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THE ACTIVITIES OF THE STATE CANNON-FOUNDRY  
(*TŌPHĀNE-I'ĀMIRE*) AT ISTANBUL IN THE EARLY  
SIXTEENTH CENTURY ACCORDING TO AN UNPUBLISHED  
TURKISH SOURCE\*

Ten years ago, when the late V. J. Parry came to survey the materials of war employed in the Ottoman Empire,<sup>1</sup> he felt constrained to observe, in concluding what he characteristically described as a 'brief and incomplete outline of a complicated — and most important — subject', that it would be no doubt the archives at Istanbul which would yield, in due course, answers to most of the problems which he had adumbrated.

In his last years Parry came to concern himself more, perhaps, than he had once done with the utility of Turkish archival sources as a tool to illuminate further his powerful insights into the nature of Ottoman warfare. On a visit to Istanbul in 1972 he collected a certain amount of material of this sort, but his untimely death, which occurred less than two years later, prevented him from making extensive use of it.

Some months ago I was invited to make an examination of the material which Parry had collected in Turkey in 1972. One item of interest proved to be a microfilm of an Ottoman defter from early in the reign of Süleymān I (926/1520 — 974/1566). One section of this defter forms the subject of the present paper.<sup>2</sup>

Istanbul, Başbakanlık Arşivi, Maliyeden Müdevver Defteri no. 7668 bears on f. 1 the title 'Account of Copper and Bronze and Tin

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<sup>1</sup> 'Materials of war in the Ottoman Empire', a paper which was presented as part of a series of conferences held at the School of Oriental and African Studies, University of London, in 1960 and subse-

quently published in M. A. Cook (ed.), *Studies in the economic history of the Middle East*, London, 1970; 219—229; at p. 227.

<sup>2</sup> My grateful thanks are due to Mrs. L. M. Parry for her generosity in making available to me this material.

for the casting of new Cannon at the State Cannon-Foundry from 29 Şafar 928 to the end of Cumādā II 932' — i. e., from 28 January 1522 to 12 April 1526.<sup>3</sup> The title, in fact, is neither all-embracing nor chronologically exact. Only six pages of the defter (ff. 1v, 2v — 3v, 14) have to do with cannon — the remaining pages are blank or are concerned with the construction of campaign tents and similar matters — and the information on the manufacture of cannon is continued to Şa'bān 934/May 1528.

The significance for Ottoman military history of this defter, which is apparently the oldest one in the Maliyeden Müdevver series to deal with the activities of the state cannon-foundry, has been referred to already by Professor İnalçık.<sup>4</sup> I offer here no more than a preliminary analysis of the contents of the defter, insofar as they may shed light on the manufacture of cannon in the Ottoman Empire and the operation of the state cannon-foundry at Istanbul in the early decades of the tenth/sixteenth century.<sup>5</sup>

The early history of the Ottoman state cannon-foundry at Istanbul — the *Ṭōphāne par excellence* — and of the quarter of the city to which it gave its name remains largely unstudied. Evliyā Çelebi, writing two centuries after the event, attributed the foundation of the *Ṭōphāne* to the sultān Meḥemmed II. He provides us with both a semi-legendary account of the quarter of *Ṭōphāne* prior to 1453 and a long and detailed description of the Ottoman cannon-foundry and its surroundings.<sup>6</sup> Evliyā's account, as well as the numerous earlier and later descriptions by European travellers, have been drawn on uncritically by later writers and we still lack a critical study of this important site. What is clear is that the history of the foundry in the half-century between the death of Meḥemmed II and the early years of the reign of Süleymān I is one of expansion and frequent rebuilding as the military needs of the Empire grew with — and as a result of — its continuing conquests, and as the use of cannon in field and naval as well as in siege warfare became increasingly the norm.<sup>7</sup>

<sup>3</sup> *Muḥāsebe-i nuḥās ve rūy ve kal'ı be-ci-het-i riḥten-i ṭōphā-i cedid der ṭōphāne-i 'āmire 'a[n] 29 Sefer [sic!] sene 928 ilā gāyet-i Cumādā 'l-āḥr sene 932.*

<sup>4</sup> In a paper entitled 'The socio-political effects of the diffusion of fire-arms in the Middle East', in V. J. Parry and M. E. Yapp (eds.), *War, technology and society in the Middle East*, London, 1975, at p. 212.

For a reference to a *Ṭōphāne* defter of slightly earlier date and different *cote* cf. I. H. Uzunçarşılı, *Kapukulu Ocakları*, Ankara, 1944, ii, 49, n. 3.

<sup>5</sup> I hope eventually to publish the relevant sections of this defter, together with a more extensive commentary.

<sup>6</sup> Evliyā Çelebi, *Seyāhatnāme*, i (Istanbul, 1314), 435–441.

<sup>7</sup> Cf. in particular (a) Parry's principal contributions — 'Bārūd', 'Harb' and 'Hişār' — (all with reference to the Ottoman Empire) in *The Encyclopaedia of Islam*, Leiden 195 x —, s. vv.: and (b) his posthumous essay, 'La manière de combattre' in Parry and Yapp (eds.), *op. cit.*, 218–256.

The organisation of the *Ṭōphāne* as a large-scale state industrial enterprise, appears to have been similar to that of other Ottoman activities in, e. g., mining or agriculture or shipbuilding which, utilising in part free craftsmen and in part forced or slave labour, served the needs of the state. Our *defter* enables us to examine the organisation and activities of the *Ṭōphāne* in two of its chief aspects: in the procurement of raw material for foundry-work; and in the production of cannon and other artefacts.

The two metals which, in the early sixteenth century, were required by the *Ṭōphāne* for its cannon-founding activities were copper and tin, the major and minor constituents of bronze, which alone the Ottoman Empire made use of for casting cannon (iron guns being unknown until much later). The needs of the foundry were met in two ways: by the procurement of copper and tin; and by an elaborate recovery-system which brought to *Ṭōphāne* from many parts of the empire large quantities of scrap bronze. This was mostly in the form of burst, obsolete or unusable guns and cannon. In the five years between 1522 and 1526 the total gross weight of copper and tin in various forms, and of scrap bronze, which was delivered to the foundry — mainly for the purpose of casting new cannon — was, according to this *defter*, 10580 *kaṅṭār*, or approximately 600 tons.<sup>8</sup>

Supplies of copper were plentiful in the Ottoman Empire, particularly large deposits being found in the vicinity of Kastamonu. The *Ṭōphāne* appears not to have drawn its supplies of the refined metal directly from the area of production, but from stores in the *bāgçe-i'āmire*, i. e., in the grounds of *Ṭōpkaḫı sarāyı*. Between January 1522 and February 1526 the *Ṭōphāne* was supplied with 4,728 *kaṅṭār* (262·36 tons) of copper in eight consignments of between 400 and 1000 *kaṅṭār* each. Two consignments were made early in 1522, possibly in anticipation of the imminent expedition against Rhodes; one in 1524; and five between February 1525 and February 1526, as the military build-up which preceded the Mohács campaign got under way. Copper from store was supplied to the foundry in the form of ingots (*külçe*): 38, 654 ingots, weighing an average of 12·3 *lodra*, or approximately 15 lbs., were delivered during this period.

Tin was less accessible to the Ottomans, who were obliged in part to seek supplies from outside the empire and in particular from the

<sup>8</sup> The units of mass employed in this *defter* are the *kaṅṭār* and the *lodra*; occasionally, with reference to smaller guns, the *vakiyye/kiyye* («okka», «oke») is employed.

The Ottoman *kaṅṭār* of 100 *lodra* weighed 56.443 kg. The *vakiyye* equalled 400 *dirham* or 1.2828 kg (W. Hinz, *Is-*

*mische Masse und Gewichte*, Leiden, 1955, 27, 24).

I have employed in this paper the British (avoirdupois) units of mass, viz. the ton of 2240 lbs. (1 ton equals 1.0161 tonnes; 1 lb. equals 0.4536 kg). I have taken the Ottoman *kaṅṭār* to equal 124.3 lbs.; the «okka» to equal 2.825 lbs.

lands of *dār ul-ḥarb*. Tin, like copper, was not supplied direct from the mines to the foundry. Stores of the metal were maintained in Galata in the so-called *maḥzen-i kule* (or *maḥzen-i kal'ı*) and were released to the foundry on the authority of the *kaḍı* of Galata or one of his deputies. In the years 1523 to 1526 200 *kaṅtār* (24,860 lbs.) of tin were delivered to the *Ṭōphāne* from this source. A further 300 *kaṅtār* of tin was obtained from a 'Frank' supplier, whose name may be read in the defter as Luigi Gritti, the Venetian *homme d'affaires* and confidant of the Ottoman grand vizir İbrahim Paşa. Between September 1524 and February 1526 eight separate consignments of tin were supplied to the *Ṭōphāne* direct from this source. Small quantities of tin were also consigned to the foundry from the stores at *Ṭōpkaḍı sarāyı*, 28·48 *kaṅtār* (3,540 lbs.) being supplied between May 1527 and March 1528.

A further account of the intake of copper by the *Ṭōphāne* is provided for the period May 1527 to March 1528. Carried forward in stock were 1,490 ingots weighing 201 *kaṅtār* (11·15 tons), together with 95 *kaṅtār* (5·27 tons) of tin, and 78 *kaṅtār* (3·77 tons) of bronze. On 8 May 1527 the *Ṭōphāne* took delivery of 4,639 ingots (555 *kaṅtār*, 30·79 tons) of copper; less than four weeks later, on 3 June, a further 4,178 ingots (505 *kaṅtār*, 28·02 tons) were released from the stores at *Ṭōpkaḍı sarāyı*. The total weight of deliveries of metal on this account for the period under review (approximately ten months) appears to have been 1559·91 *kaṅtār* (86·56 tons), 1392·66 *kaṅtār* (77·28 tons) of which were subsequently drawn from store at the foundry for use during the same period.

Of greater interest, perhaps, than the procurement of copper and tin is the large amount of information which our defter provides concerning the recovery by the *Ṭōphāne* of burst, unusable or obsolete cannon and other scrap bronze from various sources for refounding into new armaments. Scrap metal appears to have reached the foundry by three routes: deliveries in lots from the dump of obsolete cannon which was maintained at *Ṭōpkaḍı sarāyı*; direct delivery to the wharf on the Bosphorus outside the walls of the foundry by galleys of the Ottoman fleet of cannon and other scrap bronze; and the recasting by the foundry of cannon manufactured at *Ṭōphāne* but found to be faulty and therefore dumped in the vicinity.

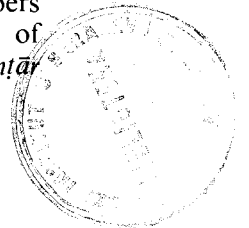
Some details of this traffic may be given. Between September 1524 and June 1525, 800 pieces of 'unusable guns' (*ḍarbzen-i lākı*), weighing in all 1,757 *kaṅtār* (97·51 tons) were transferred from the dump at *Ṭōpkaḍı sarāyı* to *Ṭōphāne* for melting down and recasting. Amongst these superseded guns were 199 pieces weighing 5·5 *kaṅtār* each (700-pounders) and 78 pieces of 4 *kaṅtār* (500-pounders), plus a further 199 pieces of 30 *vakiyye* (85-pounders), 284 40-pounders and 38 pieces weighing 35 *vakiyye* each (100-pounders).

A large number of scrap guns were brought to the foundry on the return of the victorious Ottoman fleet from Rhodes. Delivered to Tōphāne by certain commanders (*re'īs*) of the Rhodes fleet was at least some part of a consignment of 104 guns and faulty cannon, weighing 571·32 *kañtār* (31·7 tons), together with all of a collection of a further 372 smaller unusable guns weighing 263·3 *kañtār* (14·61 tons). Yet another delivery was made in January 1524, this time from the dump at Tōpkapı sarayı. This consisted of 19 pieces of 'Wheeled cannon' (*top-i caclī*) and 20 pieces of 'wheeled guns' (*zarbzen-i caclī*) which are described as being 'from the time of the campaign of İbrahim Paşa, brought by the commanders of the Rhodes fleet'. A further 104 pieces of wheeled guns of unspecified provenance are also mentioned as having been delivered from the ships of the fleet for recasting. This consignment weighed 357·8 *kañtār* (19·91 tons); i. e., the guns were of an average weight of 3·45 *kañtār* or large 400-pounders.

During this period guns for recasting were consigned to the foundry from various parts of the empire. An unspecified number and weight of faulty cannon were obtained from Foca, while from Midillü 'and elsewhere' in these years came a consignment of 70 *kañtār* (3·88 tons) weight of faulty cannon. A further 116·22 *kañtār* (6·45 tons) of scrap faulty cannon (*tōphā-i sakīm-i hurdevāt*) was obtained from the *vilāyet* of Kefe (Caffa) at about this time, together with 100 pieces of faulty swivel-guns (*prankūhā-i sakīm*) — small pieces of an average weight of 0·9 *kañtār* (112 lbs.) — and ten 'useless small guns' (*zarbzen-i küçek-i lākī*) of 2 *kañtār* (250 lbs.) each, from an unspecified source.

There are only a few references to the recasting of the larger types of siege cannon at Tōphāne. It is possible that only large faulty pieces that had never left the foundry were reworked there. Mention is made, however, of a pair of *şāyka* cannon (or a single cannon manufactured in two pieces) weighing 150 *kañtār* (18,645 lbs.) from Tōpkapı sarayı which was recast at Tōphāne, and to a faulty piece of 40 *kañtār* (4,972 lbs.) which had been manufactured in the time of Ayās Āğā, a former superintendent (*ser-tōpçı-i köhne*) of the foundry. Another single large siege-piece, weighing 30 *kañtār* and the work of the *tōpçı* Kāsım, is also recorded as being refounded in this way. An adjoining entry in the *defters* refers to the refounding of seventeen guns weighing in all 107·86 *kañtār* (nearly six tons) — i. e., pieces with an average weight of 6·3 *kañtār* — which had been cast under the supervision of the *ser-tōpçı* Murād Āğā.

Other types of guns and cannon brought in as scrap may be enumerated briefly: mortars (*tōp-i havānī/hvaāyī*) from, *inter alia*, the fortresses of Şudağ and Ak-Kermān; a further *şāyka* cannon; numbers of so-called 'Egyptian basilisks' (*baçaluşka-i Mısrī*); eleven pieces of faulty 'Egyptian guns' (*zarbzen-i Mısrī*) of approximately 6 *kañtār*



average weight; and, finally, a »great basilisk« (*t̄ōp-i bacaluşka-i buzurg*) from the foundry itself which weighed no less than 210 *kañtār* (26,103 lbs.).

During these years scrap bronze other than old cannon was also being made use of by the Tophâne for the casting of new weapons. For example, in the year which led up to the Mohács campaign (1525–6) one-third of a ton of old pitch-boilers (*każgān-i köhne-i zift*) were taken out of store in Galata and, together with a few *kañtārs*' weight of scrap bronze from the Crimea (Şudağ and Taman) were consigned to the foundry — evidence of the urgent need for the raw materials of warfare which was experienced by the Ottomans in these years of incessant military activity.

Finally, in dealing with the raw materials for the manufacture of cannon, mention must be made of one last source of bronze: the booty of conquest. From Rhodes, after its reduction, were brought not only the life-expired Ottoman guns mentioned above, but also 'infidel guns' (*z̄arbzenhā-i gebri*) and 'large and small infidel bells' (*cershā-i buzurg ve küçek-i gebri*), together with 'pieces of cannon and other things', to the extent of 341·15 *kañtār* (18·93 tons).

To turn from the raw materials employed by the Tophâne to the artefacts which were produced there. These were of two types: first, and principally, firearms; secondly, and much less significantly, artefacts of bronze or copper which were intended for military or civil use. The firearms are designated in the defter by the two terms already mentioned (a) *t̄ōp* (generally of greater weight), and (b) *z̄arbzen* (generally of lesser weight) — although the typological distinction between firearms designated by the one or the other term is by no means a clear one.

During the years 1522 to 1526 the Tophâne produced (according to this defter) 1,027 guns and cannon of various specified weights totalling 7,968·7 *kañtār* (442·19 tons), plus an unspecified but not large number of siege-cannon (*t̄ōp-i hişāri*) weighing 700 *kañtār* in all. The gross total weight of the production of guns and cannon appears to have been 8,668·7 *kañtār* or 481·03 tons.

To deal first with the firearms which are denoted in this defter by the term *z̄arbzen*, which I have for convenience' sake rendered as »guns«.

Numerically the largest items among the output of the Tophâne were the 'small guns' (*z̄arbzen-i küçek*) which weighed a nominal 3 *kañtār* (375 pounds). 625 of these, with an average actual weight of 2·983 *kañtār*, were produced. The next most numerous were the nominal eight-*kañtār* (1000—1b.) guns known as 'large guns' (*z̄arbzen-i buzurg*), of which 355, of an average weight of 8·166 *kañtār*, were produced during these years. The production of *z̄arbzens* in this period is completed with a small order for fifteen 'special small guns' (*z̄arbzen-i*

*küçek-i hāşşa*), of an average weight of 1·346 *kañtār* (166 lbs.). The total production of *zarbzens* recorded in this defter is 995 pieces, the manufacture of which consumed 4,783·7 *kañtār* (265·45 tons) of bronze.

In contrast to the large numbers of *zarbzens* mentioned above, the production of large cannon (*ṭāp*) during these years was apparently on a limited scale. The largest item recorded is an order for 32 basilisks (*baçaluşka*) of an average weight of 77·65 *kañtār* (9,652 lbs.). Apart from these basilisks, only the unspecified number and 700 *kañtār*-weight of the siege cannon previously mentioned are recorded.

For a later period, from May 1527 to March 1528, the then superintendant of the foundry, Sinān Āğā, used nearly 1,155 *kañtār* (64·1 tons) of copper, tin and bronze for the casting of 148 pieces of 'large guns' (*zarbzēn-i buzurğ*) — i. e., the nominal eight-*kañtār* (1000-pounder) pieces of a type already encountered. No production of large pieces — basilisks or siege-cannon — is recorded for this period.

The production of guns was not, however, the sole manufacturing activity of the *Tōphāne* during the years under review. In fact, a diverse range of castings intended for various military and non-military purposes was also produced, details of which are given in our defter. Among the castings which were produced for military use should be mentioned in particular the copper moulds (*derīce*) which apparently were employed in the manufacture of cast-iron cannon-balls (*şeng-i ahen*) for basilisks or siege-cannon. Seventy-four of these moulds were produced, the manufacture of which consumed 12·42 *kañtār* (1,544 lbs.) of copper. Large bronze mortars and copper cauldrons were also produced for military purposes at *Tōphāne*. The former were used in the production of saltpeter (*güherçile*), as part of the process of the manufacture of gunpowder; the latter in the preparation of pitch (*zift*), which was used for caulking the timbers of the Ottoman fleet.

Castings were also produced at *Tōphāne* for what might be termed 'civilian' uses. These castings were in part provided for use in various state construction works which were being undertaken at the time in Istanbul. A variety of artefacts were produced for construction work at *Ṭopkapı sarayı*, such as bronze window-grilles (*pencere*) and tie-bars (*perāzvāne*). More tie-bars, and also copper candlesticks, were produced for the 'imāret and *türbe* of Selim I, and other decorative castings produced at this time included the ornamental finials (*ser-kubbe*) for the 'imāret and for *Ṭopkapı*. Finally, at a more mundane level, it may be noted that the Palace was also on occasion supplied with tin, five *kañtār* on occasion being despatched to the imperial

kitchen (*matbah-i 'āmire*) for the repair of faulty utensils (*reddet-i evānī*), and with copper drainpipes for the imperial privies (*künk-i muşluk-i āb-i hāşşa*).

With this we may conclude the analysis of our defter. Our preliminary account of its contents raises more questions than it answers. What proportion of Ottoman field- and siege- artillery and naval guns was produced at *Topḥāne*, and what proportion was produced elsewhere in the empire? To what extent were the Ottomans still, in the early years of Süleymān I, casting large siege-cannon in the field? What numbers of »infidel« cannon, captured on the field of battle or at the conclusion of a successful siege, were put into service by the Ottomans and not recycled? What part of the production of the Istanbul cannon-foundry here described was intended for land use, and what proportion for employment on board the galleys of the Ottoman fleet? Unfortunately, the financial aspects of the production of cannon are also not illuminated by this defter, nor are the difficult questions which surround the origins and recruitment of those who worked voluntarily or involuntarily at the foundry. Only when these questions, too, come to be answered on the basis of Turkish archival material will it be possible fully to account for the history of cannon-founding in the Ottoman Empire in the spirit of the observations of Vernon Parry which stand at the head of this paper.

### S u m m a r y

THE ACTIVITIES OF THE FACTORY OF CANNONS (TOPHANE — I AMIRE)  
IN ISTANBUL AT THE BEGINNING OF THE XVIIth CENTURY  
ACCORDING TO UNPUBLISHED TURKISH SOURCES

This historico-economic study analyzes a rather significant problem of the Ottoman war history: the production of weapons and the sources of the raw materials used by *TÖPHĀNE-I'ĀMIRE* in Istanbul at the beginning of the XVIIth century. The study is based on unpublished Turkish documents, i. e. it is the analysis of *Maliyeden Mudevver Defter No 7668*, number 1, titled: The account of the copper, the bronze and the tin used for casting of new cannons in the Imperial factory of cannons from Safer the 29th, 928 to the end of gumadal-ahir 932. (i. e. from January the 28th 1522. to April the 12th 1526.)

The work considers the problem of the internal organization of *TÖPHĀNE-I'ĀMIRE*, the activity for procurement of the raw materials and the production of cannons on the basis of data from the aforementioned defter. The needs for raw materials were met in two ways: 1. by procuring the copper and the tin from the mine *Kastamonu* and other domestic sources or from without the Empire through



BAĞÇE-I'ĀMIRE in Topkapi saray and MAHZENI KULE in Galata, 2. by procuring the bronze by collecting the damaged and useless weapons in the Empire (in the defter the procurements from Rhodes and Foča are mentioned).

Beside many data about the procurements of the raw materials and the production of weapons, the analyzed defter, as the author concludes, raises some questions that deserve enlightenment e. g. how many weapons were produced in Tophane in this period and later and how many in other factories, how much were these weapons used on the sea and ashore and, finally, the financial aspects of the production of cannons in Tophane and the Turkish Empire in this period.

### R e z i m e

#### DJELATNOST CARSKJE LJEVAONICE TOPOVA (TOPHĀNE-I'AMIRE) U ISTANBULU POČETKOM ŠESNAESTOG STOLJEĆA PREMA NEOBJAVLJENIM TURSKIM IZVORIMA

Ova historijsko-ekonomska studija obrađuje jedan dosta značajan problem otomanske ratne historije: proizvodnju oružja i izvore sirovina koje je koristila TOPHĀNE-I'AMIRE u Istanbulu početkom XVI stoljeća. Studija je utemeljena na turskim neobjavljenim arhivskim dokumentima, odnosno predstavlja analizu Maliyeden Mudevver deftera No. 7668, broj 1 pod naslovom: Obračun bakra, bronze i kalaja za lijevanje novih topova u Carskoj ljevaonici topova od 29. safara 928. g. do kraja džumadal-ahira 932. tj. od 28. januara 1922. do 12. aprila 1526. god.

Rad tretira problem unutrašnje organizacije TOPHANE-I'AMIRE, te djelatnost oko nabavke sirovina i proizvodnji topova čije podatke sadrži navedeni defter. Naime, potrebe za sirovinama Tophana je zadovoljavala na dva načina: 1. nabavkom bakra i kalaja iz rudnika Kastamonu i drugih domaćih nalazišta, odnosno izvan imperije posredstvom BAĞÇE-I'AMIRE koja se nalazila na Topkapi saraju i MAHZEN-I KULE na Galati, 2. nabavkom bronze sakupljanjem oštećenog i neupotrebljivog oružja širom imperije (U defteru se spominju nabavke sa Rodosa i iz Foče).

Pored niza podataka o nabavci sirovina i proizvodnji oružja, defter koji je predmet analize u ovoj studiji inicira, po mišljenju autora i niz značajnih pitanja koja će trebati rasvijetliti kao npr. koliko je artiljerijskih oruđa proizvedeno u Tophani u tom periodu i kasnije, a koliko u drugim objektima za proizvodnju naoružanja. Koliko je to oružje korišteno u suhozemnim snagama, a koliko u mornarici, te finansijske aspekte proizvodnje artiljerijskog oruđa u Tophani, odnosno u Turskoj imperiji toga perioda.