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A Mechanical Clock from Venice for Emperor Dawit of Ethiopia

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Although the reign of Dawit I (r. 1382–1413) has been overlooked in importance by modern scholars, his reign marked a period of increasing international diplomacy and contact with the larger Christian world. Dawit also played a critical role in the restructuring of Ethiopia's internal affairs by encouraging the worship of the Cross and the Virgin Mary, thus uniting the competing local religious factions through "pan-Christian symbols".¹ His patronage to the Arts and the cultural sector also sparked the golden age of Ethiopic literature in the late middle ages, with the great translating activity initiated during his time by the Egyptian bishop Abba Sälama II (1348–1388).

Amongst the notable highlights of Dawit's reign was the Ethiopian delegation sent by him which arrives at Venice in the year 1402. Not a few primary and secondary sources have discussed at length Dawit's embassy to the Republic of Venice, each with varying degree of elaboration.² The purpose of this Ethiopian delegation was to procure sacred objects of worship in exchange for which the Ethiopians sent a series of articles catalogued in the Venetian archives and recorded as including four leopards, aromatics, zebra and monkey leather and other "pleasing things" subsequently "worth 1000 ducats of gold".³ The Ethiopian delegation returns home having acquired a fragment of the Holy Cross along with other sacred and profane objects which are described in detail in an Ethiopic manuscript of the BAV published by Raineri and in the following manners: "sec. XX, pergamina, cm. 27,5 X 21,5, ff. 90, coll. 2; inchiostro nero e rosso; copertine in legno rivestite di pelle bulinata rosa. Provenienza: Gondar".⁴

The Ethiopian delegation, headed by a Florentine known to us by other sources as Antonio Bartoli, but identified in MS. Raineri 43 of the Biblioteca Apostolica Vaticana as "Abrahan" and as one of the two "travelers" (*nägadäyan*) [sent] from the King of Afranj" set out on the ninth of the month

¹ KAPLAN 2002.

² CERULLI 1943, 1949; SPENCER 1972; HELDMAN 1990, GETATCHEW HAILE 1983; TADESSE TAMRAT 1972.

³ RAINERI 1999:363–448, here 365.

⁴ RAINERI 1999:363–448.

of Ṭərr (equivalent to the 4th of January, assumably the year 1402) to the “King of Bandedya whose name is Mika’el” (f. 7ra). As has already been noted by Raineri in his introductory notes to the manuscript, “Bandedya” was the recognized name for Venice (Ar. *Bunduqya*) amongst the Arabs and the king referred to as Mika’el is presumably Michele Steno of Venice who ruled from 1400 to 1413. Amongst one of the more extraordinary gifts acquired by the Ethiopian delegation on its return home, was a mechanical clock which is described in fine detail.⁵ Although the acquisitions of the Ethiopian Embassy have been described at length in other writings, this manuscript is single-handedly the only one which cites a mechanical clock (referred to as *däl*, a contraction of *däwäl*) with the contents of the gifts acquired by the Ethiopians. As suddenly as it has appeared, the clock simply disappears after mention in this manuscript, and to the best of our knowledge, is never again cited by any other later literature emerging from Ethiopia.

According to the Venetian documents found and illustrated in this connection by Gianfranco Fiaccadori, this mechanical clock belonged to the Byzantine emperor of Trabzond Manuel III Komnenos, who had sent it for repair to Venice – “where it had been naturally built” – some time before 1401, when he first claimed it back from the Republic. The arrival of this mechanical clock to Ethiopia is viewed with great excitement by the scribe, who writes,

And now today, my beloved brothers, listen, I will tell you of the astounding and wondrously complex thing about a bell which has been sent with the glorious cross, because it rings, without the aid of the hand of man for the counting of the hours, whether it be night or day. At one o’clock, it rings once and at three o’clock and at four o’clock, it rings four times (sic!) and at five o’clock, it rings five times and at six o’clock, it rings six times and at seven o’clock, it rings seven times and at eight o’clock, it rings eight times and nine o’clock, it rings nine times and at ten o’clock, it rings ten times and at eleven o’clock, it rings eleven times and at twelve o’clock, it rings twelve times. And it does the same thing for the twelve hours of the night. (f. 39va–40rb)

The implications of the arrival of this mechanical clock and other profane objects (including a mirror, royal gowns, golden cups and plates) for private and royal use can be viewed as the sign of increasing political alignment with the Christian West. This newfound friendship with the Christian West

⁵ I am grateful to Osvaldo Raineri for bringing this manuscript to my attention and to Gianfranco Fiaccadori for providing me with references to his forthcoming paper during the 15th International Conference of Ethiopian Studies; see now also FIACCADORI 2009:36f., on the text’s authorship, with lit., 48.

was, amongst other factors, one of the alliances which secured Ethiopia's continuing existence as a Christian state.

Description of the Mechanical Clock in MS. Raineri 43 BAV

The mechanical clock described at length in MS. Raineri 43 BAV in 23 columns, from 37vb to 43ra, is of the striking train type of the Church of St. Gothard of Milan, announcing the hours of day and night by its number of strikes (the clock would strike one bell at one o'clock, two bells at two o'clock and so forth). This twelve hour cycle of counting time was not employed by the Church of St. Gothard which counted the hours up to twenty four. The clock is equipped with a time counting device "to count the hours" and a hammer to strike the "bell" (*däll*). The face of the clock is described as "a wide metal plate, which has a drawing on its border but not on its middle" (f. 42rb). Other details including astrological figures or devices or external adornments typical of medieval standing clocks are not mentioned in the manuscript. No mention is also made of the power which drives the clock, although presumably, should we take our European models of the same period, such clocks were almost exclusively driven by a falling weight of some kind.

The clock sits on a metal base (*mādr ʿabnā ʿarār*), resembling a tripod (*mälhəq*). It is constructed on a well coordinated set of wheels ("*ʿawadəyan*") with teeth, levers and pinions which ring the bell and turn the hands of the clock. Presumably on the one hand is a barrel, connected to its power source, usually weights, which when released sets a central wheel into motion. This central wheel is itself connected to other wheels through a central pinion, "seal" (*māʿətāb*), which regulates the motion of the wheels. These wheels are also connected to each other by their teeth (*ʿasnan*), dents, which perfectly fit into each other and move each other. The size of each wheel determines its relative power to move the next wheel to which it is connected. On one of the wheels is mounted a count wheel which has around its edges a notch (*ʿaf*) with a release pin, a "wooden key" (*māhrəw ʿəd*) connected to the striker (*säfelya nāhābi*). The coordination between the counting mechanism of the clock with hands and the strikes to be hit by the "hammer", is made through a connecting rod, a thin metal rod (*hādīn nəʿus*) to the count wheel with notches. The clock is also described as having a wide iron shield (*sāleda hādīn safiḥa*) which has a drawing of a lion. The power which drives the hands of the clock and the power which drives the main count wheel are separate (although there is no mention of the power which drives either distinct but related mechanisms), but they are coordinated through a rod, a notch and a release pin. This enables the clock to move its pointers to indicate the time while the hammer strikes the bell as many times as are the number of hours.

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EMML 2063

EMML = A Catalogue of Ethiopian Manuscripts microfilmed for the Ethiopian Manuscript Microfilm Library, Addis Ababa, and for the Hill Monastic Manuscript Library, Collegeville. Volumes I–III (1975, 1976, 1978) were compiled by WILLIAM F. Macomber, volume IV (1979) by GETATCHEW HAILE, volumes V–VII (1981, 1982, 1983) by GETATCHEW HAILE and WILLIAM F. MACOMBER, volumes VIII–X (1985, 1987, 1993) by GETATCHEW HAILE.

Summary

This short paper touches on one of the more significant episodes of Dawit I’s reign (r. 1382–1413): the Ethiopian Embassy to Venice in 1402. MS. Raineri 43 of the Biblioteca Apostolica Vaticana is noteworthy for the new details it offers, information otherwise omitted by other sources. A fully mechanical clock equipped with wheels and a striking mechanism, is alongside the Holy Cross, one of the items sent to Ethiopia in recognition of the growing alliance between two Christian states: Ethiopia and Venice.