. 0.0 = c. £fl 240
1439	profit	£st 386.12.1 = c. £fl 442

²⁸ ABIB, BLo fols. 17, 89, 146, 177, 185, 257, 299, 305, 406.

The main sources of profit were exchange operations and trade, but the Borromei of London also enjoyed a steady income from brokerage and commission on trade undertaken on behalf of others. In striking contrast, the Bruges company enjoyed two years of good profits, but then incurred heavy losses.²⁹

1435	profit	ffl 298.4.2
1436	profit	c. ffl 606
1437	loss	c. ffl 714
1438	loss	ffl 799.12.1

However, it is more meaningful to consider the profits and losses of the two banks together, since it has been argued that they were part a single unit. This shows the following:

1435	profit	c. ffl 298.4.2
1436	profit	c. ffl 634
1437	loss	c. ffl 350
1438	loss	c. ffl 560

Despite making healthy profits in London, the Borromei were not doing well in northern Europe overall. The reason for this is clear: the heavy losses suffered by Bruges on exchange dealings which more than doubled between 1437 and 1438 from £322.7.2 flemish to £685.2.2 flemish, as shown below in Table 1. Given that most of the exchange was with Venice, it is not surprising that most of the losses were incurred in that area. They were also worse than they first appear. Exchange with Venice amounted to 41.6 per cent of the total but the losses incurred in those operations amounted to 61.5 per cent by value. Operations with London also show losses where the percentage of the total value is greater than the percentage of bills, whereas for Barcelona the reverse is true. No losses were recorded on exchange operations with other places.

It is possible that external factors were partially responsible for these losses. From 1429 onwards Philip the Good, duke of Burgundy, faced severe monetary and political problems in his northern territories as well as with their main trading partner, England. The imposition of the bullion ordinances at the Calais Staple

²⁹ ABIB, BBr fols. 39, 162.1avere, 162.2avere, 254.

Table 1. The Losses of Filippo Borromei & Co. of Bruges on Exchange Operations, 1438

<i>Place</i>	<i>Correspondent</i>	<i>Loss in £fl</i>	<i>%</i>
Venice	Antonio Borromei and Lazzaro di Giovanni	317.18.2	46.4%
	Cocco di Tommaso and brothers	77.12.0	11.3%
	Arrighino Panigarola	26.0.0	3.8%
	<i>Venice, total losses</i>	421.10.2	61.5%
London	Filippo Borromei & Co.	160.0.0	23.4%
	Agostino Ruffini	7.4.0	1.1%
	<i>London, total losses</i>	167.4.0	24.4%
Barcelona	Filippo Borromei & Co.	96.0.0	14.0%
	<i>Barcelona, total losses</i>	96.0.0	14.0%
		685.2.2	100.0%

Source: ABIB, BBr, fol. 57.

in that year led to increasingly bitter cross-Channel disputes that were one of the main reasons behind the duke's abandonment of England for France at the Treaty of Arras in 1435. Before then, and in retaliation for the bullion ordinances, he had imposed a ban on the sale of English cloth in his other territories in the Low Countries similar to that which had been in place in Flanders since 1359 and following the siege of Calais in 1436 there was an almost complete interruption in wool trade. Commercial disputes with England were not to be resolved until 1439 and the bullion "wars" continued for a further three decades. Within Flanders there was civil war. Bruges rebelled in 1436 against the duke's attempts to introduce a unified system of government for his northern territories. The revolt was almost inevitably crushed and the city had to pay the enormous indemnity of £480,000 flemish to regain his "pleasure." This came at a time of severe famine in 1437-1438 and against a background of monetary confusion. Duke Philip's manipulation of the currency for his own profit had led to a widespread distrust of his coinage and in 1433 he was forced to agree to monetary reform. The *gros vierlander* was introduced as a

common currency throughout his northern territories and Philip had to agree to maintain monetary stability for the next 20 years. The value of the coinage was severely deflated, with new gold and silver coins 6.1 and 7.0 per cent stronger than those of 1428. To attract money to his mints the duke imposed strict bans on the export of bullion from his lands and cut his seignorage to a minimum. Eventually, and probably by 1437, the re-coining proved a success but there are signs in the Borromei ledger of continuing uncertainties, with references to "old," "bad" and "good" money.³⁰

Yet, if the Borromei's profits were severely affected by these circumstances, then so should those of other companies, and they were not. Bernardo Portinari was sent to Bruges by the Medici in 1436 to settle outstanding debits and "to inquire about local customs with respect to trade as well as to bills of exchange, and to find out the strength and the credit standing of the principal foreign merchants residing in Bruges, especially the exchange dealers." He must have made a favorable report, because he returned to Bruges to act as an agent for the Medici and then became an active partner in the bank they founded there in 1439. It was soon making good profits: £670.1.5 flemish in 1439-1440, £498.16.4 flemish in 1441, £302.0.0 flemish in 1442 and £538.7.6 flemish in 1443.³¹ Political upheaval, famines and monetary revaluation did not mean heavy losses for the Medici and other reasons must be sought to explain the Borromei's failures, if failures they were.

Bad management may explain the losses in 1437 and it is quite possible that in 1438 a desperate and unsuccessful attempt was being made to recoup them by gambling on the exchange market. The evidence from the ledger, however, suggests that there was sound commercial reasoning behind the heavy losses on exchange

³⁰ Wim P. Blockmans, "The Formation of a Political Union," in J. C. H. Blom and Emiel Lamberts, eds., *A History of the Low Countries* (New York and London: Berghahn, 1999), 95; David Nicholas, *Medieval Flanders* (London and New York: Lamberts, 1992), 359-61; John H. A. Munro, *Wool, Cloth, and Gold. The Struggle for Bullion in the Anglo-Burgundian Trade, 1340-1478* (Toronto: University of Toronto Press, 1972), Chapter IV, *passim*. ABIB, BBr fols. 48.1avere, 49.4dare, 54.5avere, 82.5avere, 249.5dare.

³¹ de Roover, *The Rise and Decline*, 59-60, 320, 322 (Table 67). Presumably, as London was in these years only a "suboffice" (as de Roover defines it) of Bruges, these are the aggregated figures for the profits enjoyed jointly in Bruges and London. For Portinari's account with the Borromei in Bruges, ABIB, BBr fols. 32.2, 82.5, 133.3, 133.4.

sustained in that year. The Borromei were willing to borrow heavily from their correspondents to finance trade through London, where profits in 1439 were 84 per cent up on the previous year. As none of the other Bruges ledgers has survived, it is not possible to determine whether the bank there returned to profit, but it seems unlikely.

The argument already advanced that the Borromei of Milan took a wide, European view of the banking and trading operations can also be taken a little further, if somewhat speculatively. The three companies outside Italy, in Bruges, London and Barcelona, all belonged to Count Vitaliano of Milan. He had provided their initial capital and it was he who took the major share of such profits as there were. Further investigation of both the London ledger and those for their main bank may be able to determine whether or not the Borromei of Milan did coordinate their operations so that any losses in the north were more than covered by profits from the sale of English imports in the south.³² In this context, it must also be remembered that losses on foreign exchange in Bruges in 1438 meant profits for London and Barcelona.

There is also a further and probably unanswerable question, what exactly was the relationship between the Borromei of Milan and the Borromei of Venice? In exchange to Venice in 1438, 75 per cent of the losses were incurred on dealings with one company only, *messer* Antonio Borromei and Lazzaro di Giovanni. During the 1420s the Borromei of Milan had used the two banks founded in Bruges and London by the Borromei of Venice as their correspondents. Both these banks continued their operations after Count Vitaliano established his own banks in the north and Alessandro Borromei and Antonio di Francesco & Co. of Bruges and Antwerp were one of the best clients of Filippo Borromei & Co. of Bruges, and usually referred to in the ledger as “*i Borromei*.” Were *messer* Antonio and Lazzaro di Giovanni in competition with or were they prepared to lend heavily to their Milanese cousins not only because they made a profit on the business but also because they were the fifth element in a successful “family” enterprise that ran from Milan through Venice to Barcelona, Bruges and London? This may be wishful thinking, but the heavy losses in Bruges can perhaps be

³² This is Fryde’s argument, albeit from limited evidence, in his “Anglo-Italian Commerce,” 353-355.

better explained in terms of a co-ordinated and ultimately profitable banking and trading enterprise between five major European centers rather than in the simpler context of Bruges, London and Milan.

Whatever the explanation, the managers of the bank at Bruges knew that 1438 was a difficult year. The substantial losses in the Profit and Loss account, £881.19.3 flemish in all, were not carried forward to the *libro azzurro* for 1439, as was the custom, but to the *libro bianco* for 1440, together with the profits from London for the years 1436 to 1438 which amounted to £632.12.6.³³ Why this was done is a mystery and is likely to remain so, as both the *libro azzurro* and the *libro bianco* have been destroyed. The contract for the Bruges bank was due to end on 31 December 1439 and the manager, Paolo da Castagnolo, may have been planning a final year's trading without the added burden of huge debits from 1437 and 1438. That is one explanation but another less charitable view is that he was trying to hide the truth from Count Vitaliano in the hope that 1439 would be a better year, with profits at last wiping out losses. In any case, the Bruges bank ceased trading at some time in 1440 and the London bank closed with it. Biscaro argued that it was the losses on exchange to Venice that caused the closure, but maybe it was simply not renewed after the end of the first contract; a completely new contract with different partners was then drawn up at Bruges, London and Barcelona.³⁴ The staff of the London branch, Giovanni and Niccolò Micheli, Felice da Fagnano and Alessandro da Palastrello appear in the English Views of Hosts trading in the city in the early 1440s and the ledger of Antonio Della Casa & Co. at the Papal court contains accounts for Filippo Borromei & Co. of Bruges, London and Barcelona in 1441 and 1442. This suggests that they may have still been working for the Borromei, on an informal basis. Biscaro states that at the beginning of 1441 Felice da Fagnano, Count Vitaliano's brother-in-law was the representative of the company in London, with Vitaliano's illegitimate son Giovanni *alias* Prevosto Borromei as the representative of the company in Bruges.³⁵ Vitaliano may himself have been

³³ ABIB, BBr fols. 254.1, 270.1.

³⁴ Biscaro, "Il banco Filippo Borromei," 313.

³⁵ Views of Hosts, National Archives, London, E 101/128/30, 31. Archivio dell'Ospedale degli Innocenti, Florence, 488, fols. 80, 116, 195 (Bruges); fols. 150, 215, 221, 223, 236, 314, 374 (London); fols. 168, 171, 172, 185, 221, 246, 247,

in financial difficulties in Italy in these years, since he had to sell large parts of his estates in 1444.³⁶

However, he still thought it worthwhile to re-found and re-structure the banks in Bruges, London and Barcelona. By contracts dated 12 March 1443 Vitaliano established two new and separate companies, one in Bruges and the other in London, to be open for business on the 1 January 1444.³⁷ The company at Bruges, *Prevosto e Alessandro Borromei & Co.*, had a capital of £19,200 milanese. This contract was again for five years (1444–1448), but was probably renewed, in the name of *Prevosto* only, as the company lasted until 1457. Count Vitaliano again provided the capital and was entitled to 66.6 per cent of the profits, whilst the remaining third was to be divided between *Prevosto* and Alessandro di Piero Borromei, who were sent to Bruges where Alessandro had already worked for the previous company.³⁸

The London company had a very similar capital: £19,076.16.4 milanese. Apart from the initial contracts there is very little surviving information for either of the companies, but they do seem to have worked separately, possibly to avoid the situation that had occurred in 1440 when the closure of Bruges led to the simultaneous closure of London. The bank was known as *Felice da Fagnano & Co.* *Felice*, whose sister had married Vitaliano and who had been previously involved in the management of the Bruges company, was the manager. Profits had to be divided between Vitaliano, who was to have two thirds, and *Felice* and Alessandro da Palastrello of Piacenza one third between them. Palastrello had also worked for the previous company in London. All that can so far be said about new company is that in 1448 Vitaliano was thinking of closing it due to bad management but that it was not dissolved until 14 March 1452.³⁹

252 (Barcelona). Biscaro, “Il banco Filippo Borromei,” 312–3. Why Giovanni was known as “il prevosto,” the parish priest, is not known.

³⁶ Mainoni, *Mercanti*, 94.

³⁷ As we have seen, the same strategy seems to have been adopted by the Medici who in 1439 opened the Bruges company and a “suboffice” in London, but in 1446 thought it worthwhile to have two separate companies (see above, note 11).

³⁸ ABIB, Box file 1051 (c) for the contract, and Box file 661 (unnumbered) for the dissolution.

³⁹ ABIB, Box file 1051(a, e) for the contract, and Box file 661(a) for the dissolution.

There was a similar restructuring at Barcelona and on 1 January 1445 a new company was established there with a capital of 6,000 milanese florins provided by Vitaliano, who was to have two thirds of the profits, with Arrighino di Ambrogio Pozzobonello taking the other third. They each had a representative in Barcelona, respectively Taddeo di Ardizio Vismara and Francesco di Arrighino Pozzobonello. Initially the company was an *acomandita* in the name of the two factors but well before the end of the contract, on 20 June 1446, the agreement was reshaped. Vitaliano's son, Filippo, was now to play a much more important role in the management of the bank. There had been disputes and litigation between the original partners, and Vitaliano had become increasingly distrustful of Vismara.⁴⁰

The person who seems to have taken the blame for the inadequate performance of the Bruges bank between 1435 and 1440 was its manager, Paolo da Castagnolo. Other members of staff survived and were promoted but by 1445-1446 he was no longer a shareholder in the main company at Milan nor was he employed by the Borromei in any other capacity.⁴¹ Winding up the affairs of Filippo Borromei & Co. of Bruges and of London was presumably a complex business and the ledgers would have been scrutinized with great care. That, as Biscaro noted, is probably why they have survived and why we are able to discuss them here, 500 years later.

⁴⁰ ABIB, Box file 1051 (a-d). For the Borromei companies of Barcelona see also Mainoni, *Mercanti*, in particular 90-110.

⁴¹ Apparently in these years he started managing the ducal treasury, but went bankrupt in 1447 (Mainoni, *Mercanti*, 93).