Much may be learned or deduced regarding Sinan’s responsibilities and architectural practice from contemporary documents, some of which have already been published, notably the Süleymaniye account books¹ and the vaktiye drawn up after its inauguration in 1557 but before the death of Rüstem Pasha, one of the principal witnesses, in 1561.² Nevertheless the highly centralized character of the Ottoman bureaucracy in the mid-16th century did not exclude a considerable measure of improvisation and irrelevance, not to mention cover-ups, which are a feature of any bureaucracy. Mostly these are not explicitly mentioned in the sources. Conclusions, therefore, are often more in the nature of gleanings, and some of them must be drawn as much from what the papers do not say as from what they do.

The Süleymaniye account books which the late Ömer Lutfi Barkan so ably edited are a virtually inexhaustible source for the administration of the building trades in mid-16th century Ottoman Turkey. Nevertheless, in many respects they remain mysterious and difficult to interpret. No other comparable accounts for the 16th century Imperial foundations survive, which makes them difficult to situate in context. Although Süleymaniye was inaugurated, Celalzade Mustafa states, on Thursday, 27 Cumada I 957 (13 June 1550) they begin in Mufrarram 961 (December 1553), when works on the arches of the mosque and the four piers supporting the dome, the entrances into the mosque and the mihrab were already virtually complete. Barkan convincingly argues that the earlier series of account books for Süleymaniye has been mislaid, and the discovery of accounts for earlier Ottoman Imperial foundations in Istanbul like Selimiye or Sehzade might enable us to flesh out the skeleton. Ottoman accounting in the 16th century however was not static but evolved continuously. We should therefore not ignore the possibility that yet another of Sinan’s important contributions to the practice of Ottoman architecture was the keeping of exact accounts. In the case of Süleymaniye this would have been specially necessary because of the unprecedented scale and complexity of the operations. It may also be the case however that such detailed accounting took some time to become standard practice. No accounts survive for Selimiye at Edirne or for any of Sinan’s later buildings, and not till the mosque of Ahmed I in Istanbul are the accounts anything like so detailed. These in fact may well be a revival of practice at Süleymaniye rather than a survival, for to accompany them a collection of Imperial edicts and other documents relating to works at Süleymaniye was put together (Topkapı Saray Library H. 1424) which Barkan has shown to have been compiled for Kalender Pasha Ahmed I’s bına emini or Clerk of the Works. Without this manual the accounts for Süleymaniye, to him no less than to us, would have been well nigh incomprehensible.

Richard Goldthwaite’s masterly survey of the late 15th century building accounts³ for the Palazzo Strozzi in Florence exploits these to show the various responsibilities of the founder and the architect (evidently Cronaca, alias Simone di Tommaso del Pollaiuolo, 1457-1508) through (i) the purchase of building materials; (ii) the technical operations; (iii) the central administration; and (iv) the artistic direction. The accounts, which like those for Süleymaniye have no obvious forerunners, are in double entry, systematically grouped by category of cost, and, he observes, contain a built in cost-analysis. Though in certain respects more sophisticated than the Süleymaniye accounts they show many parallels, though these may be incidental and, except insofar as they exemplify masons’ practice, which cannot have differed greatly in 15th- and 16th-century Italy and Turkey either in industrial organization or technical specialization, are very probably misleading. It is well to bear in mind the technological background and the conditions it imposed, but the Sülemesiye accounts (the purpose of which may not have been practical at all, since they are exceptionally well written) do not really lend themselves to a reconstruction of what actually happened there.

I am already notorious for my complaints that Ottoman documents rarely tell the architectural historian what he may know to have been the case and even more rarely tell him what they say they are going to. Since we do not know why the accounts were drawn up and since Ottoman accountancy, in the light of the surviving documents, may well have been somewhat haphazard, it is useless to ascribe blame — or praise — for that. But the structure of the accounts published by Barkan, which may briefly be resumed as follows, leaves a great deal to the imagination.

The main defter covers the period 1 Muham- ram 961 - Sa‘ban 966 (7 December 1553 to 9 March 1559) and evidently represents the final settlement when the books were closed. The total expenditure of 26,251,939 akçe
is broken down into two main categories: materials purchased (mubaya'at): 8,125,332 akçe; wages and salaries (icarat): 18,126,607 akçe. The remainder is made up of transfers (tahvilat), mainly small sums owed for unspecified reasons by the previous bina emini, Hüseyin Çelebi; and miscellaneous minor purchases, 393,069 akçe, possibly afterthoughts, for builders' and decorators' materials, tools and various transport expenses. The reasons for the separate section are likewise unspecified. Practically all the categories have some intrusive items but the break down could be described as reasonably systematic. The mubay'at cover stone, bricks, plaster and mortar; Iznik tiles, for the mosque and the tomb (there is no mention of Roxelana's); lead, tin, iron and brass; ropes; and decorators' materials. The icarat cover labour of two types, evidently, State works already contracted for; and piece-work (ber veçh-i maktu'). The former type includes work by carpenters, stoncutters, builders or masons (beña), builders' labourers (irgadan), smiths, plumbers (sürberan), glaziers, decorators, tunnelers (lagimgeran), putters (lökümgeran), sawyers and porters. The accounts for piece-work cover partly the working of materials already paid for and partly the working of new materials by the same craftsmen, though it is, not surprisingly, difficult to correlate these works one-to-one with the list of purchases, which must have been largely topping up. Special craftsmen, however, are paid for chains, joinery, etc. Further, there are payments for lodging and transport by land and sea; wages for administrative and clerical staff; and, a conspicuous intrusive item, lead purchased on the open market, which sounds like an afterthought.

Since the craftsman paid for piece-work are mostly from the main labour force it is difficult to resist the conclusion that they were sometimes, even generally, being paid twice for the same work. But whereas the craftsmen listed in palace registers of Süleyman's reign received both a (low) per diem, which must have been analogous to a retainer, and a reward or gratuity on the completion of work offered to the Sultan the masons working at Süleymaniye were not paid any retainer at all when they were laid off for the customary two or three months in winter; and a double system of payment would have been an entirely gratuitous complication in such a vast operation. The payments for piece-work may therefore reflect work which had not been previously envisaged, possibly because the estimates were defective or too low.

The relatively unsystematic nature and the incomplete temporal coverage of the accounts are not the only reasons why they cannot tell us as much about the structure and practice of the Ottoman building trades as do the Palazzo Strozzi accounts. In the first place the detailed accounts for labour on the various parts of the mosque and the other buildings of the complex and the costs of the dressed stone for the domes and the door- or window-frames give no idea of the central coordination of operations. But, partly because they had to look presentable and partly, doubtless, because they had to cover over irregularities, they also convey the impression that the minutest details, and even the dimensions, of the buildings were determined in advance. This must be unrealistic of course, but the clerks who drew them up were book-keepers, not architectural historians. Because of the advanced state of works at the date the accounts begin, moreover, we learn nothing from them of the planning and costing of the operation, which was the essential preliminary to works at Süleymaniye as soon as the Sultan's command for the foundation had been given. Whether or not the estimates were even remotely realistic is a matter of interest primarily to accountants — though possibly evidence of Sinan's tact when it came to explaining to the Sultan that unfortunately the project was running over budget. But even if the estimates were amended as the building works proceeded they must originally have been directly related to the size, scale and components envisaged, so that if we had them they would demonstrate the original priorities as well as the after-thoughts and give an idea of the financial constraints upon them. We must therefore, look to other documentary sources if we are to reconstruct Sinan's modus operandi as an architect-planner. The missing accounts for the terracing, landscaping and digging of foundations would provide essential information on the relation of these works to the construction works and the points at which Sinan's personal direction was of crucial importance for the result.

The impact of Sinan's building on Ottoman urbanism in Istanbul is, in a rather more general way, clear in the case of the palaces he built, on both the European and the Asiatic sides, and in the history of the waterworks for Süleymaniye, the planning of which was an immediate consequence of Süleyman's decl-
sion to build a mosque and its appurtenances in the grounds of the Eski Saray. With the exception of parts of the Topkapi Saray and the palace of Ibrahim Pasha on the Hippodrome no 16th-century palace building survives in Istanbul, but Sinan’s considerable works in this sphere are listed with only minor discrepancies by all the biographical treatises.PALACES ARE NOT SO MUCH RESPECTERS AS CREATORS OF THE URBAN ENVIRONMENT, IN THAT THE SITE SELECTED, THE COMPONENT ELEMENTS AND THEIR ULTIMATE APPEARANCE MUST ALL HAVE BEEN SUBJECT TO THE WHIM OF THE SULTAN OR THE GRANDEE BY WHOM THEY WERE ORDERED. BUT THIS DOES NOT JUSTIFY THEIR NEGLIGENCE IN THE ASSESSMENT OF SINAN’S CONTRIBUTION TO OTTOMAN URBANISM. RECENT WORK ON OTTOMAN ADMINISTRATION HAS, ON THE CONTRARY, EMPHASIZED THE IMPORTANCE OF IMPERIAL PALACES, AND AFTER THE MINISTERIAL HOUSEHOLDS, WERE NOT MERELY GRAND RESIDENCES BUT ALSO GREAT ADMINISTRATIVE CENTRES, WITH SCHOOLS FOR THE TRAINING OF A MILITARY ELITE AND AN ARMY OF SERVANTS, SLAVES, STAFF, CONSCRIPTED TRADESMEN AND ARTISANS, SOMETIMES WITH PROVISION FOR THEIR OWN WORKSHOPS, WITH STABLES, BARRACKS AND ALL SORTS OF OTHER OUTBUILDINGS, MAKING THE PALACES VIRTUALLY MAHALLES OF THEIR OWN. IN TERMS OF NUMBERS AND VARIETY OF POPULATION, THEREFORE, THE EFFECTS OF OTTOMAN PALACE BUILDING ON URBANISM WERE FAR-REACHING, EVEN IF, LARGELY UNPLANNED, THEY MAY BE SEEN TO EXTEND AS ACCIDENTAL.

The Imperial palaces on which Sinan is stated to have worked had a variety of principal functions — administrative centres, like the Galata Saray; pleasure pavilions, lodgings or stands at suitable points to review the army at the outset of a campaign, like the Usküdar or Silivrikapi palaces; and, doubtless, hunting lodges. But he also supervised major works in the Topkapi Saray for Murad III, following the great fire which destroyed the kitchens in 1574: these were doubtless not unconnected with Murad III’s transfer of a sizable part of the harem from the Eski Saray, where it is recorded that Sinan executed restoration work and alterations for the women of the harem left behind there.

These Imperial constructions were however arguably of less immediate urbanistic importance than the palaces built for the four Viziers of the Dome, for Sinan Pasha, the Admiral, Rüstem Pasha’s brother and for a Nisanci or two. The notable absence of any merchants or members of the ‘ulema from the lists of palaces given by the biographical sources suggests very strongly that Sinan in undertaking these commissions was not acting primarily in a private capacity but on the Sultan’s orders and that the palaces were in the nature of official residences, at least those inside Istanbul. They were built all over the city, at Ayasofya, Kadırga, İstavroz, Usküdar, Süleymaniye, Beyazıt, Atmeydanı, Hocapasa, Yenibahçe, Halkalı, Sehzadebasi and Eyüp, but although some of them must have been for lodging ministers’ retinues when they moved out with the Sultan on campaign or accompanied him when he went hunting or paid ceremonial visits to Eyüp and other shrines, they show a distinct concentration along the Divanyolu, the processional route from Ayasofya to Süleymaniye. They also demonstrate that in Istanbul, in addition to the townscape beautified by Sinan’s great religious foundations and public works, there was also a smart centre with grand palaces — fully comparable to 15th-century Mamluk Cairo and its suburbs or to a Renaissance Italian city — of which practically all traces have vanished. They are even ignored in contemporary views. The depiction of Istanbul in Matrakçı Nasuh’s Meçmu’a-i Menazil (Istanbul University Library T 5984 ff. 8b-9a), with the single exception of the palace of Ibrahim Pasha on the Hippodrome, shows the city without any palaces. Melchior Lorches’s vantage point on the Galata side from which he drew his panorama of Istanbul in 1557 did not give him a view of the grand residences along the Divanyolu towards Süleymaniye. Moreover the illustrations to the Surname (Topkapi Saray Library H. 1344), showing the festival processions of 1582 in the Hippodrome, are almost all taken from the south, to show the palace of Ibrahim Pasha, from which Murad III reviewed the celebrations, in the background. The palaces on the south side, which were evidently cleared away when the complex of Ahmed I was built, are ignored.

It is certainly curious that if Sinan was really so active in the sphere of palace building there should be so little to show for it. But palace architecture, in Europe as well as in Asia, is inherently ephemeral, subject to radical alteration or even total destruction at the owner’s whim; unlike Muslim pious foundations, palaces had no endowments or grants for their upkeep, or at least these were very sporadically made; and in Istanbul a great deal of the domestic architecture was in wood so must have been highly vulnerable to the periodic fires which ravaged the city: there are even comparatively few pre-18th-
an urgent prerequisite to the beginning of works on Süleymaniye and the laying of the pipes must have taken place at an early stage in building, possibly immediately following the digging of the foundations. New watercourses also had a significant effect on the preexisting water supply of Istanbul and on the urban environment.

Here again the sources leave considerable scope for conjecture. For the waterworks do not appear in the extant account books, except for a few references to piping, spigots etc., which may relate to the plumbing of particular elements of the complex. The absence of detailed costings makes it difficult to estimate the efficiency of the preexisting water supply to the area: initially, it is quite possible that, given the proximity of Sehzade, the authorities considered its water supply to be adequate for Süleymaniye as well, so that the waterworks for Süleymaniye may even have been something of an afterthought. Inalcık has suggested that the earliest documented sebils (public fountains: the term çeşme is also used, at this date possibly in the same sense) were directly related to the population rise following the Conquest in 1453 and may have been deliberately concentrated in areas which were at the time ill-served by aqueducts. This could indicate overall planning by the central authorities, but in fact sebil-foundations before 1500 are negligible and even in the vakf-register of 1546 are of very moderate importance. Moreover, where waterworks are mentioned in this register — basins, taps, water-wheels or wells — they are generally treated as private facilities, not public amenities. Of course, when they were installations in a public foundation like a kitchen or an imaret they were clearly indirectly to the public benefit and may even have been deliberately installed to the benefit of the mahalle. The Süleymaniye vakfı originally contained no provision for any public fountain and Sinan himself had to seek permission to add a fountain to the complex in the 1570s. It is anyway slightly surprising, in the face of repeated orders forbidding private individuals from tapping the great aqueducts, that the Sultans did not find more public fountains, which would have removed one of the obvious temptations to abuse their beneficence.

One factor which is however often ignored relevant to the provision of water supplies to Ottoman pious foundations, is that the Ottomans were Hanafi Muslims, for whom ablutions in running water were obligatory. The
THE COMMERCIAL AREA OF ISTANBUL IN 1844 (FROM HUBERT SATTLER)

EYÜP, THE CEMETERIES AND THE GOLDEN HORN (FROM MELLING, 1819)
practical consequences of this are not easy to assess, but may explain the Ottoman preference in Istanbul and Edirne for aqueducts rather than wells. However, the infrequent mentions of wells in surveys like the vakf-register of 1546 may indicate that, as is known to have been the case with the grounds of the Topkapi Saray, geologically Istanbul could not adequately be provisioned from ground water.

There is no complete documentation of the Süleymaniye waterworks, the Halkali Suyu. Its chronology is unclear and there is not even conclusive evidence for Professor Özis's assumption that they were fully in operation by 1557, when the mosque was inaugurated. The documents published by Ahmet Refik, however, suggest constant tinkering and improvisation and in particular indicate that the planning and construction of the tunnels, collection and distribution points and the aqueducts of the various water supply systems credited to Sinan covered a considerable period of time, even years. Sinan's part in their overall planning is also difficult to assess, since many of the orders are addressed not to him but to the Inspector of Waterworks (suyolu nazir), probably a high Janissary officer. We do not know enough of his responsibilities to determine his seniority vis-à-vis Sinan, but it could well be that Sinan in constructing the aqueducts for the supply was here an executive and that the planning was in the hands of a central office and not in the Hassa Mi'mar's hands at all.

The earliest sign that all was not well is an order dated 16 Ramadan 966 (21 June 1559); evidently in response to complaints that the flow was inadequate, for new piping for a storage tank (sanduk) and a demand for specifications. Much more serious was the case brought against Sinan, where he was accused of having built a large fountain at the door of his house at Süleymaniye, with a marble reservoir, a bath and a tap inside his houses (sic). These were supplied by tapping the Kâğıthane Suyu, as a result of which the medical school and the three (sic) medreses at Süleymaniye no longer had enough water. Even had his installations not affected the water supply, Sinan might still have been held to be in the wrong, because the orders issued by the authorities regarding access to water supplies, like those forbidding houses and market gardens from encroaching upon the Kırkçeşme Suyu, bear out the 1546 vakf-register in showing their attitude to be very proprietal. However the important conclusion to be drawn from this case against Sinan is that, whether or not he had acted ultra vires, the water supply was by 1577 so sparse that even slight overloading caused an inconvenient shortage. This could have been temporary: the affair seems to have come to a head at the end of a summer when there could well have been a drought. But a later order dated 18 Muharram 994 (31 December 1585) laying down an increase in the Sehzade-Süleymaniye flow suggests either that the flow remained inadequate or that insufficient attention had been given over the years to keeping the pipes clear. Claims by Sinan and his staff that the Süleymaniye water supply was excellent are not necessarily convincing and could easily be flim-flam for the Sultan: they could scarcely have claimed otherwise. But the case also shows that to describe the Süleymaniye waterworks as public without further qualification is not entirely accurate.

The authorities' proprietorial attitude to the water supply of pious foundations brings out an often neglected feature of Imperial complex foundations (the contemporary term was 'imaret-i 'Amire), which are generally assumed by definition to be public works. In a general sense this is undeniable but many, if not most, of the institutions they comprised were in fact private. Just how far an Imperial mosque like Süleymaniye is comparable in status and functions to a European cathedral is a matter of judgment; but almost certainly its role in State ceremonial went against its function as a mosque for public daily prayers, and access to it may accordingly have been limited on occasion. The Süleymaniye medreses, like 16th-century Oxford college foundations by the Lord Chancellors of England, were set up with the deliberate purpose of training already highly qualified 'ulama for the highest legal offices of state and were restricted in their numbers and their entrance requirements. The Imperial tombs were private and where tekkes were present one could well argue that they were private too; though hospitals, 'imaretis and public kitchens were self-evidently much more widely accessible. The Süleymaniye baths, which Celalzade Mustafa in his ekphrasis of the foundation at the end of his Tabakatü'l-Memalik perhaps in error includes among the pious benefactions, would in that case have been exclusively for those on the foundation and would have been not at all comparable to Roxelana's immensely profitable public baths at Ayasofya. Where caravansarais form part of pious founda-
tions, as at Lüleburgaz, Payas and at the Atik Valide at Uskudar, these were indisputably public, but we do not know whether they were free or paying. In the three examples given above one may in fact suggest administrative reasons for their inclusion, either as barracks when the army was on campaign or the Court was on the move to Edirne or Filibe/Plovdiv: the reasons at Lüleburgaz were thus practical, not pious. And in the case of Payas and the Atik Valide at Uskudar they must have been where the immensely profitable tax farms (mukata'at) were levied on the international trade with Europe and the East. Considering that we know so much about the Ottoman tax system we know curiously little about how and where the taxes were levied in practice; but contemporary Venice and Mamluk Cairo, with their centrally directed and administered bonded warehouses, fondachi and wikalas must have had their Ottoman equivalent: doubtless indicated by the lists as Sinan's warehouse buildings for the Sultan and the Grand Viziers.

Since the component elements of these Ottoman complexes varied in status from the deeply pious to the merely practical we might well ask how far the choice of a particular set of them for a complex reflected a founder's decision. Were the component buildings of Suleymaniye, for example, Suleyman's own idea, which it then fell to Sinan to realize as best he could? Did the Sultans and their officials keep a general eye on the state of the pious foundations in the great Ottoman cities, adding new ones as it became clear that there was a need for them? — perhaps that would explain the addition of a hospital to Roxelana's foundation at the Avratpazari in Istanbul, quite a number of years after the original buildings (it was completed in 1557 (1550-1), apparently).15 If it was added because a general need for a hospital was felt, however, that scarcely explains why Suleyman, almost simultaneously, included such a substantial hospital element in Suleymaniye; though since the ad hominem element in many medrese or tekke foundations must also have been considerable, his hospitals could have been founded for favourite physicians. This must unfortunately remain speculation, for we know nothing of the specific motives for the foundation of any of the Imperial complexes. It is also possible that the selection of component institutions reflected not only Sinan's executive role — realizing, as ingeniously as he could, a founder's prescriptions — but also his role as contractor and architect, advising a founder how to get the best value for his available money. As often as not, founders must have started out merely with a basic idea of the sort of institutions and building they would like but without specific ideas of how much they wanted to spend for construction and the endowment (this could be, and often was, topped up with later donations). Such was certainly the case in contemporary Italy, though many founders later wished to be flattered by having the whole enterprise, conception and execution, credited to their ideas. Sinan's considerable practical experience fitted him particularly well for this advisory role and it is therefore rather tempting to suggest that, to an appreciable extent, the choice of component elements of his Istanbul foundations, as well as their actual buildings, was his.

In the specific case of Suleymaniye this raises the question how far, and at which point the components and the plan were predetermined. If the question seems almost lèse-majesté to Suleyman there are sufficient indications that over the seven-year period of building works there were significant afterthoughts, even if it can hardly be said that Sinan extemporised as he went along. We learn little of this from Celalzade Mustafa, who more than once uses the term camii-i serif ve'imaret-i 'amire, but possibly as a trope for the whole complex. We cannot conclude that 'imaret is here a specific description of a particular institution or that it excludes any of the others. But there are other indications. First, although one would have expected the land allotted for the site to have been exactly determined before building began in June 1550, a series of land parcels were subsequently acquired by istibdal ("substitution" of vakf property, which in Hanafi law was sometimes regarded as licit), up to early winter 1552,16 when the mosque and some buildings of the complex were already well under way.

We do not know the original limits of the grounds of the Eski Saray; not all the properties acquired by istibdal, which included private houses, vakf-property and the Janissary Aga's otlu, are explicitly stated to be in the vicinity of the 'Imaret-i 'Amire; and the exact purposes for which they were acquired are not stated. It is therefore difficult to identify which elements of the complex they were intended for, hence which of them were afterthoughts. It is however highly likely that they relate to the land at the edge of the great artificial terrace: this was used for
the medreses running down the hill which as Godfrey Goodwin has argued, were deliberately sited to give an unrestricted vista of the vast mass of the Imperial mosque at the centre of the esplanade. The acquisitions by istibdâl may also be related to an order to Sinan dated 5 Rabi' 959 (1 March 1552) that space in the ‘Imaret-i 'Amire’ must also be found for a hospital (ve bimarhanede dahî); a clear, if surprisingly late, indication that at Süleymaniye, as in Roxelana’s complex, the hospital was an afterthought. There is no mention either in the accounts or in Celalzade Mustafa of a tomb for Roxelana in the cemetery behind the mosque. That therefore must postdate the inauguration and also her death in 1558, though the tomb is listed in the vakîye published by Kürkçüoğlu, where she is described as deceased (marihuma) and which must have been drawn up before the death of Rustem Pasha in 1561.

Though it probably would not do to describe the tomb as an afterthought for it postdates, evidently, the completion of works on Süleymaniye, the position of the Dar al-Hadith, which was certainly an integral part of the foundation, was altered in the course of building. An order to the bina emini or Clerk of Works, Hüseyin Çelebi, dated late Muhtar-ram 959 (early January 1552) states that the position on the qibla side of the mosque (mihrib-i serif mukabelesinde) originally selected for the Dar al-Hadith was unsuitably cramped and that if the (foundation) wall was demolished for it that could damage the structure of the mosque. There was, however, empty ground (ard halî) against the garden wall (bagçe divarina varîna) which could accommodate the required number of rooms for students and that was where it should be built. Since the alternative choice was almost certainly the site of the present building, which is still cramped and eccentric in plan, it suggests that either the order was ignored (because no one had any choice), or that the location was changed without any modification to the original plan, or that the site originally intended, which is now the cemetery, was not necessarily intended for Süleyman’s tomb. Room for manoeuvre, literally as well as metaphorically, was an essential in any planning which had to take account of the sovereign’s changes of mind: given the seven-year building period and Süleyman’s understandable impatience and curiosity, it would actually have been most surprising if such changes of plan and location had not occurred. Moreover, as Professor Kuran has observed to me, by the time the surviving account books begin (1553) although the ‘imaret, tabhane and hospital (bimarhanede) are stated to be in course of construction, nothing is said of the medreses. These may have been begun, if not also planned, subsequently, for in the Süleymaniye vakîye only three medreses are described and the fourth was still evidently incomplete.

Of obvious relevance to the planning of Süleymaniye as a complex is the plan and model prepared by Sinan. Celalzade Mustafa’s term in the Tabakât ‘l-Memalik (f. 519b), resim ve tarh, is ambiguous, but we have independent evidence for the existence of a model both from the Surname (Topkapi Saray Library, H. 1344) and in the Chester Beatty Süleymanname (Ms 413) made for Murad III; and in accounts for paper, ink and gold leaf for the manufacture of a karnâme in the Süleymaniye defters. This term is also ambiguous, but paper or cardboard castles made by Matrakçî Nasuhi for the mock sieges in the Hippodrome for the circumcision festivities of 1530 are illustrated in his Tu fetû ‘l-Guzat (Ms, Süleymaniye Library, Esat Efendi 2206, ff. 33b-34a) and are also graphically described in letters from Venetian ambassadors present at the celebrations. It is moreover difficult to see why so much paper and decorative materials should be costed in the Süleymaniye accounts unless a model, on the lines of Matrakçî Nasuhi’s creations, was envisaged. It need not have been to scale; nor can it have been structural for, as Richard Goldthwaite has pointed out in his important discussion of the models used in 15th and 16th century Italy, the science of statics was still in its infancy. An obvious reason for its construction, at a point when works on the building were well advanced, was to assuage the Sultan’s impatience, and in that respect it must have served the purpose of a modern “presentation drawing” executed in an architect’s drawing office when a project has been agreed.

Goldthwaite has also pointed out the importance of Italian Renaissance modelli in communication between architect and builders. Filarete, for example, in his Treatise on Architecture states that after making drawings and explaining them to his workers he “made models of the building’s ornaments which I wanted done first, basements, cornices, ar- chictraves and doors.” For the Strozzi palace in Florence numerous models are known to have been made for the ornamental ironwork, from mere brackets to the great lanterns on
the outside corners, some of them by the sculptor, Benedetto da Maiano, though Cronaca, the architect in charge, certainly made many other models even if, as Goldthwaite suggests, someone else actually did the designs. In the case of Suleymaniye we do not know of other models for decorative details, but it is obvious that a large-scale model of the mosque would have been essential in coordinating the various architectural and decorative features proposed.

Surprisingly little attention has been given to the architectural decoration of Sinan's buildings, but the execution of mouldings, cornices, architraves and capitals was under identical constraints in Istanbul as in Florence. The homogeneity of the result justifies the conclusion that behind the building of the mosque lay a concerted design operation of which the model was the convenient graphic summary. There is, however no reason to believe that other models for the other buildings of the complex, were considered necessary.

As for the plans, these no longer exist; we can do little more than speculate upon their form and detail. Was there an overall plan of the complex indicating the component elements and their interrelations? At what point did it become fixed and unchanging? Was it to scale? In the case of the subsidiary buildings, did they each have a plan of their own, or was a standard plan adapted in each case? The order regarding the repositioning of the Dar al-Hadith may indicate that originally there was an overall plan — unless the positioning of the various buildings was worked out on the ground. It would seem highly probable that at least a sketch plan of the complex showing the principal buildings was presented to Suleyman for approval, possibly before work began on the levelling and the foundations; but whether this was taken as implying a commitment to the complex as presented there is difficult to say. There is however one case known to me which casts some light on the matter, an order to the kadi of Edirne dated 1 Sa'ban 966 (9 June 1559) (Basbakanlik Arsivi, Mühimme 3, no. 117) regarding a karname prepared by Hüseyin, a member of the Hassa Mi'mar's office, for a mescid to be added to an imaret about to be built a Edirne next to the bridge of Çoban Mustafa Pasha, stating that whereas it had been drawn with two minarets there should properly be only one (amma resimde minare iki olmustur, bir itdirsin). Karname is evidently here not the plan but either a drawing of the elevation or a model. The latter would be the more economical solution for a building of moderate importance. But it demonstrates that substantial amendments could take place between the drawing of a plan or design and the building as executed.

There are no surviving plans or models of Sinan's other buildings and it is unclear whether they were submitted to other founders as a matter of course: that would probably have depended upon whether he was working for them on the Sultan's instructions or not. But it is also extremely probable that there were working plans kept in the Hassa Mi'mar's office; and, in the case of late buildings like Kilic Ali Pasha's complex at Tophane, where the mosque is a carefully scaled down version of Hagia Sophia, there must sometimes have been elevations too. These may even have been in general circulation, for certain peculiarities in elevation drawings of Imperial mosques in Istanbul or at Edirne by European travellers in the later 16th century suggest that they were done not after the buildings themselves but after drawings. The inaccuracies and sheer fantasy in Melchior Lorch's drawings of Ottoman architecture in Istanbul and the Balkans in his Wohlgerissene Figuren (Hamburg 1626), which contrast strikingly with the buildings shown in his panorama from Galata in 1557, and which were evidently worked up in his old age from sketches made on the spot many years previously, need not be sheer lapses of memory but accurate reproductions of drawings which later were amended. A view of Suleymaniye bearing a superscription in an anonymous German hand describing the inauguration ceremonies of the mosque on 8 October 1557 looks commendably accurate, but Klaus Brisch rightly argues that it must have been done from memory too; but in this case why not from the model or an elevation?

The question has recently been raised regarding the cost-effectiveness of Sinan's constructions: how far was the diversion of State funds into architecture a more rational, economical or equitable policy than alternative forms of private or State expenditure? This preoccupation is modish but anachronistic. Sinan's patrons would have regarded grandeur as an essential feature of pious foundation; but piety it first and foremost was, and in his buildings Sinan was merely the agent of Imperial beneficence, which was one of the traditional attributes of the just ruler in Islam. Nor does it make much
TOPKAPI SARAY. THE KITCHENS BY SINAN (FROM ELDEM)
sense to consider how far Sinan spent his money well or whether a cheaper construction might have served his, or the founder’s, purpose better. The penalties for the collapse of a dome or other public failure in Imperial Ottoman architecture were so alarming that all Ottoman architects built with exaggerated safety factors. That not one of the many extant buildings credited to Sinan yet shows any serious structural defects, in spite of often problematic siting or terrain and of damage from earthquakes, is a clear demonstration of his caution. As for the question of the diversion of State funds into Imperial architecture, there was a current of Muslim thought which plainly disapproved of grand building projects, witness the depressing if quite bogus hadith that nothing so rapidly dissipates the substance of a believer as architecture.

But a very rough consideration of the accounts for the years 961-6 (1553-59), giving a total of more than 26 million akçe, which Barkan estimated to be about 49 per cent of the total expenditure on the complex, suggests that the dissipation was not excessive. That was the equivalent (at about 45 akçe to the ducat) of around 580,000 ducats, which at estimates for 1530 was something over one-sixteenth of the Ottoman empire’s income and rather less than the annual tribute from Egypt. Moreover almost 26 million of this was from the Sultan’s private purse, which was not for the public benefit anyway. If we consider that the notorious Venetian gold crown sold to Süleyman in 1532 may have cost him as much as 115,000 ducats then Süleymaniye, which was at least indirectly a public benefit, does not seem to be an extravagant enterprise at all.

Also relevant to the question of cost-effectiveness is the diversion of men and strategic materials to the construction of Imperial complexes, a point first raised by Klaus Kreiser who pertinently remarks that works on Selimiye at Edirne, inaugurated in 1572 which follow hard upon the battle of Lepanto the previous year, when the Ottoman fleet was virtually annihilated, may be financially and administratively related. Within a year after Lepanto the fleet was almost entirely rebuilt, though at considerable expense in labour and materials. This must have greatly complicated the task of the Hassa Mi’mar’s office on the contracting and supply sides and makes it pertinent to consider briefly how far the necessary progress of architectural works was hampered by the conflicting claims of the armed services.

It was almost certainly a matter of good luck, not good management, that building works on Süleymaniye did not coincide with major campaigns. In 1547 peace was signed with the Habsburgs, leaving Süleyman free to concentrate upon an Eastern campaign the next year. A lull followed and though fighting was renewed in 1553 it was ended by the peace of Amasya in 1555. In Hungary and Transylvania from 1551 on though there was continuous military activity it was well below the scale of a full Imperial campaign (sefer-i Humayun). Probably the most serious distraction was the naval campaign of 1552 when Piri Reis, who commanded the Suez fleet, sailed East into the Gulf, besieged Hormuz and Muscat but contrived to get the fleet blocked at Basra. The immediate sequel is not entirely clear but was evidently disastrous enough to warrant his execution.

It was not entirely his fault that the fleet had later to be written off, but its rebuilding posed far greater problems: the lack of proper materials in Egypt meant that the Alexandria dockyards had to be supplied with timber and other strategic goods from mainland Turkey. Very probably, none of these naval and military campaigns seriously hampered work on Süleymaniye, but cumulatively they might have come near to overstretched the supply side of the State economy. Thus outside pressures on occasion could have created unexpected difficulties for Süleymaniye. Conversely, to supply materials for the building site must on several occasions have diverted strategic material from the Arsenal.

This comes out clearly in orders issued by the central authorities regarding the supply of fine marbles to the site workshop (‘anbar-i amire) at Süleymaniye, culminating in the unimaginably complex procedures attending the four monolithic granite columns which, as it turned out, seem not to have been actually used in the mosque. These involved the felling and transport of timber from the forests of Bithynia behind the Dardanelles dockyards to build and strengthen the quay (iskele) at Alexandria: the timber was loaded on a cannon boat (hassa top gemisine tahmil olunub) in mid-Sa’ban 953 (mid-October 1551) for despatch to Egypt.

It was evidently insufficient, for further timber was ordered to be felled and despatched to Alexandria. To transport the columns two heavy naval transport ships were specially ordered to be constructed in the Dardanelles dockyards; these were delayed, first because of labour shortages and then by
unseasonable weather which made it dangerous for them to set out.⁹ We can only guess what accidents occurred as only two columns, not the original four, arrived in Istanbul: but if one of the ships was lost on the way out or returning, the set-back was covered up. The loss of course, was not merely to the Süleymaniye works and the Sultan's purse, but to the Ottoman navy as well. The same fuss started all over again in 1552 with a demand for two columns from the temple of Jupiter Helios at Ba'ibakk, in this case with the additional expense and labour of transport across the Lebanon, to add to the not inconsiderable labour and expense of strengthening jetties, providing shipping, crews, Janissary engineers, etc.

It is clear from the orders addressed to the Sancakbegs or provincial governors that the provision of labour, including Janissaries and naval officers to direct or advise operations, and the costs of transport, ropes, block and tackle, etc., were envisaged as falling upon provincial funds, which in normal periods of civil quiescence the administration could easily absorb. It also appears from enquiries to the Sancakbegs of Adana, Sis and Tarsus that once the end was ordered the means were too. What coloured marble columns and panelling were there near the sea in the area? what did they measure? Was there a jetty or quay? If not, could one be built? An estimate of the overall cost of removal and transport was to be sent back to Istanbul: we have no evidence that any such estimate was rejected for reasons of expense. It is probable that if the authorities knew beforehand the time, trouble and cost involved in obtaining the granite columns, they might never have issued orders to bring them from Alexandria in the first place, as this involved a diversion of artillery ships to transport timber as well as of labour in the already overstretched Dardanelles dockyards to construct the transport ships. We have only to look at modern building projects which regularly run vastly over budget but the soaring costs are grimly accepted because they occur when plans can no longer be changed. But it is perhaps surprising that the Ottoman authorities do not seem to have been more severe than Mrs. Thatcher’s government in punishing those held responsible for the escalation.

The specification of much of the ordinary
timber and stone by function and cut, as well as by description and type, indicates a degree of standardization at the quarries and the timber-yards, which evidently supplied materials half- if not fully worked. It is also possible that, as in contemporary Florence, some of the terms for timber and stone which still resist lexical translation also implied standard measurements; though this is a far cry from the conclusion that any of Sinan's buildings was modular. Orders for rubble (moloz), mortar (horosani), building stone (ates tasi, küfek tasi) and timber recur with great regularity in the accounts, indicating that the quantities necessary to keep up a steady rhythm of work were too large to be ordered in bulk in advance or to be stored all at once on the site ('anbar-i 'amire). However, we may assume that there was a bulk order for these materials at the outset or as part of the estimates, in order to get work off to a good start without constant hitches. The provision of iron and lead, for cramps as well as for roofing or ironwork, from the Ottoman mines at Samakov in Bulgaria (iron) and in Bosnia and at Sidrekapsi in Northern Greece (lead) was a more complex problem, because the exceptionally large quantities suddenly required demanded, Barkan has argued, a major organization of production.\textsuperscript{31} It is not really clear that this occurred. The authorities, who evidently presumed an indefinitely elastic labour supply, seem to have embarked on a degree of capitalization, in the form of advances to miners and entrepreneurs in order to stimulate productivity. However, the industry was dependent for power on water-mills and it would certainly have been more realistic to build more of these. In the case of lead they also made provision for smelting ore, possibly at Süleymaniye itself, given the large sums allotted for firewood in the accounts; though the transport costs of large quantities of lead ore and coal would have been a less economical proposition than smelting it at the mines themselves. The documents published by Barkan,\textsuperscript{32} mostly issued between the summer of 1550 and mid-1552 illuminate the pressures upon the authorities to supply lead simultaneously for the various Imperial building projects and for the fleet. Orders in 957 (1550-51),
repeated in Rabi' I 958 (March-April 1551), demand that since lead was urgently required for the Dardanelles dockyards 200 kantars should be borrowed (sic: ikraz olunmak) from the stocks at Süleymaniye, to be returned when the pressure had eased. "Borrowing" was evidently standard procedure. Simultaneously, urgent requests were despatched to the harbour (iskele) at Ahyolu in Thrace enquiring how much lead was (still) available there and underlining that it was to be transported to Istanbul without delay. The urgency is comprehensible: for if at this stage lead had not been available for cramps it could have delayed completion of the buildings by months or even years. The urgent need continued and in 1552 there is a report\(^3\) that 800 kantars of lead were brought from "the 'imaret under construction by the Valide Sultan" (there was properly no such person at this time: can it be an allusion to Roxelana's foundation at the Avratpazari in Istanbul which despite its vakfiyes was still not absolutely complete?); 200 kantars from the Prefect (seheremini) of Istanbul, who may have been holding stocks of lead for running repairs to the city walls; and a total of 1236 kantars (brought) from a new caravansaray (han-i cedid) in the province of Aleppo. Such a large amount in this last case must imply either that building works on the han were totally discontinued and the building never finished, or that it was in fact the central official storehouse for strategic supplies in the vilayet of Aleppo. This pressing need for lead at Süleymaniye, however, also had to compete with others of the Sultan's works, notably with 300 kantars needed for the roof of a pavilion in the Topkapi Saray (no longer extant, evidently) (beray-i pusiden-i bala-yi kôsk der saray-i 'amire-yi cedid). These also were to be "borrowed" from the stocks of the Hassa Harc Emini in Istanbul.\(^4\)

In fact, such was the demand for lead from all sides that the only recourse for the authorities was the open market in Istanbul. Though this was by no means the only occasion on which they turned to the open market in the course of the Süleymaniye works, they do not seem to have been so overwhelming-ly dependent upon it as the builders of 15th- and 16th-century Florence. Curiously, one of the private individuals from whom they bought lead, Süleyman Beg, was actually Inspector of Mines (nazir-i ma'adîn): would it not have been his duty therefore to supply the authorities with lead in the first place? Considering that lead was of such strategic im-

portance and that mines in the eyes of the Ottoman authorities were State property\(^5\) we must conclude that the monopoly was (like other State monopolies and at other times in history) rather slackly enforced and State employees lost no chance of speculating. The shortfalls in production in the mines and the improvisation to which they gave rise reflect no particular discredit upon the conduct of the Süleymaniye works. Indeed, that work continued so rapidly, and evidently so smoothly too, in spite of the many conflicting demands for strategic materials, demonstrates yet another facet of Sinan's genius as planner and master of the Sultan's works.

J.M. Rogers

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6. See Contents.
7. "Istanbul", Encyclopaedia of Islam².
9. A. Bilge, "Mimar Sinan hakkinda arastirmalar. II. Süleymaniye' deki sebili v.s.", Sanat Tarihî Yıllığı V (Istanbul, 1972-73) 141-73, citing a register of repairs and restorations to the awqaf of Süleyman covering the years 995-1003 (1587-94) (Babakankılı Arşivi, Maliye 7159, 28 (old pagination 25). The exact date is uncertain.
11 Refik 14, no. 1.
12 Order dated 25 Cumada II 985 (9 September 1577), cf. Refek 26, no. 21.
13 Refik 30, no. 31.
15 The earliest of the vakfiyes of Roxelana’s foundation to list the hospital and its staff is dated 928 (1551-52), which implies that the hospital was by that stage virtually complete. Cf. J.M. Rogers and R.M. Ward, Süleyman the Magnificent, exhibition catalogue (British Museum, 1988) 19, N. Taşkiran, Hasekinin kitabı (İstanbul, 1972), followed by Esin Atıl in The Age of Süleyman the Magnificent, exhibition catalogue (Washington DC, 1987) no. 6, somewhat misleadingly conflates vakfiyes of different dates.
16 O.L. Barkan, Süleymaniye camii ve imareti inşaatti II (Ankara, 1979) 201-2, nos. 534-8. He also refers to expropriation or forced purchase (lismo) but I think this must be an anachronism.
17 Topkapı Saray library, Koguslar 388, f. 100a, cited by Barkan, Süleymaniye camii ve imareti inşaatti I, 78; II, 201, no. 531.
19 Ibid 1, 65-79.
22 “The building of the Strozzi palace”, 123 ff.
24 Berlin, Staatliche Museen Preussischer Kulturbesitz, Kunsthistorisches Museum, HDZ. 4168. C f. Türkische Kunst und Kultur aus osmanischer Zeit, exhibition catalogue (Frankfurt, 1985) I/55; Schätze aus dem Topkapı Saray. Das Zeitalter Süleymans des Prächtigen, exhibition catalogue (Berlin, 1988) no. 5. The view of Süleymaniye in the “Freshfield album” (Cambridge, Trinity College library, MS. O. 17.2, f. 14), illustrated in Türkische Kunst und Kultur aus osmanischer Zeit, exhibition catalogue (Frankfurt, 1985) I/48 and p. 81, is much more in stereometric perspective with considerable, almost surprising, detail. The drawing is anonymous, though evidently in a German hand, and was probably the work of an attaché in the suite of one of the imperial ambassadors of the 1570’s to the Ottoman court. A terminus is provided by the drawing of the tomb of Selim II at Ayasofya (f. 31) where the graves are shown under a tent; this must date it c. 1574, after Selim’s death but before the mausoleum was built.