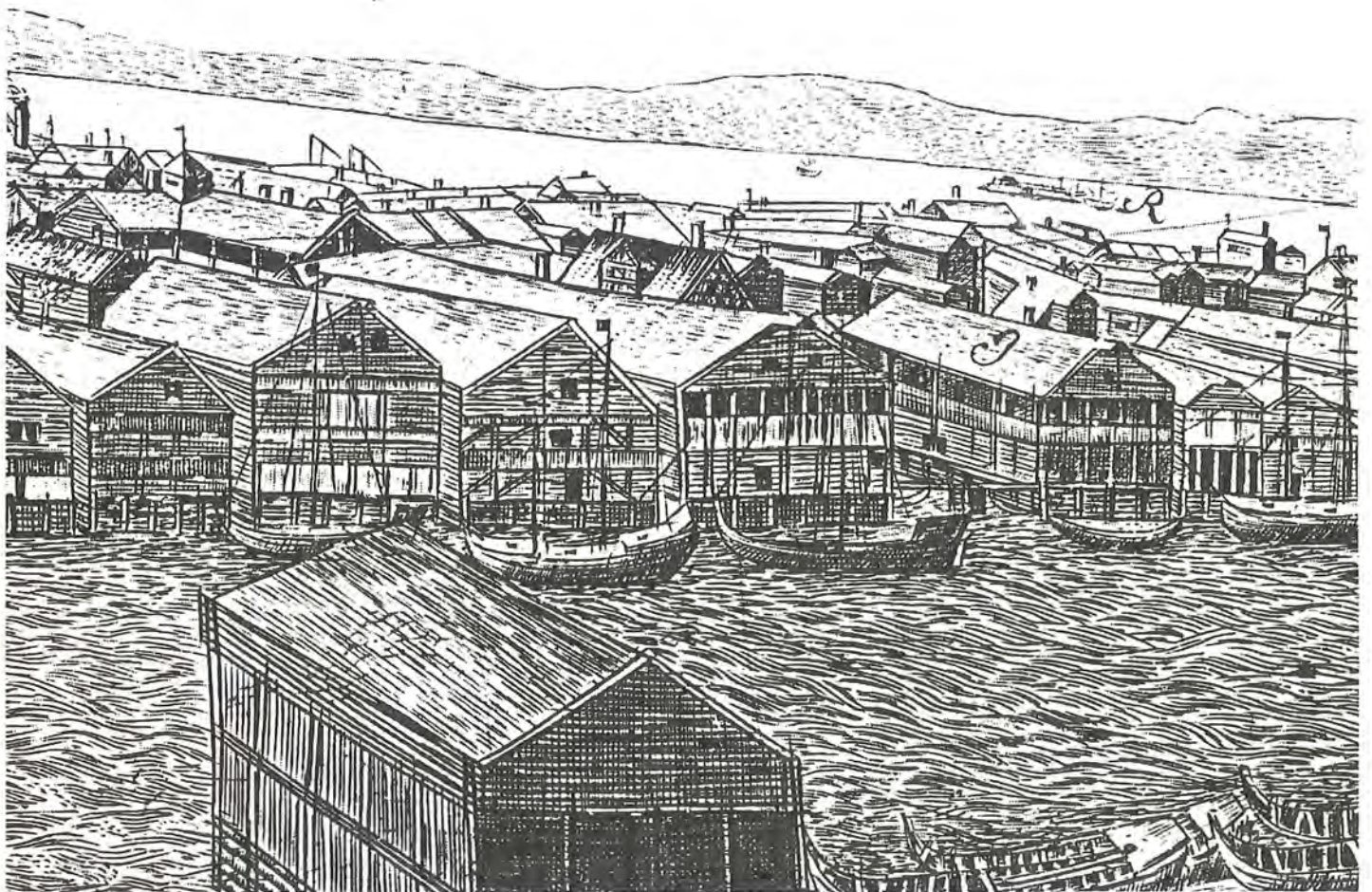


FORTIDEN I TRONDHEIM BYGRUNN:
FOLKEBIBLIOTEKSTOMTEN

MEDDELELSER NR. 17



A. CHRISTOPHERSEN, E. JONDELL,
S.W. NORDEIDE, I.W. REED

EXCAVATION, CHRONOLOGY AND
SETTLEMENT DEVELOPMENT

MEDDELELSER NR 17

from the research project:
**FORTIDEN I TRONDHEIM BYGRUNN
FOLKEBIBLIOTEKSTOMTEN**

**Axel Christophersen, Erik Jondell,
Sæbjørg Walaker Nordeide, Ian W Reed**

EXCAVATION, CHRONOLOGY AND SETTLEMENT DEVELOPMENT.

Riksantikvaren, Utgravningskontoret for Trondheim

Trondheim 1989

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PREFACE

Between 1973 and 1985 the Folkebibliotekstomt (Library site) in Trondheim, Norway, was archaeologically excavated. The site covered an area of approximately 3200 m² in the central part of the medieval town, near the mouth of the River Nid. Here continual occupation of the site from the late 10th century to c.1700 was uncovered. This consisted of a number of rectangular, intensively built up properties on either side of one of the towns main streets - Krabugate. In 1985 the Central Office of Historic Monuments and sites established a project whose aim was to process and publish the material from this excavation, which is one of Scandinavia's largest.

This research is to be published partly in a series of reports Meddelelser and partly in a planned final synthesis, where all the results will be drawn together and placed in a larger historical perspective. To date 15 such reports have been published.

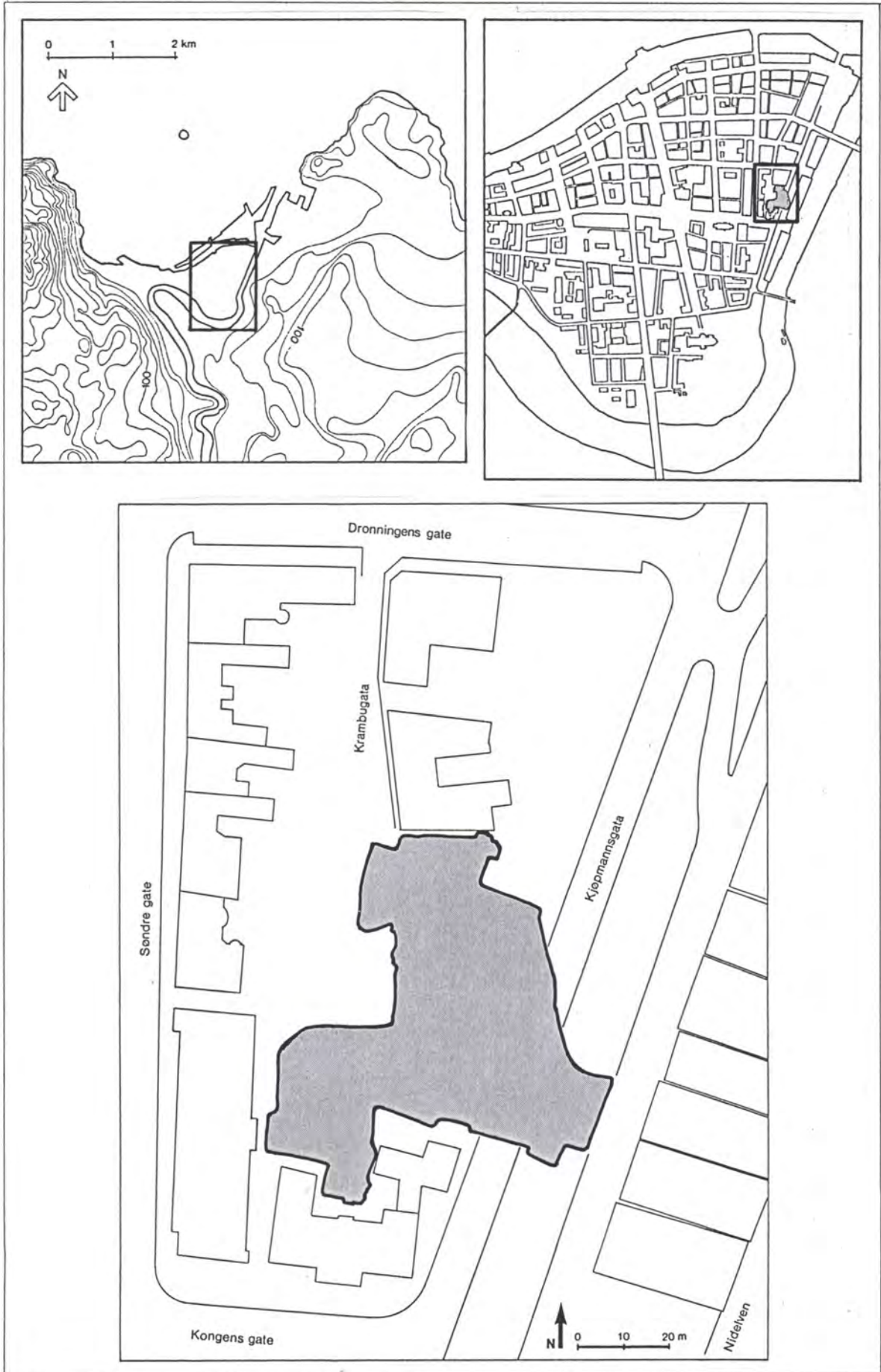
This volume is a shortened, English version of Meddelelser no.13, Utgravning, kronologi og bebyggelsesutvikling. In this report the background to the excavation, together with the methodology and the course of events is given. A first general description of the settlement development in the area, together with the phasing and chronology is also presented. The aim of this volume is to make the material known and available to researchers outside the Scandinavian-speaking area. For more detailed information the reader is referred to the individual Meddelelser. These can be obtained singly or as a series from the Central Office of Historic Monuments and sites in Trondheim.

Trondheim, June 1989

Axel Christophersen, fil.dr.
Project leader

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Folkebibliotekets tomt (The Library Site), Trondheim.

1. THE BACKGROUND AND ORGANIZATION OF THE ARCHAEOLOGICAL EXCAVATIONS ON THE LIBRARY SITE 1973 - 85 (Erik Jondell)

1.1. The Site Development and the Time-table for the Archaeological Excavations

The properties lying along Kjøpmannsgata to the N. of the old Town Hall have often been the focus for large building schemes. One such was a proposed voluminous town hall for the former Strinda Council, though this was never realised. In the beginning of the 1970s plans for Trondheim Council's new main library took shape, and in the autumn of 1972 Riksantikvaren received the first inquiry concerning the archaeological status of the area chosen for its construction. According to the results of an ongoing survey within the town it was clear that there was significant archaeological potential here. These occupation deposits were protected at the time by the Ancient Monument Act of 1951.

Excavations on the Library Site were undertaken over 9 seasons covering the years 1973-76, 1978-79, 1981 and 1984-85. The time-table for the excavations was revised many times during the 1970s and 80s. In the first plan for the archaeological project set out in the autumn of 1972, the excavation of an area of 2,500 metres² over a three-year period (1973-75) was envisaged. Accordingly, each excavation season should have comprised 5.5 months. Following the enlargement of the proposed building site in 1973, a new three-year archaeological plan for the period 1974-76 was presented. Unclarified financial circumstances at the beginning of most of the excavation seasons allied with very unfavourable weather conditions resulted in this plan not being fully realized either. After the architectural competition for the new building was decided in 1977, new areas were added to the original 2,500m², and a revised plan for the years 1978-80 was drawn up. The 1980 season did not materialize due to the temporary suspension of the building project by Trondheim Council. However, a reduced excavation was undertaken in 1981. Following the submission of the revised final plan for the library in 1983, the remaining area was excavated in 1984-85 (see Fig. 1).

The total area ultimately excavated comprised some 3,250 metres².

1.2. Methods of excavation and documentation.

Introduction

The delegation of assignments and the division of responsibilities within such an extensive excavation as described here naturally give rise to the danger of variation in the quality of working practices and documentation. It was hoped to rectify this through the introduction of standardized instructions for documentation, drawing and photographic procedures, though this occurred only after the initial two years of excavation. Experience has shown, however, that such instructions and procedural guide-lines are not always followed to the letter.

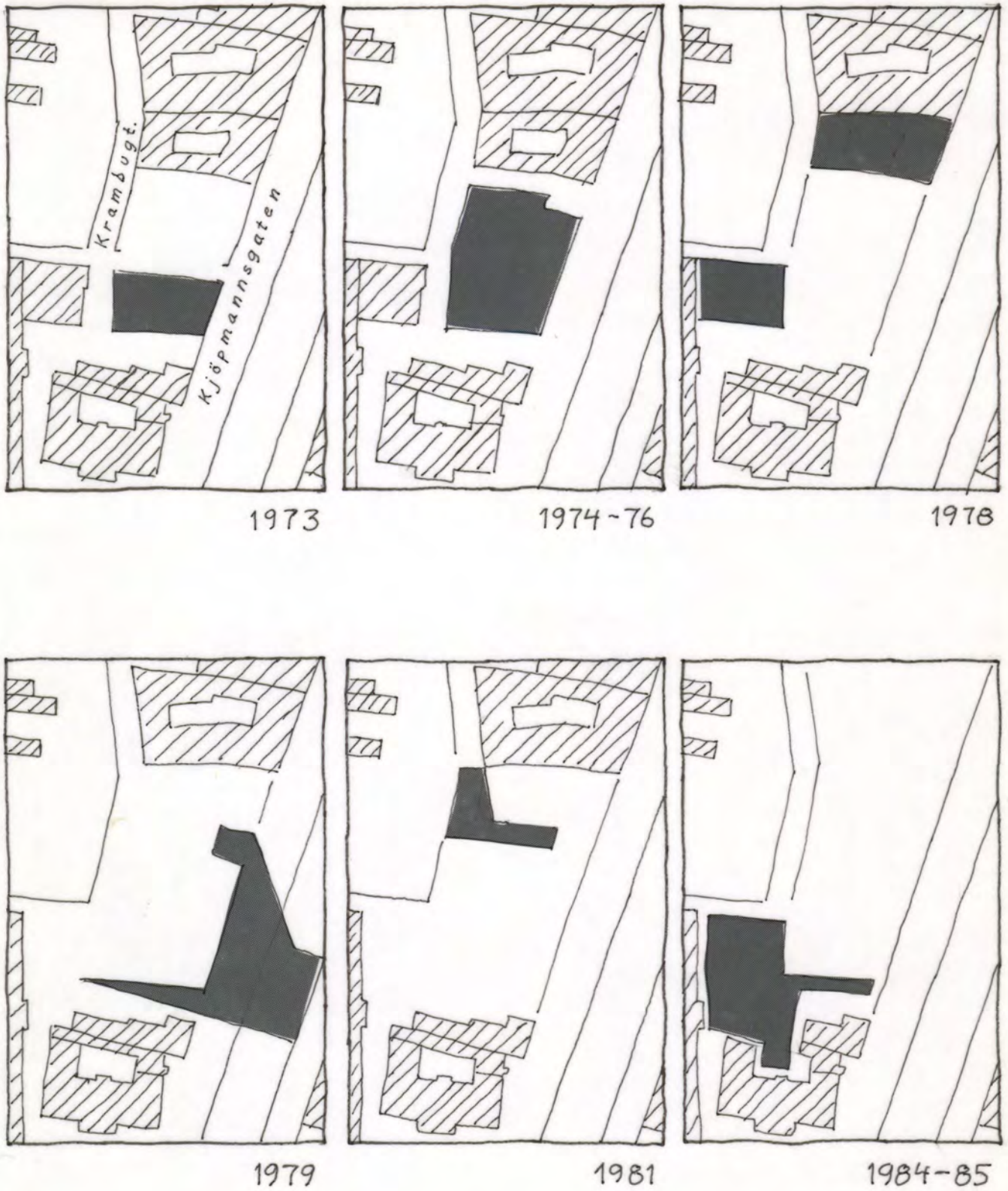
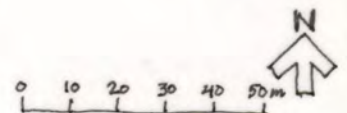


Fig. 1. The extension of the Library Site 1973-1985.



In the first years there was little assessment and control of procedures. This was improved gradually, however, and aspects of the excavation and documentation methods were adjusted under way. An example is the introduction of context cards in 1979.

Excavation methods

For every new area (Fig.2) to be investigated, excavation was begun by the removal of overburden by machine. The objective was to remove everything above the medieval layers. These organic deposits could normally be quite easily distinguished from the more or less disturbed post-medieval overburden of sands, gravels and dumped material etc. The introductory machine cuts were supervised by archaeologists, but in some instances (e.g. area FX in 1979) more medieval deposits were removed than might have been wished for.

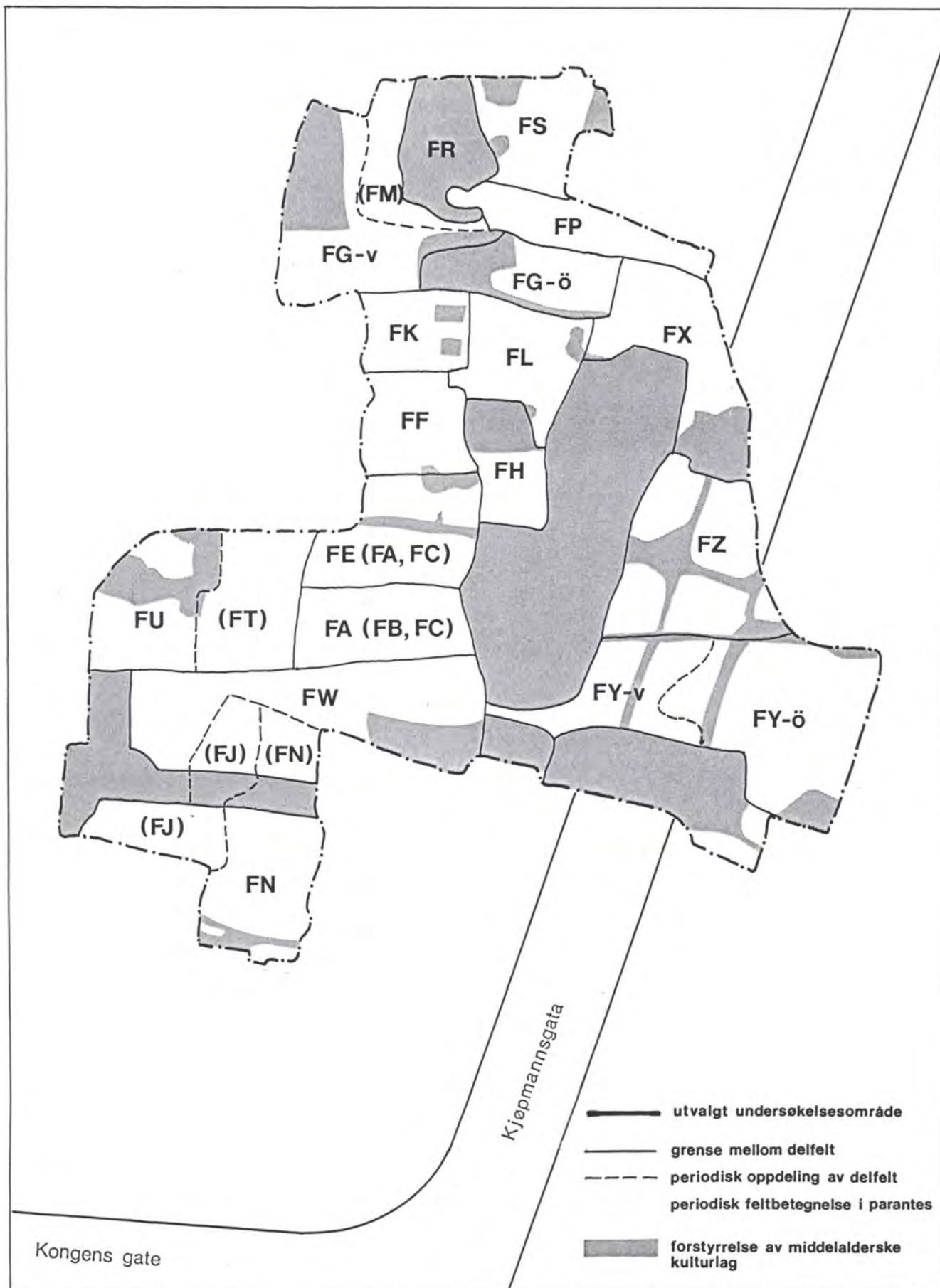
Following machine clearance the area was cleaned with large hand tools and disturbances such as modern pipe trenches were isolated. The subsequent excavation procedure throughout the Library Site was conducted exclusively according to the principle of systematic stratigraphical removal of layers (Fig. 3). This was as a rule done with trowels, but in many instances heavier tools, such as spades or hoes were used, although in such cases a strict stratigraphical procedure was maintained, and such practices as the removal of arbitrary thicknesses of deposits (i.e. the **planum** method) and the like have never been utilized on the Library Site.

The excavations were originally planned to incorporate permanent baulks between the individual areas (Fig. 4). This was done in the first season in 1973. In 1974 this practice was abandoned because standing profiles were judged to hinder a comprehensive overview as large and interrelated constructions were uncovered. The stratigraphical removal of layers was considered to yield such good data that it was nevertheless thought necessary to provide some means of correlating the various areas within the site. In post-excavation it has become apparent that in fact it would have been helpful to have had profile sections within the areas, though in the form of temporary sections rather than permanent baulks. This would have facilitated better control in areas where there was little overlapping between structures, such as across property boundaries, between the street and buildings fronting it, or in areas with few or poorly-preserved structures.

The lack of intra-site baulks was substituted for by the profiles along the edges of the areas. Due to the shifting areas of excavation within the site there were always differing profiles along the edges, and these were drawn at a scale of 1:10 towards the end of each season. However, this profile documentation work was not thorough enough. For example, the correlation of the excavated elements with those seen in the profile was rarely attempted. Their value is, in many cases, limited.

Documentation of the stratigraphy

The stratigraphy was documented by means of daybooks, plans, drawings, and photographs. The site archive consists of 49 daybooks, c. 3300 plans, and c. 14500 photographs. In addition, a context card system was introduced from 1979. This heralded a clear change in the quality and breadth of documentation. The most important part of the stratigraphic information is to be found



(Etter Christophersen et al 1988)

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Fig. 2. Area divisions.

1:500

10 m





Fig. 3. From the excavation of areas FH and FF 1976. (Photo RA 1985).

in the daybooks, on context cards and on the plans.

During the Library Site excavation project each individual area used a context number sequence running from 1 onwards. A context number also includes the relevant area's letter code by which it can be identified (e.g. FA 199). Each area had its own number sequence covering both layer, structures and structural elements. Occasionally it occurs that one layer has been given more than one number (e.g. in order to divide up a very extensive layer into a number of smaller portions).

Each layer was numbered as soon as it was uncovered and was given a primary description in the daybook. It could often take some time from the uncovering of a layer to the completion of its excavation and recording, and consequently the relevant documentation may be spread over a number of pages in the daybook. It can often therefore be a laborious process trying to find all the information concerning a single context in one of the old daybooks. This was remedied somewhat by the provision of a context list or index at the back of each book incorporating relevant relationships and the numbers of the pages on which information about the context occurs.

Exposed layers were given a description incorporating data on constituent material (e.g. wood-chips, clay, sand) and character (e.g. colour, texture, thickness, intrusive, disturbed etc.). It was thought that such descriptions could be done objectively, but the post-excavation analyses have shown that this was not attainable. This important part of the site documentation was left to each supervisor's subjective judgement, consequently resulting in the inevitable variability in terms of detail.



Fig. 4. Profile section between areas FU and FW. One of the few profiles left standing during the whole excavation season.

Context interrelationships are another important aspect of the stratigraphic documentation. "Over and under" relationships are of course particularly important in this instance. The systematic recording of each layer's horizontal extent is erratic and prior to the introduction of context cards in 1979 this might in fact be characterized as bad. It was generally assumed that the layers' horizontal extent should be described verbally in the daybooks as well as on plan. But between each planned level a number of layers might have been removed which were never recorded on plan. The written record, where in fact it occurs, is often very incomplete. The introduction of the context cards (see Fig. 5) was designed, among other things, to ensure that exactly this aspect of recording was done. The cards have a space on their reverse sides where the relevant layer's extent can be drawn. This has improved the situation, but this rear side is only rarely or incompletely filled out.

The interpretation of contexts should have been included within the daybooks. In fact, this aspect is one of the most variable in quality within the documentation of the Library Site. There are some extremely good, and some very bad, attempts at interpretation. This of course is a factor immediately dependent on each supervisor's training and experience.

Documentation of structures

Structures and structural elements are recorded in the daybooks, photographs, plans and drawings. As noted in the previous section, the structures were

allocated numbers within the same sequence used for layers. Consequently there is no independent designation of structures within the site documentation.

Documentation through photography was given high priority. On the exposure of each new structural level the elements were cleaned for photography and planning, the former being done by an experienced site photographer in black-and-white prints and colour slides. General and detail shots were taken as a rule.

The recording of structural elements holds an exceptional position. All plans on the Library Site are tied in to the Trondheim municipal survey system. This grid has its origin in the cathedral spire, while the 0 datum level above the sea is related to the mean low tide mark. As stated planning was undertaken as soon as a new structure came to light. A new planning level was also assigned to, for example, each observable phase within a building. Only in a few instances was a new planning level set up to record a layer's extent. The plans were drawn at 1:20 by the excavator. On each are added the relevant context numbers. Due to the fact that all planning was controlled by the site drawing office this aspect of the documentation is of good quality.

felt	lagnr.	dato	side	x	y	m.o.h.	rute
FG	(269)	28.7.81	72 →				M16/L16.
under	(260)	over (280) (but mixed in)	(280)	andre relasjoner FUS (245) hearth			
tegning	4901/4902	foto	p. 73/				
beskrivelse	Layer consists of black ash + charcoal frags + patches of pink ash. Layers massive to hearth (245) and fills hearth (245) c. 12cms brick here.						
talkning	Burnt layer from hearth (245)						sign. T.C.

Fig. 5. Context card for use in the documentation of earth layers and structural remains. Introduced in 1979.

To compensate for the fact that no structures were conserved a comprehensive recording procedure was undertaken by means of so-called detail drawings in

plan and section at 1:10 or 1:5. These were done by the drawing office personnel and the quality can be described as being very good. Practically all "laft-heads" (the interlocking corners of timber buildings), for example, are drawn thus, as well as posts and timbers of particular interest, as well as boat timbers etc.

The interpretations of structures etc. are to be found in the daybooks. As with the interpretations of stratigraphical relationships, their quality is variable.

Principles for the collection of finds

The chief criterion for the salvaging of finds material was that all objects which portrayed signs of human working were to be collected. There were nevertheless a couple of exceptions to this rule: structural details and parts of buildings were not salvaged. These were recorded by means of the drawing office's detailed drawings. Waste products from construction activity, such as wood chips, were not kept either. For other waste materials there has not been any uniform or systematic policy of collection over the 9 excavation seasons.

Pieces of waste leather were, for the most part, collected for counting and weighing, thereafter being thrown away. At the end of the final season in 1985, however, these were conserved, although in the end the greater proportion of the leather finds material was discarded following drawing at 1:1. The reason for this was lack of economic and technical resources in the conservation department of the University-museum.

Waste products of bone and horn were collected, but not systematically. Worked bone and horn items were conserved and stored. On the other hand, the criteria for the saving of smaller waste fragments (e.g. flakes or other small pieces) were very unclear. Here the position was adopted that collection should take place from a layer bearing a significant amount of such waste material. On occasion merely an arbitrary sample was taken comprising, for example, a litre of material, while at other times a larger volume was salvaged. The value as evidence of such unsystematic samples is severely limited. Another finds group which was not systematically retrieved is brick: only small samples were taken of significant deposits.

All post-medieval material derived via hand-excavation was collected as a rule, although in practice there was great inconsistency: for example, only a selection of window- and bottle-glass was collected.

To facilitate the stratigraphic localization of finds material it was necessary to connect items to their relevant context numbers within each area. It was judged that, as in principle each layer's extent should be evident from the site documentation, it was not necessary to register finds according to, say, specified squares. As is evident from the previous account of the documentation of stratigraphy there are many problems associated with determining the areal extent of layers. Consequently it is generally difficult to draw up distribution plans for the finds material. In some instances it will not be possible to define the distribution more closely other than simply to the individual excavated area. In others cases a methodical inspection of the stratigraphical documentation, referring here to the daybooks and there to the stratigraphic analyses in the "Meddelelser" series of reports, can, nonetheless, produce a detailed picture of the finds distribution. A departure from the rule

that each find should be tied to its context number occurred in a number of instances prior to 1979, where objects were occasionally given their own context number. This has caused some significant problems in trying to place these "isolated" context numbers within a stratigraphical context.

Some objects' positions were nevertheless plotted in three dimensions. This concerns particularly those finds regarded as having special significance as datable items (e.g. coins and combs), or those which held some unique or distinctive value (e.g. ornaments, decorated objects and rune-inscribed items).

In addition to these provisions for the stratigraphic localization of finds material, the date on which each find was recovered is appended to its accession number.

2. RELATIVE CHRONOLOGY AND PHASING (Sæbjørg Walaker Nordeide)

2.1. Theoretical basis

The phasing concept as an analytical tool

In 1985 a research project was established to process the substantial body of material derived from the Library Site. This project was given the title "Fortiden i Trondheim bygrunn: Folkebibliotekstomten", and its permanent staff comprises Axel Christophersen and the present author. In addition, members of Riksantikvaren's Excavation Office and other interested parties have contributed to the research programme.

The project's principal aims have been a) to make the material more accessible for research through systematization and publication, as well as b) to carry out work on some specific research topics and to point to others within the material (see Christophersen 1985).

As part of b) we decided to initiate a problem-orientated material analysis which could engender a general insight into medieval urban development, with its basis in a local study, namely the Library Site. We wished to establish which functions the town had, and whether these changed through time. This demanded both synchronic and diachronic studies of the settlement pattern and finds material which necessitated the analysis of the material at varying levels of detail. Since the material from the Library Site is so extensive and variable in terms of quantity and quality, it was important to create a comprehensive survey of the subject matter. This required a rough sorting of the data. However, with a more qualitative, synchronic study, the tiniest details have to be explored.

To cater to these needs we have (with regard to point a) above) chosen the following modus operandi: We operate on both a macro-level (i.e. the Library Site) and a micro-level (i.e. areas FA, FE etc.).

On the micro-level reports for each area have been compiled (see Meddelelser nos. 3, 4, 5, 7, 9, 10, and 11). In these the stratigraphy of each individual area is analysed. At the same time they act as keys to the original documentation. Mini-matrices for each area phase are included which facilitate further access to the material.

On the macro-level, as represented by the present report, all the excavated areas are grouped together into one site, the Library Site. The built-up area therein is divided into 12 so-called "main" phases. In this report a general account of the settlement pattern is provided.

As an aid to sorting the data we have used the concept of phasing. By a phase we mean a structural sequence wherein the main part of the settlement on the site is built - used - and destroyed. This means that the layers which derive from the building of structures ("construction layers"), the structures themselves and the layers which accumulated while they were in use ("occupation layers"), and the collapsed, possibly burnt, remains left after the destruction

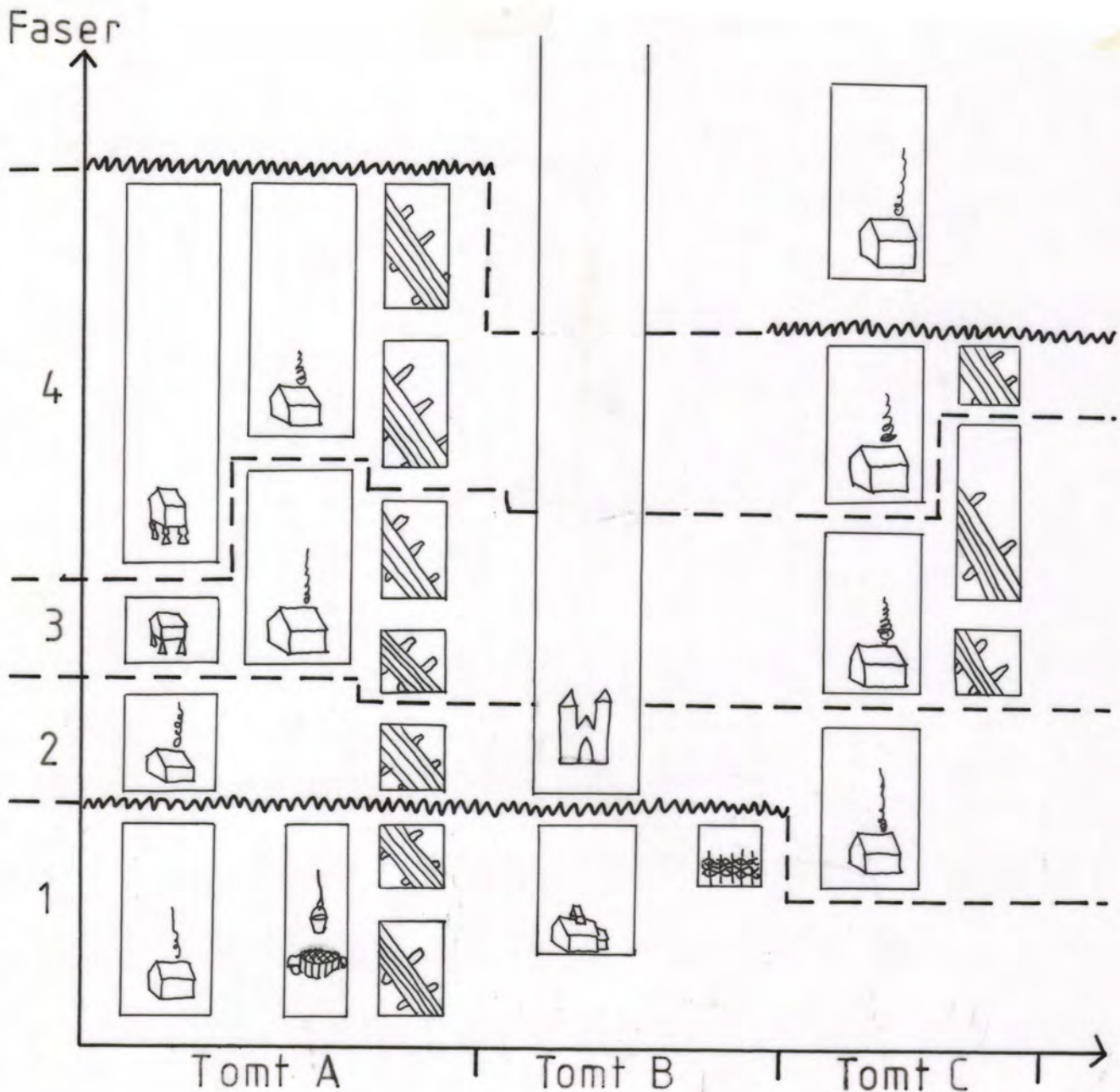


Fig. 6. Hypothetical schematic example of the structural development, divided into phases. The boxes indicate the life-times of structures. Note how the phase boundaries (broken lines; a wavy line signifies fire) follow the structures and consequently do not occur across the given point in time. The stone church on plot "B" probably stands throughout. The passages constitute different levels (a, b, etc.) within the phases.

or abandonment of these structures ("destruction layers") are all included within one and the same phase (Fig. 6).

One result of this particular form of phasing is that the stratigraphic analysis of the Library Site has its basis in the structures. All the earth layers,

whether they can be related directly to the structures or not, are related to the structural process i.e. the processes by which a building exists, from its construction to its destruction. This has been possible because the bulk of the site bears well-preserved structural remains. These surviving structural components are the most securely fixed points on which to tie "over and under" relationships in the stratigraphic analysis. Wherever possible the stratigraphic analysis has been linked to the structural evidence, though in the SE. corner of the site, and in the later phases (ie. phases 11 and 12), it has been necessary to get help from datable finds.

In some instances the phases are subdivided into levels. A level is defined as a lesser change within a phase, such as the repair or extension of buildings, or the repair or renewal of street surfacing.

It by no means follows that all buildings within a given space of time in the medieval period were built simultaneously or destroyed simultaneously. With the exception of the situation following a catastrophic event such as a widespread fire, housing was replaced piecemeal. The building tempo was dependent upon, among other things, economy, population, and the buildings' function and form. This tempo varied partly between properties and partly within them. A result of this is that a phase is a structural sequence which fluctuates in time across the whole site. A phase may be dated and delimited in time (through allocation of an earliest date and a latest date), but the beginning and end for each of the individual building complexes therein will vary within these chronological limits (e.g. phase 3 in Fig. 6). Consequently a phase does not reproduce "medieval reality" in terms of reconstituting the original pattern of buildings which occurred at particular points of time within the phase limits. It is rather that a phase states merely that the structures within its chronological limits are either relatively earlier than those in the phase succeeding it, or later than those in the phase preceding it, within the respective areas. To what extent the buildings within one and the same phase are exactly contemporary is difficult to establish from this form of phasing. Contemporaneity is extremely difficult to demonstrate stratigraphically; it becomes essentially a question of interpretation. We must, however, believe that the greater proportion of structures within the boundaries of one phase have existed at the same time, or at least overlapped in time.

A phase is per se a purely analytical tool which rough-sorts the material into more or less contemporary blocks. These blocks should not be construed as fixed intervals of time, but rather as time-sequences with dissimilar durations in different parts of the site. A phase can therefore conceivably overlap the phases before and after it in time in "medieval reality" (Fig. 6).

This is illustrated by the graphic presentation of the preliminary dating of the site: the main phases (Fig. 7). This has been constructed on the basis of the dates derived from the analysis of material from each individual area within the site. (See Chapter 4). Thick lines represent the chronological range derived from the bulk of the dates for each individual area phase. Thin lines (extreme dates) represent the maximum chronological limits indicated by dates derived from some, though in fact only very few, of the individual area phases. The extreme dates can indicate that there is wide temporal dispersal in the dates derived from the range of material within each individual phase. As noted above it was to be expected that a number of aberrations in the range of dates would be registered. In extreme cases even re-checking of the stratigraphic correlations cannot change this. These deviations in dating might also result from weaknesses in the dating methods (e.g. with regard to finds

representativity - see below). This will be discussed in greater detail in a forthcoming presentation of the dendrochronological results.

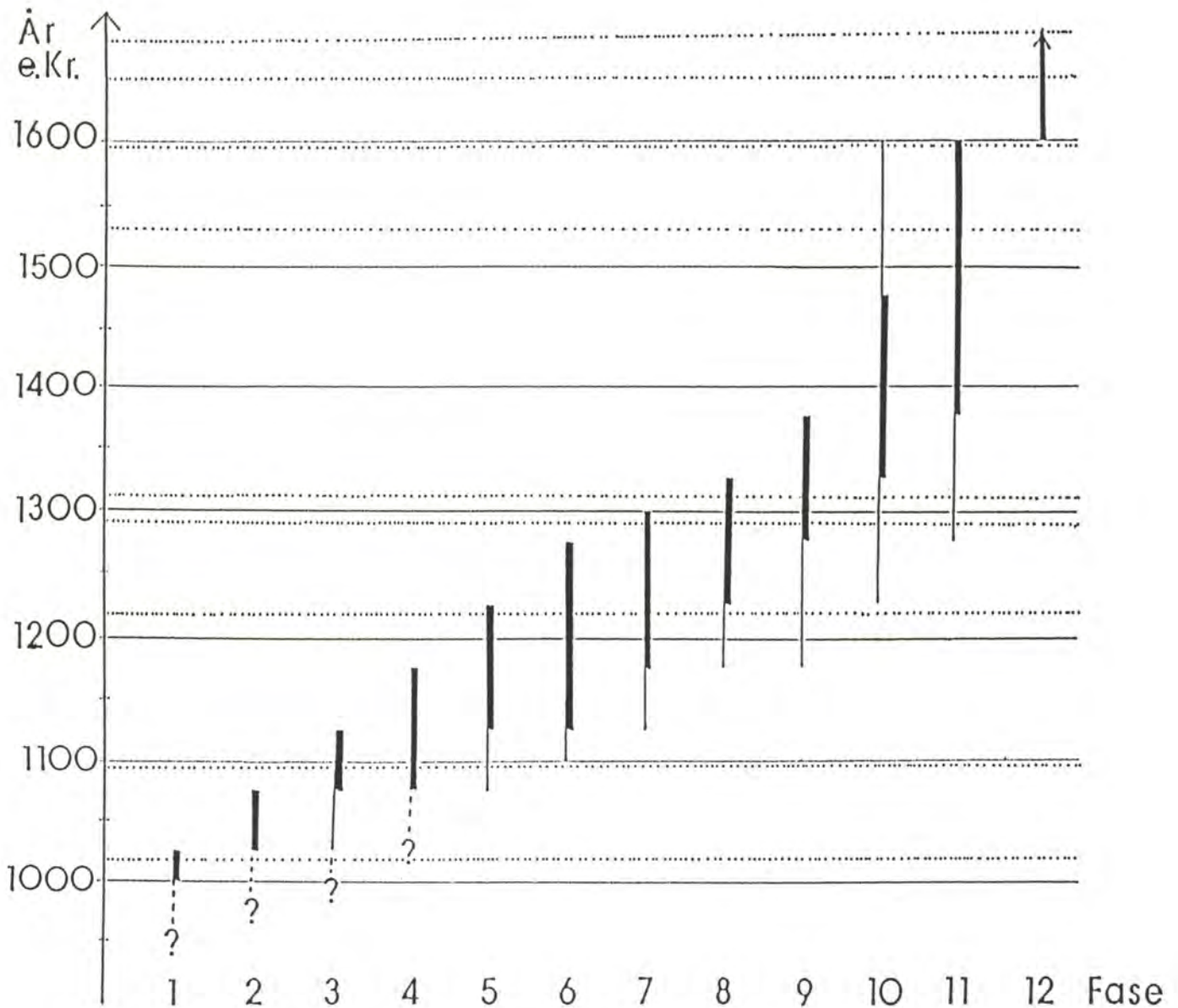


Fig. 7. Preliminary datings for each main phase. A thin line indicates the maximum interval of time covered by the dates. A thick line denotes the interval of time in which the majority of dates lie. Documented town fires which may have affected this area are marked with a dotted line.

The latest dates for each phase (i.e. see the uppermost portions of the thick lines in Fig. 6) are, nonetheless, nicely distributed in time: we get one phase every hundred years in the period A.D.1400-1600, two phases per century in the period A.D.1000-1200, and three phases in the period A.D.1200-1300. The

phase date ranges have a tendency to stretch over a longer and longer interval as time progresses.

This tendency might result from problems inherent to this form of dating. For instance, since soil has been thrown up in the course of digging post-holes, ditches and the like within the area throughout its occupation, there may consequently be an over-representation of older (earlier) material (ie. residual material) in each phase's range of artefacts (see also the section " Phase division with the help of artefact analyses" below). The proportion of residual items within the artefact material is naturally enough least in the earlier phases, but grows with time.

There has been a traditional bias within Norwegian archaeology towards dating all material derived from urban excavations to after the year A.D. 1000. It is possible that in fact the beginnings of the earlier phases here should be dated earlier than conventional artefact dating allows.

For the sake of interest I have also placed known fires which might have affected the Library Site on Fig. 7. Traces of fire do occur within most phases. However, it must be stated that contemporary remains of fire have never been demonstrably synchronised across the whole site. It is therefore not easy to correlate documented fires with the ends of the phases.

The fires which are included in Fig. 7 are as follows (dates A.D.):

- 1015 (Snorre Sturlasson's Sagas of the Norse Kings; Olav the Holy's Saga, Chapter 44)
- 1097 (Snorre Sturlasson's Sagas of the Norse Kings; Magnus Barefoot's Saga, Chapter 21).
- 1219 (Håkon Håkonsson's Saga, p. 54)
- 1282 (Icelandic Annals, p. 29, among others)
- 1313 or before? (Norges gamle Love III, nr. 36b)
- 1531 (Diplomatarium Norvegicum IX, no. 670)
- 1598 (Personalthistorisk tidsskrift, Vol. 2, p. 286)
- 1651 (Personalthistorisk tidsskrift, Vol. 2, p. 286)
- 1681 (Nicolaysen, N. 1858: Norsk Magasin. Vol. 1, p. 144)

The reference to the 1313 fire is in a law amendment of Håkon Magnusson. It does not state that the town burned in 1313 but that " (12) they who have built fences or houses in the public right of way ("almeningen") following the burning of the town may retain them, but it is warned against doing so again, (13) the bridge in the town shall be rebuilt...". This might be a reference to the fire in 1282, though it seems very unlikely that the king waited 30 years before reacting towards those who had built illegally in the public thoroughfare. If the bridge was destroyed in the same fire, it also seems improbable that the town managed without one for 30 years. I think it feasible therefore that there was a fire in 1313, or just before.

Stratigraphical documentation in the horizontal plane: Problems and possibilities

The various excavations within the Library Site were essentially open areas, dug without any systematic use of profile sections. It is mainly the profiles situated around the perimeters of these areas which were drawn (see Ch.1.2. Excavation Methods).

The stratigraphy was kept track of through plans, the plotting of heights by levelling, photographs, and the documented "over and under" relationships. In later years this information was catalogued by means of context cards, a step which has caused much relief in post-excavation work.

The basis for stratigraphic analysis lies in the "over and under" relationships and the production of matrices (see Harris 1979). These matrices comprise the skeleton of the analytical work which is fleshed out with interpretation. With their help it is possible to identify mistakes in the layer documentation (e.g. so-called "spiral stratigraphy"; a over b over a etc.). Since the excavations were conducted on stratigraphic lines the recording of "over and under" relationships is satisfactory. The horizontal extents of earth layers are, however, not always as well documented.

The published matrices, divided into area phases, each provide a good means of access to the material within every individual area phase.

An assessment of other methods of phase classification through comparison with the situation on the Library Site

The way in which we have divided up the material from the Library Site into phases is not the only method available. We chose this as it was relevant for our purposes. Factors taken into consideration were, among others, the goals of the stratigraphic analysis, the resources of the project, and the nature of the material. Since there are other means of phase classification which are as common, it is natural that something should be said about our experience of them.

a) Fire-layer chronology

A widely-used method of dividing material up into phases is with the help of fire-layers (see for example Høeg et al 1977, Herteig 1984, Christenson 1980, Dunlop 1981). In theory the same principle on which our work is based is used: Phase divisions are determined by the construction and destruction of structures. This requires however a) that they have been destroyed during one in a series of regularly occurring episodes of fire; b) that the fire-layers on different areas can be correlated, stratigraphically or in another manner; c) that buildings burn at the same time over the whole site. If a-c are not fulfilled, it is easy to be in error when different parts of a site come to be correlated. As a corollary, there will be few phase divisions if there has seldom been burning.

There were some fire-layers on the Library Site, though their definition as such in the field has not been consistent. Sometimes it has been impossible to decide whether a layer really should be characterised as a "fire-layer" or as merely a "layer containing fire-debris". The individual site supervisors' subjective interpretations have formed the basis for assessment. Consequently, during post-excavation work it has been difficult to judge whether or not such layers do in fact represent in situ burning.

The fire-layers on the Library Site have turned out to be generally unconnected. Fire-layers which have been correlated during excavation have, on closer analysis, been shown to stem from different chronological episodes. This can be demonstrated because we have such well-preserved and well-defined wooden structures against which the earth layer sequences can be cross-checked. If we had relied purely on the fire-layers, the correlation of the

individual areas would have been distorted.

In the earliest phases the fire-layers are few and isolated. This is natural. The built-up area at this time would, as a result of its more dispersed character, have been less prone to wholesale destruction, in contrast to the denser occupation in the 13th century. A fire could be more easily contained. Consequently these early phases do not hold much potential for a fire-based chronology. This is particularly unfortunate, as the Project has given priority to the earliest and the latest medieval phases.

b) Phase division with the help of artefact analyses

It is also possible to divide the material into phases with the aid of datable artefacts, preferably in conjunction with other methods (e.g. Schia 1979). It is well known that artefact material seldom provides precise dates. This dating method has, besides, resulted in a number of circular arguments. In addition it occurs that the finds content is not always representative of the context within which it was found. For example, this can be illustrated by looking at the phase plans and noting all the post-holes, pits etc. which are to be found in each phase, cutting through and removing earlier material from earlier layers. The finds content of each context must consequently be viewed in the light of the problems associated with redeposition, residuality and intrusion. Other circumstances, such as social and economic factors, can influence the currency and frequency of particular items. It is consequently probable that finds which are older/earlier than the phase are most often over-represented therein (see also the section on the phase concept above, 2.1.).

Provisional dating of the phases within the individual areas on the Library Site has taken place. These dates are based on evidence derived from pottery, coins, shoes and 14C. By comparing Fig. 25 in Chapter 4 with Fig. 9 it is evident that there are significant variations in the datings within one and the same main phase. I have noted earlier that the phases must necessarily vary in time between different areas on the site due to an unsynchronised building tempo. However, there are also large variations (minimum 50 years) within the most well-defined phases, which both start and end with a fire, and which have a short existence. If the different parts of the site had been correlated on the basis of datable artefacts, the result would have been distorted.

The two methods of phase division described above are most often used in combination. Since both methods are demonstrably inapplicable to the Library Site, we have based our analysis on the stratigraphy alone, and the fire-layers have acquired no special importance. The relationships between the permanent structures have shown themselves to be the most reliable. However, there occur areas of the site which have not been susceptible to correlation with the rest through stratigraphy alone (areas FZ, FY, FO). In these instances we have had to make use of a combination of stratigraphy and artefact chronology (see further in this section).

c) "Imaginary Date System" (I.D. system)

One of those who has worked as a site supervisor on the Library Site for many years, Tom Chilton, has developed a more flexible means of dividing up the material (Chilton 1987). He takes his starting point in an imaginary range of numbers which are used as fictitious calendar years ("imaginary dates", or I.D.). In principle every structure is allocated an imaginary age, thus placing them in a relative chronological sequence (Fig. 8). Through this series of

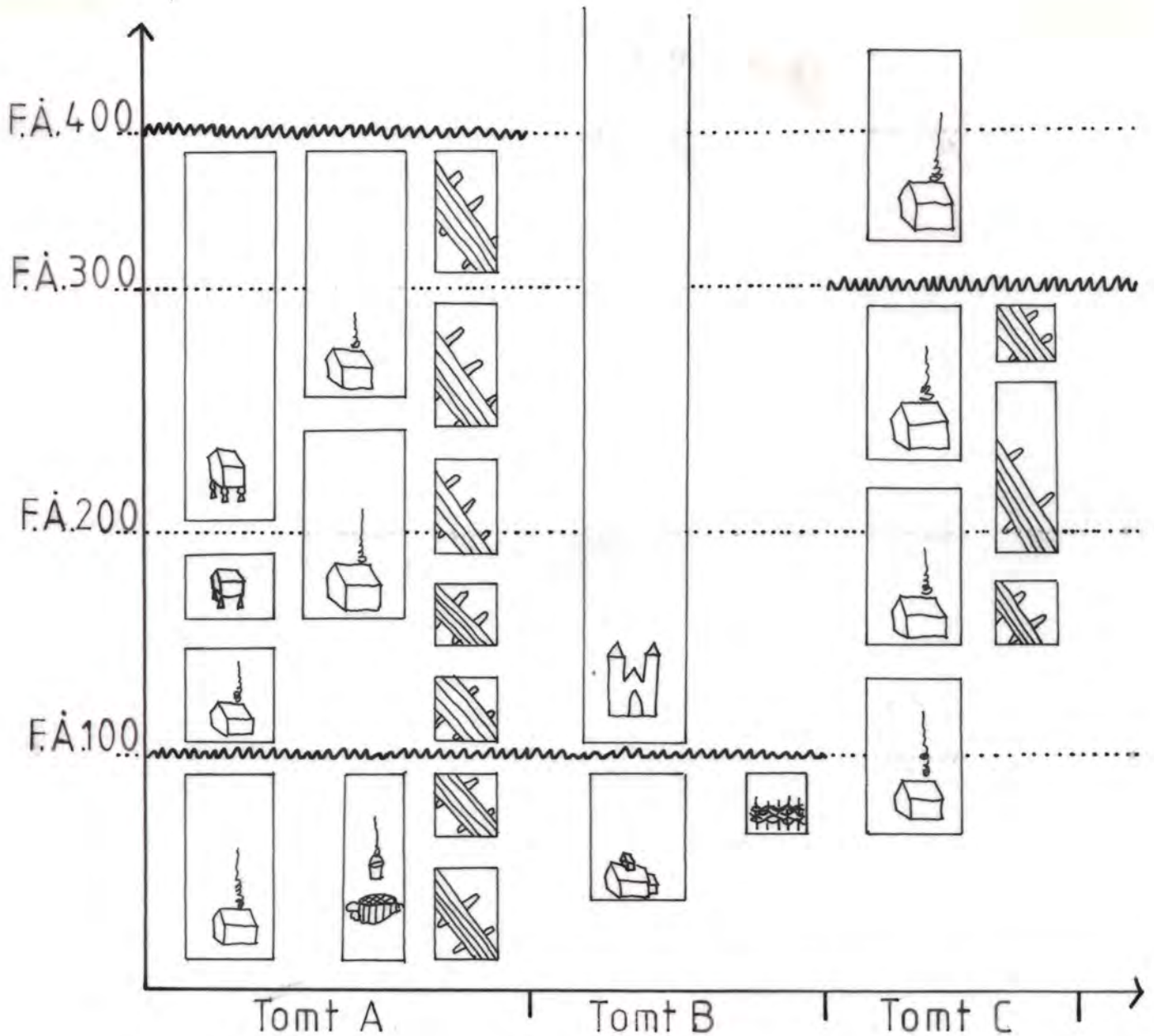


Fig. 8. The same hypothetical scheme for structural development as represented in Fig. 6, but now divided up into "imaginary dates" (I.D.). To locate a chosen structure within I.D. it is necessary to enter a particular point in imaginary time. To gather together a number of, or all, structures it is therefore necessary to enter a number of different points in imaginary time (e.g. I.D. 40, I.D. 100, I.D. 125, I.D. 170).

numbers he tries to reproduce "snapshots", or "frozen images", of the built-up area.

In addition to the "snapshots" Chilton also utilizes periodization. This functions in practice like our phasing concept (see above). With its basis in the built-up

Hoved- faser	Delfeltfaser																		
	FN/FJ	FW/FJ	FU/FT	FA/FC	FE	FF	FK	FGV/FM	FH	FL	FGØ	FS	FX	FP	FZ	FYV	FYØ	FO	
12	14																		
	13	14																	
	12	13		9 8(12A2a)					13										
	11	12	11	8(11/11a)	11	12	13	11	12	12	10	10	10	10	10	10	12 11	13	
11																			10 * 9 * 8 7 II
	10	11 II 11 I	10	8 K41 (12a) 8 K40(11a)	10 9	11(?)	12 11	10	11	12	9	9	9	9	9	9	7·I	12 11	
10	9	10	10	7 G13(10)	10 9	10 G1 10 G2	12 11	10	11	12	9	9	9	9	8	8	6 III 6 II	10 9	
9																			8(?) 7
	8	9	9	6 G12(9)	8 G11	9 G3	10 II	9b 9a	10	11	8 II	8	8 II	8	7 6	7	6 I 5	6 5	
8																			
	7 II	8 II 8 I	8	5 G11(8b) 5 G10 (8a) 5 G9 (8)	7b G10	8 G4 8 G5	10 I 9 II 9 I	8c 8b 8a	9	10 9	8 I 7 II	8	8 I 7 II	8	5	6 5	4	4	
7																			
	7 I 6	7 6 II 6 I	7 6	4 G8 (7a) 4 G7 (7)	7a G9 7A G8 7a G7	7 G6 7 G7 7 G8	8 II 8 I 7	7 6b 6a	8	8	7 I	7	7 I	7	4 3	4 3	3	3	
6	5	5	5	3 G6 (6a) 3 G5 (6)	6b G6	6 G9	6	4+5	8	7	6	6	6	6	2	2b 2a	2 II	2	
5																			
	4	4 III	4 II	2u G4 (5)	6a G5	5 G10 5 G11 5 G12	5 4 r.3 4 r.2 4 r.1 4	3	7 6	6	5 4	5 4	5 4	5 4	2	2b 2a	2 I	2	
4																			
	3	4 II 4 I	4 I	2l G3 (4)	5 G4 4 G3	4 G13 4 G14 4 G15 4 G16	3 III 3 II	2	5 4 II 4 I	5 4 3	3 II 3 I	3 II 3 I	3 II 3 I	3 II 3 I	1	1	1	1	
3	2	3	3	1u G2 (3)	3	3	3 I	1	3	2	2	2	2	2	1	1	1	1	
2																			
	1	2 II *2 I	2 II 2 I	1m G1 (2)	2 G2	2 G17 2 G18	2 II 2 I	1	2 *1 II	1 y. nivå	1	1	*1 III 1 II	1	1	1	1	1	
1	1	1	1	1l (1)	1 G1	1 G19	1	1	1 I	1 e. nivå	1	1	1 I	1	1	1	1	1	

Fig. 9. Correlation of area phases and main phases. A stippled line between phases indicates an uncertain boundary. On site FA there is, in addition to the phases, also a so-called "drawing" level (in trackets), which is roughly equivalent to the area phases on the other sites. On FA, FE and FF a street level is also included (G1, G2 etc.). Definite fire horizons are indicated by double-lines.

area's development, a period is defined as an interval of time when most of the buildings are built/destroyed. The period boundaries are given a rounded off "imaginary date" e.g I.D. 100, I.D. 200 etc. These boundaries tend to coincide mainly with fire-layers. With the aid of what he terms "phase cramming" different structures which are not necessarily contemporary are combined on the same plan.

Chilton has ended up with a combination of the phase concept used by us and "imaginary dates". This is by no means accidental. It became apparent, however, that in fact it is not possible to correlate the stratigraphy on such a large area as the Library Site using the I.D. system. The broad picture rapidly becomes obscured, due to the resultant fragmentation of the built-up area. The method likewise does not function so well with regard to artefact analysis, since there are problems in fixing earth layers to the chronology within I.D. The method demands thorough documentation on site if it is to bear fruit. Even with good recording, as on the Library Site, it is clear that I.D. adds no more to the picture than that obtained by the method applied by the project (as defined above). I.D. can in fact give a false picture of the level of detail. However, the method can certainly be developed further and be made more logical, though since it is so resource-demanding it is best used in connection with smaller sites, or in cases where one requires as detailed a picture of development as possible.

To summarize: The project's concept of phasing, based on structure-related stratigraphy, has functioned best for our purposes because a) the fire-layers would demonstrably have distorted the correlation of individual areas, the inconsistencies possibly resulting from there having been less extensive, or fewer, fires here than in other towns, or perhaps being indicative of more extensive post-fire clearance and renovation?; b) phase-division built on the basis of, or correlated by, artefact dating would also have distorted the picture; c) even though the documentation on the Library Site is in itself of a high standard, it is not so sufficiently detailed as to allow I.D. to contribute anything further to the information gained by means of the project's own procedure.

The project's aims have been to establish, in a reasonable amount of time, the main lines in the town's historical development. We have also been interested in constructing the best possible comprehensive survey of the source material, though at the same time creating and exploiting possibilities for analysis in greater depth. This has been achieved by the methods of classification used by the project, which, in contrast to the I.D. method for example, do not easily lead to fragmentation of the data. Despite the fact that the project's applied concept of phase division changes "reality" when compared to the I.D. system, we are confident that "reality" has not been falsified.

2.2. Phasing: A summary

The stratigraphy on the Library Site has been analysed and divided into phases in the following manner:

Firstly, individual area by individual area (resulting in the various "area phases");

Thereafter, all areas have been amalgamated as a "site" and phased (resulting in the "main phases").

The relationship between the area phases and the main phases is shown in Fig. 9.

The phasing process is related to the remains of structures. Since the tempo of construction on each area is uneven, the duration and position in time of the main phases varies from area to area, and also partly within the areas (see Fig. 6). A summary of the preliminary datings is provided in Fig. 6.

By using the already published area reports (Meddelelser nos. 3, 4, 5, 7, 9, 10 and 11) and this report it is possible to research the material at whatever level of detail one wishes; on the macro-level (the Library Site), or the micro-level (via the area reports, down to each individual context number).

The W. portion of the Library Site (i.e. W. of the N.-S. running street) bears the thickest deposits, has the best conditions for preservation, and is the most uniformly and intensively built-upon part of the Library Site. The correlation of the stratigraphy between the various areas here has consequently experienced few problems. The other areas, however, are affected by a great deal of later disturbances, and have thinner deposits, greater variability in the building pattern, and a less intensive scale of exploitation of area. The NE. portion has, nonetheless, been tied to the W. areas via stratigraphy, if to a rather less secure degree. The SE. corner, on the other hand, is almost totally isolated stratigraphically, and it has been necessary to use datable artefacts to relate this to the rest of the site.

3. A REVIEW OF THE HISTORICAL DEVELOPMENT OF SETTLEMENT ON THE LIBRARY SITE (Axel Christophersen)

3.1. Introduction

Contents and limitations

In this chapter the development of settlement on the Library Site will be described generally and in such a way that the continuity in the evolution of the settlement pattern will become apparent. The basis for the survey lies in the structural evidence as reconstructed and grouped together in the 12 main phase plans.

The main purpose of this survey is to focus on the structural aspects within each phase which together can contribute to illuminating periods of stability and periods of change within the settlement pattern's development.

This account of the individual structural phases will not include comprehensive descriptions of each and every building or complex of buildings. More detailed descriptions of the individual structures and their implications for interpretation are to be found in the stratigraphical reports (Meddelelser nos. 3-5, 7, 9-11), and the reader is referred to these. Where interpretations of individual structures or complexes in the survey differ from those in the stratigraphical reports, and where the structures otherwise have particular significance in the development of the settlement pattern, any reinterpretation is discussed specifically in the relevant discussion of the "micro-level". Where reinterpretation occurs, it arises as a natural consequence of the revelation of correlations and associations which did not become apparent until the stratigraphical connection of the individual areas.

This chapter will also contain a description of the natural topographical conditions associated with the earliest settlement.

The development of settlement here will be described chronologically, beginning with the earliest phase (Phase 1). Each section is headed by a proposed date for the relevant settlement phase. This expresses the phase's "maximum dating" i.e. the most extreme chronological limits for the phase, early and late; within these temporal limits it is reasonable to assume, based on the dating methods used, that the total structural assemblage has been in use (see Fig. 6).

The phase plans attempt to capture the main trends in the evolution of the settlement, though there are a number of details which are not contained within them which might be of significance in the discussion and understanding of the growth of the settlement. These are not dealt with here.

Within each main phase the description of the settlement structure is divided between the micro-level and the macro-level (see next section).

Concept and definitions: An outline

By "description on the macro-level" is meant a description of a consolidated area which includes within it a number of different independent functions

associated with the settlement pattern. The discussion of the settlement structure on the macro-level will incorporate, in particular, a description of the excavated site's arrangement into, and the relationships between: a) public and private components of settlement; b) areas devoted to transport and communication; c) waterfront and harbour constructions; d) churchyards.

By "description on the micro-level" is meant a description of the settlement structure within the functionally defined areas which together form the macro-level. The discussion on this level will, within the excavated site, include especially: a) the division of the built-up area into plots, or properties; b) the spatial organization within the individual plots/properties; c) the street's variation in breadth and its changing structural nature; d) the exploitation of the churchyard; e) the waterfront's expansion and orientation.

Another way in which to characterize the relationship between macro- and micro-levels is by saying that the settlement structure's macro-level is multi-functional, while the micro-level is always dominated by one function of settlement (i.e. property development, harbour function, burial place, public communication etc.).

Furthermore, the relationship between the macro- and micro-levels might be described as being hierarchical, to the effect that changes in the settlement structure on the macro-level can (though won't necessarily) cause changes on the micro-level, while changes on the micro-level cannot (normally) exert a corresponding influence on the macro-level.

Dividing up the description in this manner constitutes an attempt to characterize systematically the dynamics in the relationship between the general spatial organization of the urban settlement on the one hand and individual plot-division and localized spatial organization on the other.

The development of the settlement will be treated analytically in a forthcoming report. The relationship between the settlement structure's macro- and micro-levels and the implications for interpretation will be dealt with in more detail therein.

Property structure: Criteria and definitions

It has already become apparent during the course of this introduction that the site bears a property structure in the form of division into building plots, a process utilizing different forms of physical demarcation. Tracing the development in the pattern of properties here stands out as one of the most central tasks of the whole settlement analysis. A characterization of the plot-division will therefore constitute a particularly important aspect of the following descriptive treatment of the settlement's evolution.

In the general description emphasis is given to achieving a coherent overview. It will therefore not be particularly appropriate to explain the analytical work by which the plot-division system here presented has been obtained. This will be dealt with in more detail in a forthcoming report.

Nevertheless, a short discussion of the main principles and the physical criteria by which the classification operates is presented.

The main principle of the analysis is that the boundary between two plots of

land can be reconstructed when there is conformity in location between the indications for the earliest plot boundaries (fences of wattle or pales, ditches) and later indications of boundaries (eaves-drip trenches, wall-lines, passages).

Later boundary lines originating in the amalgamation of older plots, or their sub-division into small or large properties, do not normally possess self-evident forms of physical demarcation such as occur in the earlier phases. Instead, in the later phases (Phase 4+), these have been reconstructed on the basis of the inferred locational continuity with earlier boundaries of other, less explicit, physical boundary criteria (see the paragraph on "physical criteria" below).

In some instances where a plot, or parts of a plot, stood open, it was nonetheless the practice, in the later phases, to mark the boundaries with the neighbouring plots by establishing a fence of wattle or pales, especially where the neighbour's plot also stood open. Such cases present good possibilities to confirm the boundary estimations inferred from such indications as wall-lines or intervening passages.

In other instances the assessment of later boundary lines can arise from a general understanding of the organization of the structures within the individual plots. The arrangements for access to the plots via small passages leading off the main street can be especially informative in this respect, a passage forming a commonly occurring structural element in the lay-out of a plot. The boundary here lies as a rule between the passage itself and the neighbouring plot's range of buildings (in some cases neighbouring passages border each other, but in such instances one or another form of fencing is always raised between them).

A problem encountered occasionally is how to decide upon which range of buildings and which passages belong together. This is particularly difficult where, among a number of plots which follow the pattern: passage - row of buildings, two rows of houses lie on the same plot, with a passage in between.

In by far the greatest number of instances the boundary lines can be confidently reconstructed, if one analyses the whole site's plot-division in relation to earlier or later securely fixed boundaries. If the boundary lines are reconstructed such that one or more plots do not have access to the street via a passage, or where a passage does not lie in connection with a row of buildings, the reconstruction is probably incorrect.

The physical criteria which are used in the analysis are in principle the same as those used by E. Schia in a comparable analysis of plot boundaries in "Søndre felt", Oslo (E. Schia, 1987, 201). Nevertheless, a certain amount of adaptation to local circumstances has been necessary. The criteria are (in order of priority):

A. Original physical boundary markers:

- 1) Ditches
- 2) Fences of wattle
- 3) Fences of pales

B. Later boundaries/boundary indications:

- 1) Street
- 2) Churchyard wall

- 3) Wattle fences and/or pales
- 4) Eaves-drip trenches
- 5) Wall-lines and/or passages
- 6) Waterfronts

A physically-delimited parcel of land is referred to as a "plot". The inherent function of such physical demarcation of a piece of land must, in an intensively built-up urban community, have been to separate and distinguish an individual area from those surrounding it.

This physical demarcation is therefore simultaneously an indirect expression of the right of private ownership to the piece of land. This is in contrast to rural villages where the physical demarcation of a piece of land could also be purely functional.

A plot might be built upon or left open, but in either case it may be termed a "property" i.e. a parcel of land owned by one or more individuals. Since circumstances of ownership change (for example through inheritance, exchange or sale), a plot might be the subject of sub-division or amalgamation. Such circumstances will be reflected in the physical record, either through evident reorganization of the existing buildings, often across earlier property boundaries, or also through the physical expression of the new boundaries.

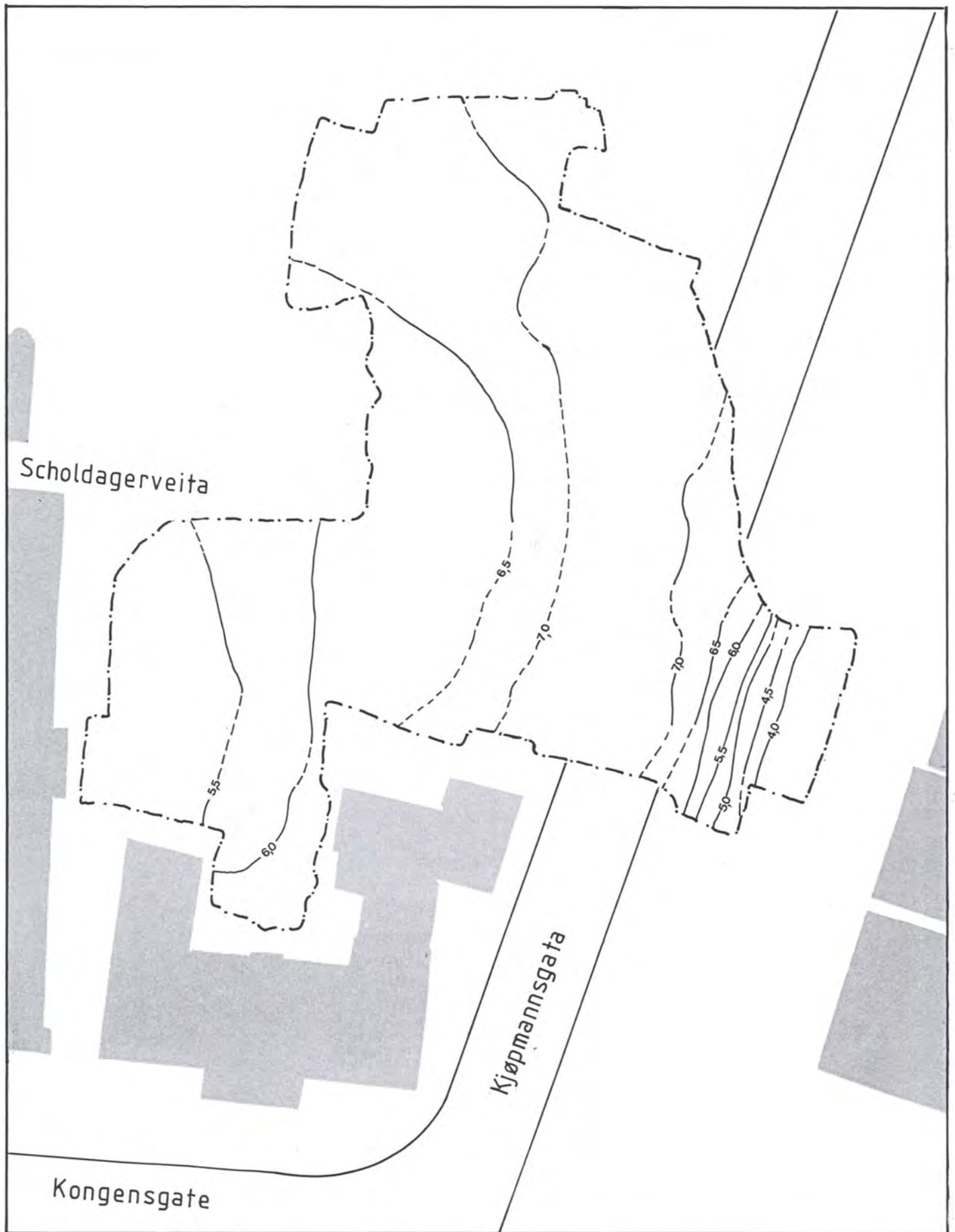
A property could also be rented out, either whole or divided up. In such instances the rights of use (tenancy) and of ownership are separated and held by different individuals. There does not necessarily have to be any direct correlation between the ownership and the use of a property (its tenancy). Even though a property's tenancy could be leased out to a number of individuals or households, it does not automatically follow that there was any corresponding need for physical separation of the various leased areas, or tenements, held by the tenants, primarily because the lease might incorporate a number of buildings or areas scattered along the whole length of the property. If anything, tenancy was linked to the buildings rather than defined areas of the plot. Consequently, the physical sub-division of a property was both unnecessary and without any real function.

In the light of this it occurs that the dividing up of the tenancy of a property was only rarely and in special circumstances registered physically. Changes in the right of ownership, on the other hand, are expressed through (direct or indirect) physical demarcations of changed plot areas.

3.2. The Natural Topography

This section will deal with the natural topographic context for settlement on the Library Site. The data relating to the vegetational history of the site is set out in an earlier report, and will only be loosely touched on here. The relevant report is by Synøve F. Selvik: Meddelelser No. 6, Naturforholdene på Nidarneset. En vegetasjonshistorisk rekonstruksjon.

The original land surface (natural ground) was uncovered for a total length of 81m in a N.-S. direction, and for a total breadth of 76m E.-W. Accordingly the revealed area comprises something over 6000m². As a result of the site's irregular form, however, only 250m² directly coincides with the earliest river course and shoreline with its steep slope (Fig. 10).



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Fig. 10. Natural.

1:500

10 m



Investigations showed that the site consisted mainly of a flat, N.-S. orientated sand and gravel ridge. The ridge's highest point lies at 7.40 m.a.s.l. (furthest to the NE.).



Fig. 11. South-facing profile section through natural ground (beneath redeposited overburden) on part of the Library Site. In the middle and left of the picture the surface of natural can be seen sloping down to the brackish water basin. Photo: RA 1986.

To the E. the terrain falls towards the river from the 7m contour to the 4m contour over a distance of c. 10m. Approximately 22m of the original shoreline was revealed.

To the W. the terrain slopes gently down towards a natural depression (Fig. 11). The lowest point on the site is c. 5.30 m.a.s.l. (in the SW. corner). Earlier archaeological excavations show, however, that the terrain continues to slope down to the W. to a lowest point of c.5.10 m.a.s.l. (under the Fire Station), thereafter rising again to the 8 m contour on the W. side of Søndre gt. (Fig. 12).

Investigations revealed that while natural ground in the bulk of the area consisted of alluvial sands and gravels, the natural ground lying under 6 m.a.s.l. in the SW. corner of the site comprised silts and clays deposited in standing water.

A series of pollen samples was taken within and immediately above natural here in 1985. The samples from the mineralogical material and from the earliest occupation layers lying under 5.7 m.a.s.l. contained large amounts of fresh- and brackish-water algae (*Pediastrum*, *Scenedesmus* and *Botryococcus*), together with pollen from typical water and marsh vegetation (*Lythrum salicaria*, *Potamogeton* and genus *Carex*).

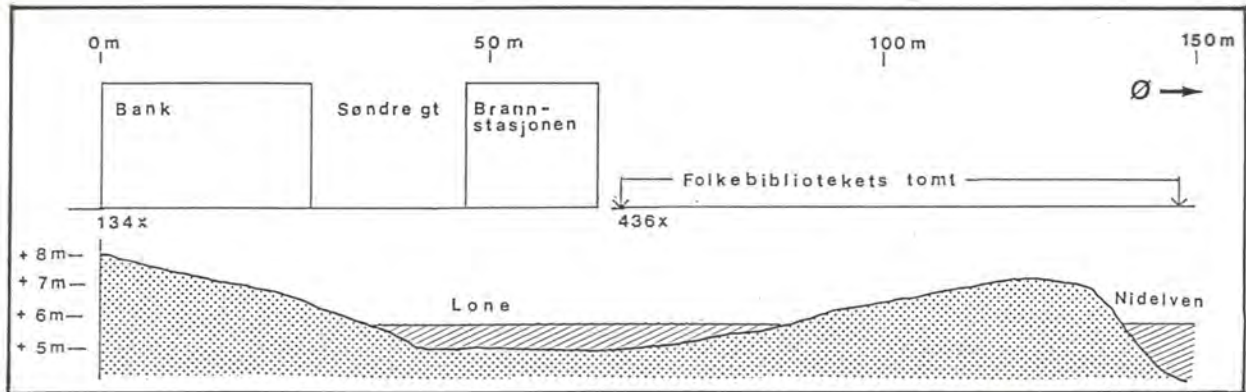


Fig. 12. Profile drawn E-W through the natural terrain from Apotekerveita to the W. bank of the river Nid.

In the samples taken at the 5.7 m.a.s.l. mark, algae occurred only in the mineralogical material comprising natural, and not in the earliest occupation deposits. Samples taken elsewhere on the site at higher levels above sea level contained very little algae at all.

The distribution of the algae deposits in the sample material together with the water and marsh vegetation pollen indicates that the area at some point in time stood constantly or periodically under water, the (shifting) boundary between wet and dry land lying herein. This line seems to have lain around 5.7 m.a.s.l., or at least under 6. m.a.s.l., which is the upper limit of the clay deposits (see further in Selvik, 1986, 25ff.).

A crucial question in the understanding of how the natural topography has influenced the character of the earliest settlement is whether the shallow water area was part of a larger fresh- or brackish-water basin which lay isolated from the river, or whether it was in contact with it.

Selvik (1986, 25ff.), on the evidence of the algae types, suggests that this area contained fresh water, though keeps the option open that it may have constituted a brackish water pool which might yet have been connected to the river.

Bore-holes aimed at determining the character of the natural ground in the locality where this probable shallow-water zone lay in contact with the River Nid show that the basin did lie in contact with the river course via a broad, but shallow, channel (at the present junction of Kongensgt. and Kjøpmannsgt.). The bottom of this opening into the river lay at around 5 m.a.s.l., though in some places it may have been rather deeper.

The conclusion to be drawn from the evidence so far outlined, is that the shallow-water area found in the site's SW. corner constituted a small part of shallow bay or inlet, which in all probability stood in contact with the river at the time when the earliest settlement was established on the gravel ridge between it and the river.

The water level within this inlet must have been subject, wholly or in part, to the same tidal movement which also today affects a long stretch of the river's course. The estimated boundary between wet and dry land around the 5.7

m.a.s.l. mark must therefore (approximately) represent the high-tide mark.




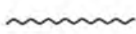


Lunde (1977, 169) estimates the shoreline at high tide as lying near 6 m.a.s.l. at around A.D. 1000. This correlates well with the results detailed above. Since the tidal range in the Trondheim area is approximately 2 metres, a state of affairs unchanged in the last 1000 years, the inlet must have constituted exposed beach or mud-flats at low tide. At mean high tide the depth of water therein lay between 60-90 cm, depending on which high tide mark one bases calculations on (i.e. 5.7 m.a.s.l. or 6 m.a.s.l.).

Within the excavated area at least 2400m² can be described as good available building land around the year A.D. 1000, while 850m² can be characterised as being not readily suitable for permanent settlement.

The terrain down towards the river was, as stated above, quite steep, and originally covered in scrub vegetation (most notably sea buckthorn, *Hippophae rhamnoides*), which didn't make access from the river particularly easy. The steep and straight riverbank did not provide any natural protection against drifting ice, floodwaters, or strong currents in the river.

To the W., however, with the help of the flood-tide, it was possible to row or sail into the calm waters of the inlet in small boats and seek protection from the elements behind the gravel ridge. In addition, access to dry land was easier here, facilitated by more favourable conditions in the terrain and vegetation.

All in all, the area around the inlet might be described as being very favourable for an early settlement. It comprised a protected harbour in direct association with an area of dry land with potential for expansion. This is the natural environmental context within which the earliest settlement phase should be seen.

	Bygninger, veg/strete
	Vann
	Grøft
	Gjerde; flettverk, påler (-hull)
	Rekonstruert tomtegrense
	Kirkegård
B	Brønn
L	Latrinegrop
pf	Pålefundament
sb	Steinbrolegning
6A	Interne tomtenummer
o	Stolpehull

Legends for the phase plans Figs. 13-24.

3.3. The Historical Development of the Settlement: A Summary.

Phase 1 (? - c.A.D.1025) (Fig 13)

In Phase 1 the excavated area is bounded on the E. by a steep riverbank, reinforced at its base by a wattle fence. To the SW. it is bordered by a shallow brackish water area, a pool linked to the river. Within the excavated area a 15 metre broad by 30 metre long beach-zone was revealed along the inlet's E. side. The pool, or inlet, stretched further N. but was not caught in the excavated area, although it has perceptibly influenced the structural layout to the N. of the site as well.

In Phase 1 the area has evidently been divided up into a number of pieces of land of various sizes, described here as "plots". The boundaries between these are physically demarcated, either by broad, U-sectioned ditches and/or wattle or pale fences. Where the natural topography has made it necessary, the boundaries are marked by a combination of ditches and fences. One such boundary ditch was observed to have been re-cut.

10 physically defined plots have been located. These are between 6 and 16 metres broad, while their lengths appear to be dependent upon the character of the natural topography. In the SW. corner, where the situation is clearest, the length of one plot is 20-25 metres (depending on how far out into the inlet it went).

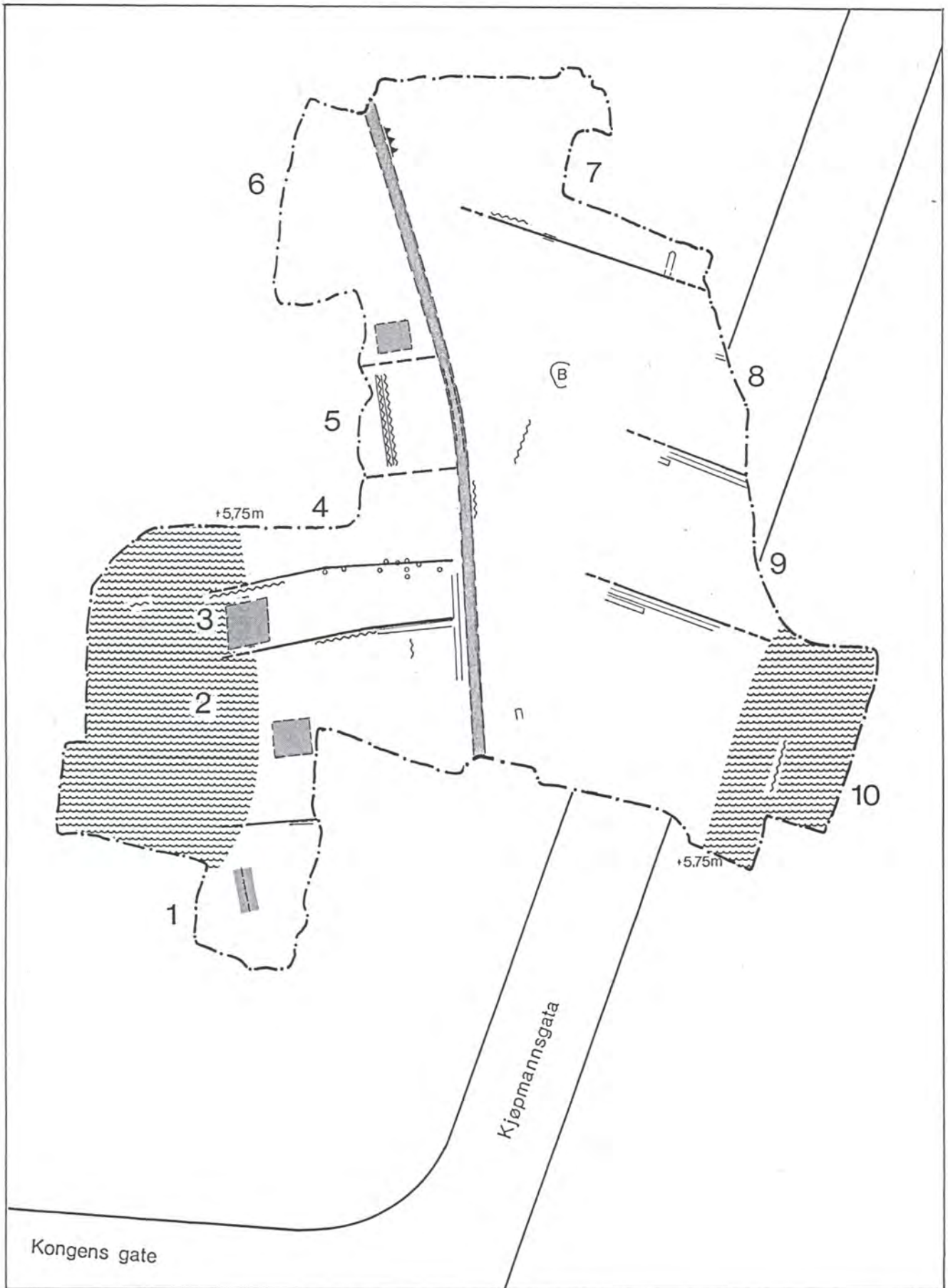
The settlement in this first phase is dispersed and comprises mainly small, simple buildings. The most explicit remains of permanent structures occur along the E. shore of the inlet (to the W. of the site). Here the houses lie centrally within the elongated plots which stretch from the brackish pool eastwards to a c. 1.5 metre broad track. From the evidence of surviving grooves and ruts this was clearly used by wagons or sledges.

On the other plots, mainly E. of the track, traces of activity in the form of post-/stake-holes, pits, open hearths etc. occur. These are thought to represent a more sporadic, changeable pattern of use of the plot areas. The post-and stake-holes might derive from the erection of sheds, tents, wind-breaks and other insubstantial structures. The well K37 might have been for communal use.

Along the riverbank to the E. occur scattered traces of activities which remain unexplained. Nevertheless they seem to indicate that this particular area was not permanently built on in Phase 1.

The evidence for structures and activities found in the NE. corner of the site are quite unlike those found elsewhere. Here they are frequent and concentrated, and comprise latrine pits, open hearths, and curvilinear ditches. This locality, which constitutes the highest part of the site, may have been the centre for sporadic activities which are earlier than those recorded in the rest of the site.

Mean high tide (m.h.t.) for the year A.D. 1000 is estimated to have lain at 5.70 m.a.s.l. (see above).



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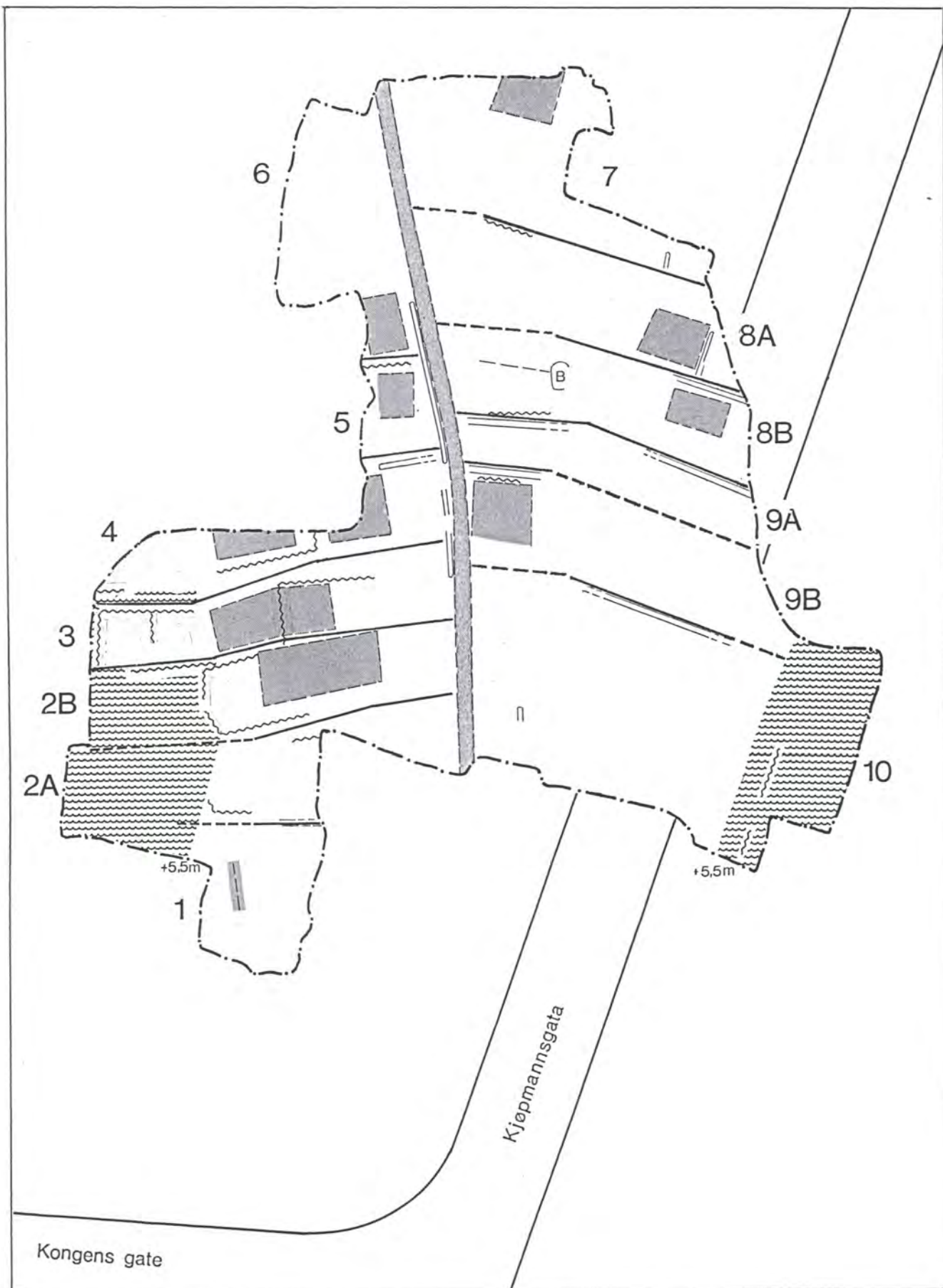
Fase 1 (ca.1025)

Fig. 13.

1:500

10 m

N



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Fase 2 (ca. 1025 -1075)

Fig. 14.

1:500

10 m



Phase 2 (c. A.D.1025 - 1075) (Fig. 14)

There is a clear continuity in the pattern of settlement between phases 1 and 2. On the macro-level the spatial organization of the settlement is maintained on previous lines, while on the micro-level the arrangements expand significantly in relation to the previous phase.

By means of a system of E.-W.-orientated ditches and fences of wattle a pattern of delimited plots appears, each with a rectangular groundplan. Their breadths vary and the lengths are determined primarily by the natural topography.

At least 13 plots occur at this stage. Three plots have been added since Phase 1, as plots 2, 8 and 9 have been sub-divided into smaller plots of equal dimensions.

The built-up area has consolidated somewhat in comparison to the previous phase. The greater number of plot divisions and newly-built houses are witness to a more intensive utilisation of space on both the macro- and micro-levels. To the W. of the track the houses are built on terraces which stick out into the inlet. This is thought to indicate that this expanse of shallow water functioned as a sheltered harbour for the earliest inhabitants of the "kaupang" (market town). At mean high tide around the year A.D. 1000 the greatest depth of water in the inlet would have been about 0.7-0.8m, while the depth next to the westernmost terrace would have been c.0.4-0.5m.

In plots 4 and 9B some right-angled drainage gullies were found which surround smaller areas and/or structures. If the amount of slag and metal-working waste here is anything to go by, it might be possible to correlate these gullies' functions to the needs of metal-workers with regard to the provision of dry working conditions.

Phase 3 (c. A.D. 1075-1125) (Fig. 15)

On the macro-level there is no change in pre-existing arrangements.

The brackish pool to the W. has, however, disappeared from the excavated area, a result of a combination of land-rise and (by no means least) the accumulation of waste deposits along the tidal beach. This in-filled area has been included within the plot units here, though these new pieces of land were not built upon in this phase.

On the micro-level there is also clear continuity in the settlement pattern. The previous phase's parcelling-out of plots through the sub-division of earlier individual areas into two smaller longitudinal units is continued. This process takes place according to the already established principles regarding the plots' form and their accommodation within the settlement's macro-structure.

The excavated area bears 15 plots in Phase 3.

In this phase a pattern is established, or is for the first time perceptible, for the spatial organization of settlement within the plots. The individual buildings are established in a row, one behind the other, against one boundary line, while an access area in the form of a small, wooden-built passage is set out in front of and alongside the row of buildings, filling out the area between this

and the opposite boundary line. All access to the buildings is via this passage, which stretches from the main street to the opposite end of the plot. There is no possibility of communication between the plots other than via the main street.

There are some exceptions to this pattern; these are dictated by the relevant plots' special form and size.

The primary determinant in the spatial organization on the micro-level seems to be a combination of natural topographic conditions and the (still unknown) contemporary circumstances which were decisive in the development of the plot areas' original form and size.

Phase 3 sees a change in the form of the track in that it is widened by about 1 metre eastwards along its whole length, and it is improved by the addition of wooden surfacing of 90 cm breadth in the W. portion along its full length. It now takes on the character of a permanent artery of communication through the area wherein provision is made for both pedestrians and vehicles. The fact that it is widened out by the addition of wooden surfacing (for pedestrians?) next to the original dirt track may indicate that it has achieved the status of a major thoroughfare, not only connecting the individual plots in the immediate locality or simply providing access in and out of the area, but comprising a route through the area.

Mean high tide is estimated to have lain around 5.40 m.a.s.l. circa A.D. 1075. A small amount of in-filling along the riverbank did not influence the shoreline at m.h.t.

Phase 4 (c. A.D. 1075 - 1175) (Fig. 16)

There is good continuity in the settlement structure between Phase 3 and Phase 4 on both macro- and micro levels.

There is no longer any perceptible bias in the area's structural lay-out; in structural terms the areas to either side of the street are of equal worth.

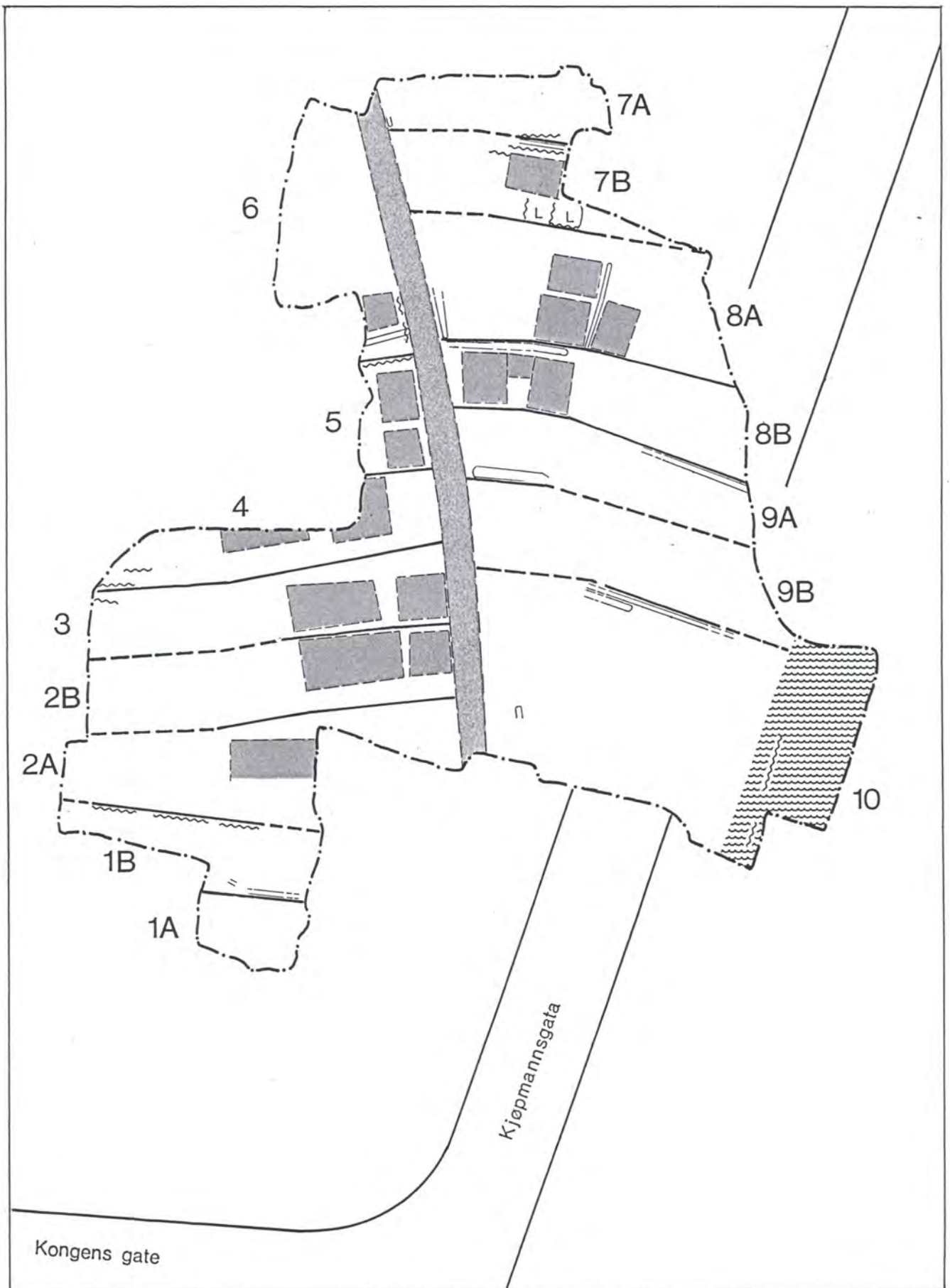
The track is now widened out to the W. and is 3 metres wide. In fact, it might now be reasonably termed a street. It is now constructed wholly of wood, although very little of the original planking survives.

There are a number of changes in plot boundaries:

To the W. of the street the two previous plots 2B and 3 are amalgamated into a composite unit, and the buildings are organized into two parallel rows with a broad passage lying between them. Where open portions of the plot area meet their neighbouring plots to the N. and S., the boundaries are marked by pales or wattle fences. The S. boundary is adjusted somewhat when an unusable area is given over to the plot neighbouring to the S.

To the E. of the street the formerly broad plot 8A is divided up into two new equally-sized plots. The structures are arranged similarly within each of these - a wooden-paved passage leading off the street lies beside a single row of buildings.

16 plots have been identified, an addition of one since the previous phase. In



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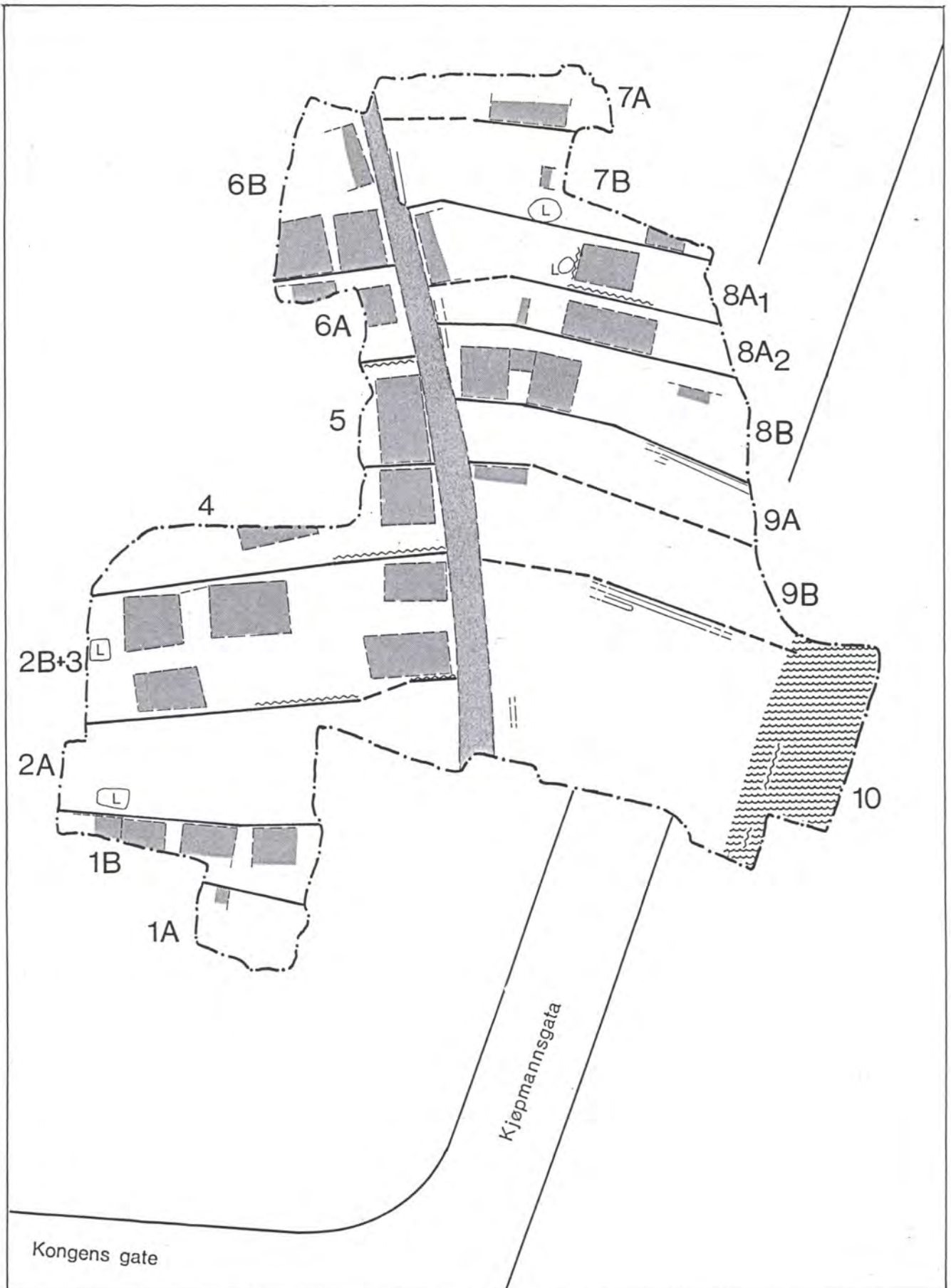
Fase 3 (ca. 1075-1125)

Fig. 15.

1:500

10 m

N



FOLKEBIBLIOTEKSTOMTEN

Fase 4 (ca. 1075 - 1175)

Fig. 16.

1:500

10 m

N

other words, the total area is not exploited to any particularly greater degree on the macro-level. On the micro-level there is, however, the emergence of a tendency towards more intensive exploitation of the available plot areas.

Mean high tide is estimated to have lain around 5.40 m.a.s.l. at the beginning of this phase (c.1075). The natural shoreline has not changed greatly, and there has been no significant filling in of the river.

Phase 5 (c. A.D. 1125 - 1225) (Fig. 17)

The macro-structure is influenced in Phase 5 by the establishment of a churchyard in the site's SW. corner. The southernmost plot here is incorporated into this new element. The churchyard area is taken up almost exclusively by coffin burials.

The churchyard pre-dates the existing church ruin which lies just to the S. of the site. The churchyard must therefore be associated with a predecessor of this stone church, which is traditionally identified as the church of St. Olav named in the sagas (Ø. Lunde 1977, 209ff.).

The introduction of the churchyard constitutes a new topographical element in the settlement's macro-level, but does not affect the micro-level, other than of course causing the destruction of the buildings on the plot taken over by it. In other words the churchyard is kept within the framework of the existing property structure.

The street maintains its breadth and orientation, and in addition has obtained a uniform wooden surfacing throughout its length and breadth. Internal longitudinal and transverse sub-divisions indicate that responsibility for the maintenance of the street is divided up, each owner of a property fronting it being responsible for the particular stretch opposite his own plot. This general legal stipulation is known from later written sources (the Town Laws of 1276). The particular situation revealed on the Library Site shows that such arrangements in Trondheim derived from a much older legal stipulation.

To the E. of the street there occurs, for the first time, evidence for a wharf fronting the river. This lies on the 5 metre contour. On the basis of the reconstructed boundaries between the three southernmost plots having direct contact with the river, it can be shown that the wharves along the riverfront were constructed individually and in stages. Each wharf filled the breadth of a plot.

At the beginning of Phase 5 (c. 1125) mean high tide is thought to have lain around 5.20 m.a.s.l. The natural shoreline at m.h.t. has not changed to any great degree, there having been little filling in of the river.

The wharf frontage is constructed along the 4 m.a.s.l. contour. This allows a water depth of c. 90 cm (at m.h.t.) in front of wharf K244. At low tide the area immediately in front of the wharves constituted mud flat.

17 plots occur in this phase. The boundaries between them are for the most part stable, though there is some movement. In a couple of instances plots which in the previous phase were combined into one unit are now split up again within the old boundaries.

Phase 6 (c. A.D. 1125 - 1275) (Fig. 18)

There are no changes on the macro-level here in relation to the preceding phase.

On the micro-level there occurs a number of minor adjustments in the property boundaries, but it can now be said that for the most part the boundaries have finally stabilised. When adjustments occur, it seems that this happens in conjunction with a general tendency towards reorganization of the portions of the plots lying against the street. Along the street's W. side there are now constructed large, rectangular buildings placed with their greater lengths parallel to the street, and with their floors raised above ground level by means of substantial posts. Wooden passages, 1.5 - 2 metres wide, against these buildings' gable-end walls, provide access to the interior of the plots. Consequently, the areas adjoining the street are intensively exploited, and the street is bordered by substantial structures, possibly of more than one storey in height.

The street maintains its average width of 3 metres, but there is some fluctuation in width due to the fact that a small additional area in front of a building on the E. side is surfaced together with the rest of the street. This may reflect the building's function, perhaps as a tradesman's booth, for example. One such open area in front of a building (K113) occurs already in Phase 3, but without wooden surfacing.

A new wharf is constructed on one of the plots along the river. The old and new waterfronts are not directly superimposed, the new wharf being built further out into the river by some 1.4 metres. This must be a localized response to changes in the shoreline as a result of the rapid accumulation of dumped waste materials in the river in front of the wharves.

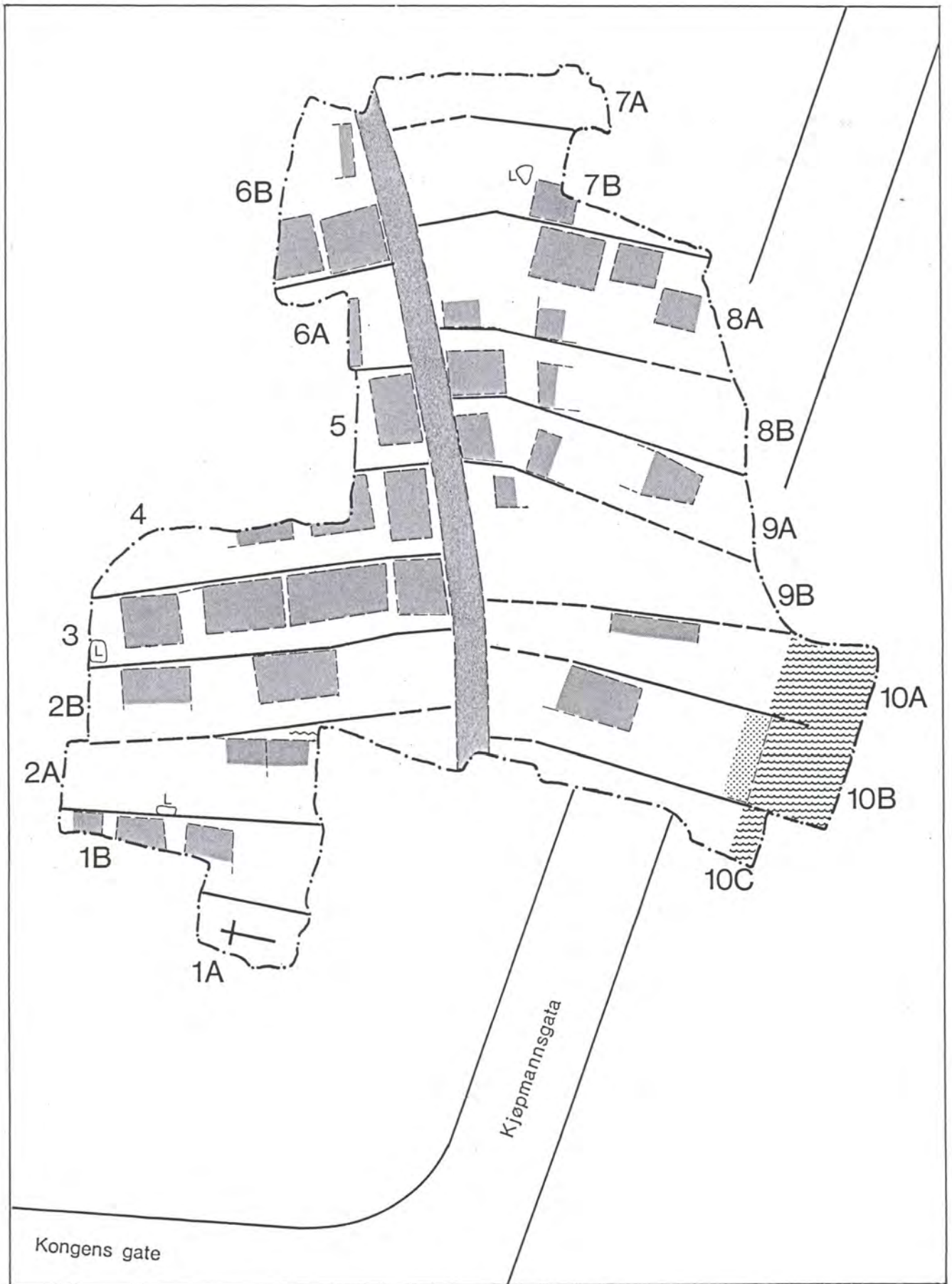
By the beginning of this phase (c.1125) mean high tide is estimated to have lain around 5.20 m.a.s.l. Due to the incipient filling in of the river in front of the wharves, by c. 15 cm in this phase, the shoreline (at m.h.t.) moves a little to the E. (to c. 5.05 m.a.s.l.). The wharf on plot 10A has moved correspondingly, while that on the neighbouring plot 10B remains as it was. The water depth in front of the new wharf on 10A is c. 95 cm at m.h.t., while that in front of the old wharf on 10B has lessened to c. 75cm as a result of the dumping in the river.

There are 17 plots evident in Phase 6, the same number as in the previous phase, although the number of properties lying to the E. of the street cannot be fully verified.

Phase 7 (c. A.D. 1175 - 1300) (Fig. 19)

In Phase 7 the churchyard expands to include the two former properties just to the N. of it in the SW. corner of the site. The new limit of the churchyard merges with the earlier plot boundary at this point. There is some slight evidence to suggest that a stone wall is built here, separating the churchyard from the town plots.

The churchyard's expansion coincides with the building of the stone church (St. Olavs) just to the S. of the excavated area.



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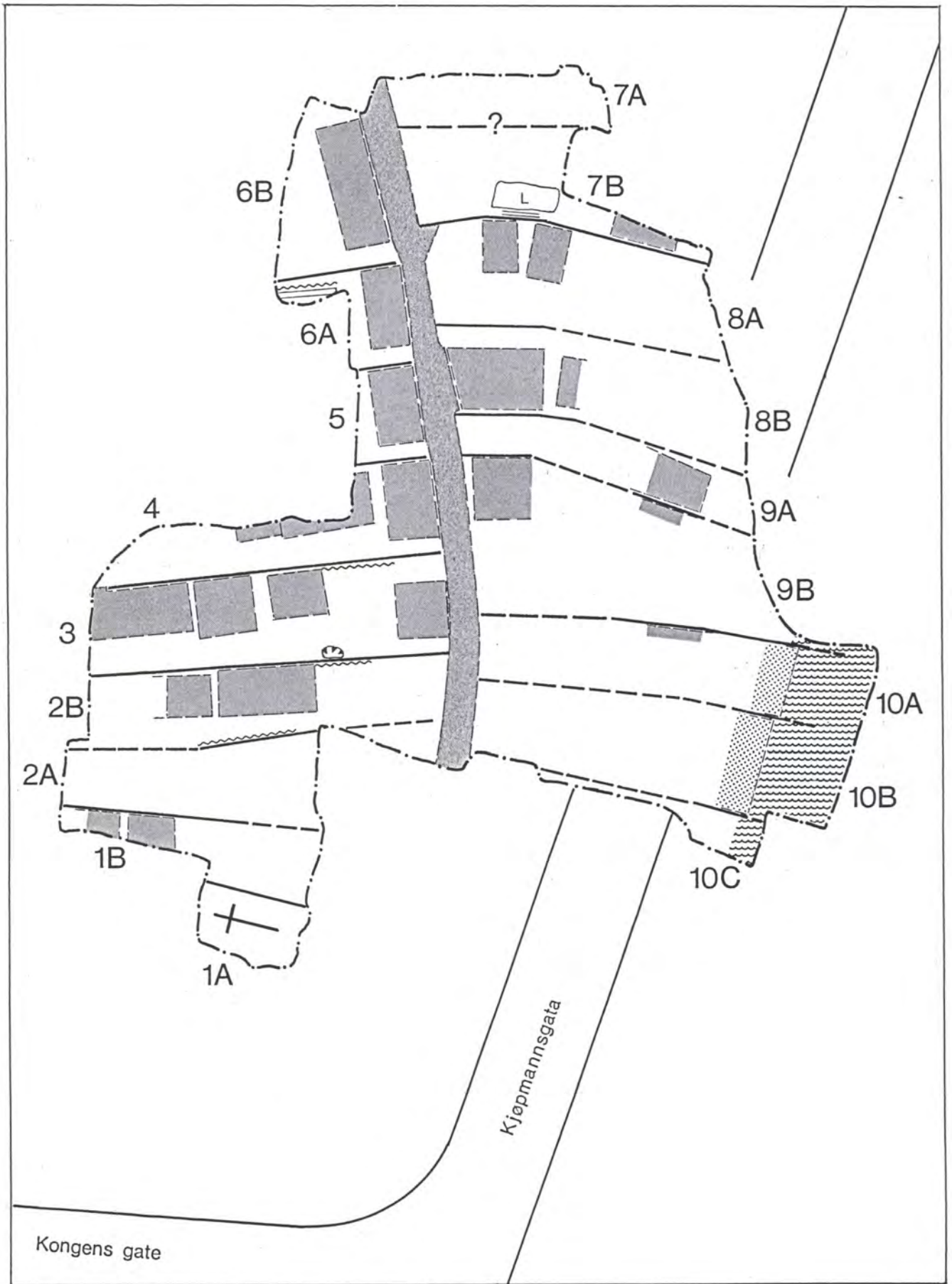
Fase 5 (ca. 1125 - 1225)

Fig. 17.

1:500

10m





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Fase 6 (ca. 1125 - 1275)

Fig. 18.

1:500

10 m



There are now few changes in the plot boundaries and areas, although the amalgamation of two earlier plots has resulted in the large single plot with an area of at least 439m² lying immediately N. of the churchyard. The buildings therein are arranged in two rows with an intervening wooden-paved passage/-courtyard. The plot area is not fully built upon.

In this phase the large buildings bordering the street in three of the plots on the western side have been replaced by smaller structures, probably built in unison, with entrance-ways leading onto the courtyards and buildings behind. This may have resulted from a desire to better utilize the areas next to the street.

The street undergoes no changes. Its width is still 3 metres, and the mid-line division is clearly marked.

To the E. of the street the settlement topography is not clear due to poor preservation conditions. It can nevertheless be suggested, with caution, that there is continuity in the lay-out between this and the preceding phase.

The wharf-frontage on plot 10A is moved c. 1 - 2 metres further out into the river, and turned in the direction NNE-SSW. A corresponding adjustment in the N. plot boundary of 10A is in evidence. The E. shift results from increased dumping in the river; the waste deposit has grown in this phase to a thickness of some 55cm.

The natural shoreline at mean high tide is thought to have stood at c. 5.5 m.a.s.l. at the beginning of Phase 7, though due to the infilling of the river the shoreline has moved to c. 4.5 m.a.s.l. Despite the shift out into the river, the water depth at the wharf frontage has fallen to c. 60cm at m.h.t.

14 plots are in evidence in this phase.

Phase 8 (c. A.D. 1225 - 1325) (Fig. 20)

There are no changes in plot boundaries or plot areas in Phase 8 apart from the movement by a further 3 metres of the 10A waterfront E. into the river.

The density of buildings within the plot areas is, however, markedly increased in comparison to the preceding phase. The plot areas to the W. are more intensively exploited (especially those parts bordering the street) than the plots to the E. of the street. This is connected with the fact that the E. properties have incorporated the waterfront development, a factor which might have resulted in less intensive exploitation of the plot areas than occurs to the W. of the street. A note of caution must be sounded, however, as the poor conditions of preservation and the greater amount of disturbances here make any reconstruction of the settlement topography to the E. of the street very uncertain.

The structural lay-out on the "waterfront" plots, however, does not vary greatly from that elsewhere: a passage usually runs alongside a row of buildings down to the waterfront. This passage can also pass between waterfront structures.

Phase 8 sees a significant increase in dumping into the river. The dump deposit

is now 70 - 75 cm thick. As a result of the shifting of the wharf constructions out onto the underwater shelf the terrain has flattened out and the wharves must be moved even further out to the E. in order to stand in deep water. However, despite moving E. by some 3 metres, the depth at mean high tide at the new frontage is no more than 40 cm. The natural shoreline at m.h.t. c. 1225 is calculated to have lain at c. 4.8 m.a.s.l., though the effective shoreline lay at c. 4.1 m.a.s.l., the result of the dumping of waste material into the river.

It is thought that the boundary between the churchyard and the town was maintained despite the fact that burials were now confined to a 10 metre broad belt along the N. wall of the church. The old churchyard's periphery to the N. seems to have been used for purposes other than burial, and in all probability for the erection of buildings, an activity suggested by thick wood-chip layers found in the locality. This change in the use of the old churchyard should perhaps be seen in the light of the (subsequently) documented conversion of St. Olav's church into a Franciscan priory, and if this is correct these developments can be dated to the second half of the 13th century or the beginning of the 14th century.

The street maintains its previous orientation and width (3 metres), and the mid-line division in the surfacing is still apparent.

A very well-preserved structural lay-out is recorded on the plot lying just to the N. of the churchyard. The plot's area is 439m², and the total built-on area therein is 294.5m². The plot contains at least 8 buildings, whereof one is a very long building divided up into 5 rooms.

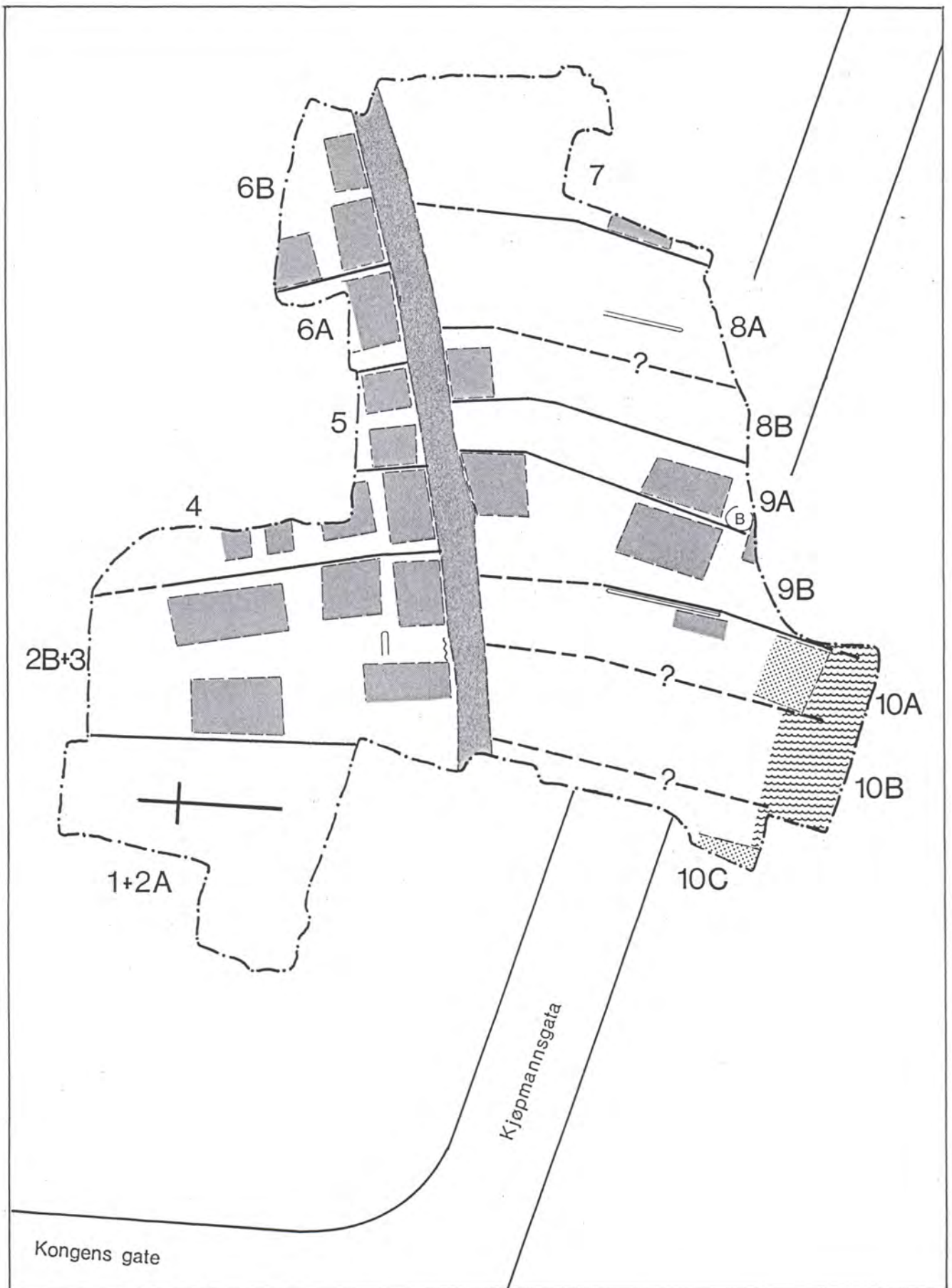
Two of the buildings in the S. row have hearths on their ground floors. The buildings in the N. row do not have hearths, and may have constituted storerooms, rentable areas, workshops and/or tradesmen's booths.

Phase 9 (c. A.D. 1275 - 1375) (Fig. 21)

Stability predominates at this stage in the settlement, on both the micro- and macro-levels. No plot area or boundary is changed, and even though a few houses are removed from the plots the spatial organisation is unaltered. The plots are intensively built upon. The houses along the W. side of the street lie with their lengths parallel to it, while those on its E. side stand with their gable-ends towards it.

The greatest changes are in connection with an internal reorganisation of the churchyard area, wherein the N. perimeter area is now taken into use for burials. On the other hand, a house is now established in the churchyard's W. area.

In this phase the waterfront is moved so far out to the E. that it lies outside the Library Site limits. The layer of dumped material in the river is now c. 1 metre thick, and the natural shoreline at mean high tide moves from c. 4.6 m.a.s.l. to c. 3.6 m.a.s.l. The buildings on the waterfront plots expand simultaneously and the plot areas seem to be more intensively exploited.



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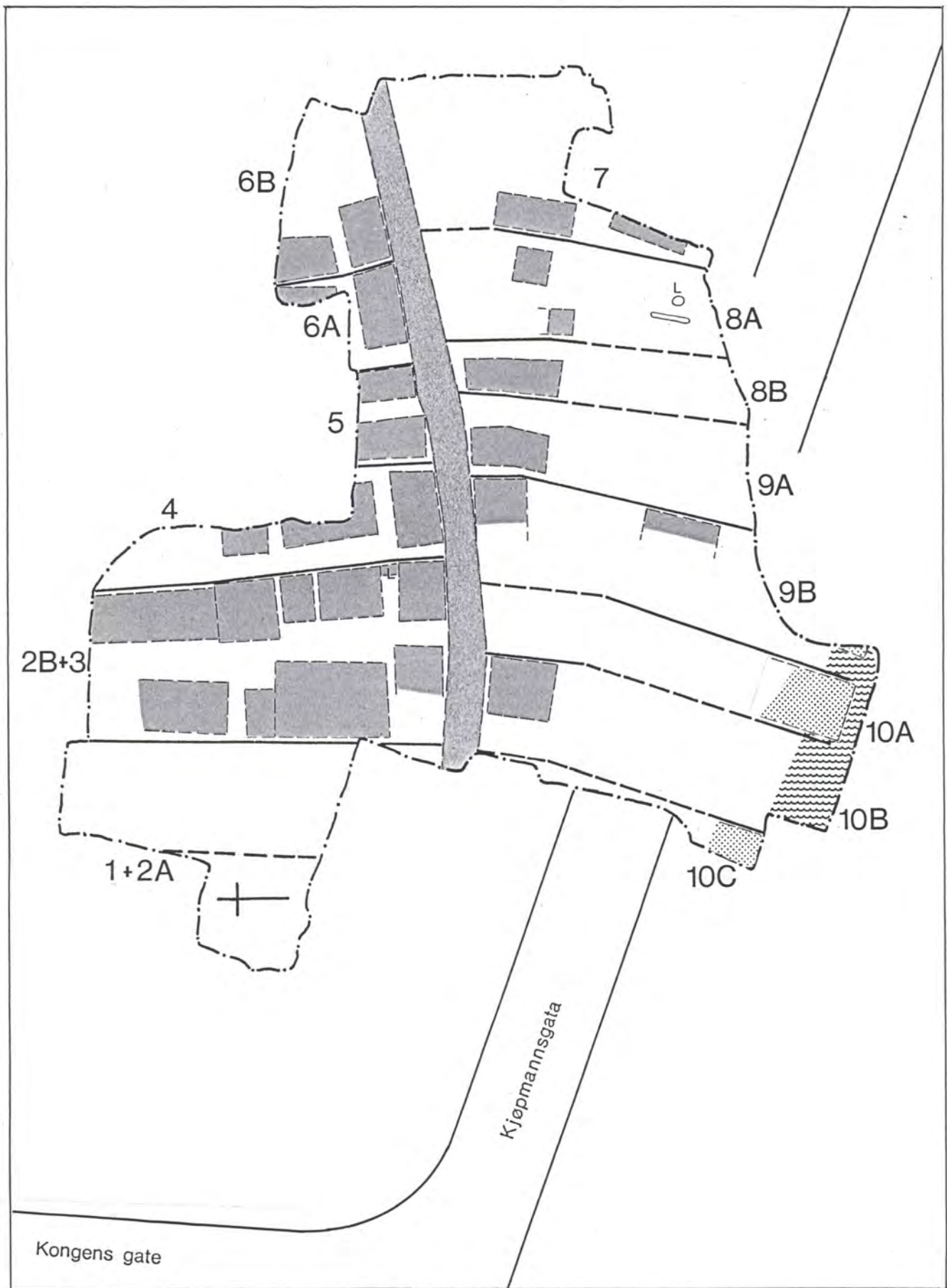
Fase 7 (ca. 1175 - 1300)

Fig. 19.

1:500

10m





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Fase 8 (ca. 1225 - 1325)

Fig. 20.

1:500

10m



Phase 10 (c. A.D. 1325 - 1475) (Fig. 22)

Preservation conditions are very poor in this phase, and reconstruction of the settlement structure is naturally more tentative (more so on the micro- than the macro-level, of course).

All indications are, however, that the settlement structure is maintained as before, on both levels. The number of plot units, 13, is consistent with the number in the preceding phase.

The old churchyard boundary to the N. is unchanged. It is partially marked by paling. The whole area to the S. of it seems to have been used for burials.

The street is widened on its W. side by c. 2 metres to a total breadth of c. 5 metres. The wooden paving changes from a N-S to an E-W orientation. As a consequence the mid-line division is not so markedly visible as before. The pattern of surfacing of the street is nevertheless very heterogeneous as it has also been laid piecemeal in the traditional manner. In a stretch furthest to the S. the wooden paving has been removed and replaced with stone surfacing.

It seems that the use of stone as surfacing material becomes an important supplement to the use of wood in Phase 10. In addition to the street, portions of stone-surfaced yards are recorded; for example, to the N. of building K459, S. of well K436, and N. of building K455.

There are 3 wells lying in separate plot areas. There is a total of 5 wells recorded for the medieval period in the whole area, whereof the two earlier examples are from Phases 1-2 (K37), and Phase 7 (K329). In other words, a significant proportion of the site's wells occurs in Phase 10. Why this should be so is not known.

Phase 11 (c. A:D: 1475 - 1600) (Fig. 23)

Poor preservation conditions and later disturbances have contributed to the fragmentary nature of this phase's remains.

With the help of the existing remains and through comparison with the settlement structure and plot boundaries in the earlier phases, as well as those in the subsequent Phase 12, a reconstruction of the pattern in Phase 11 is possible.

It seems that the structural pattern is as before. However, because of the poor preservation, little can be said with certainty about the density of settlement, its spatial organisation etc.

Certain changes in the general settlement pattern are perceptible.

The churchyard has expanded northwards by some few metres. In what way this affected the structural pattern on the neighbouring property cannot be seen due to the lack of surviving remains.

Within the churchyard itself a ditch separates an isolated area of burials to the N. from an unexploited area to the S. nearest the church. To the W. lies a latrine and this area is free of burials.

These circumstances may be seen in the light of written sources which relate the fact that in 1559 the church building and the open part of the churchyard were sold to a private individual, one Severin Pedersson.

The street is broadened by c. 1.2 metres, the total breadth being now 6.2 metres. The wooden paving is replaced with sand make-up and cobbling.

In the SE. corner the plots down by the river are built upon with small square "lafted" (of notched, interlocking timbers) buildings, partially dug down into the riverside slope. These are rebuilt a number of times on the same spot. The plot boundaries appear to have been maintained, both to the W. and to the E. of the street.

Stone cobbles are now used to a much greater degree as surfacing material in the yards.

Phase 12 (c. A.D. 1600 -) (Fig. 24)

This is a composite phase in which cellars and other structures later than c. 1600 are collected together. There has been no attempt here to distinguish between structures which, according to the stratigraphic analysis, clearly derive from different building phases.

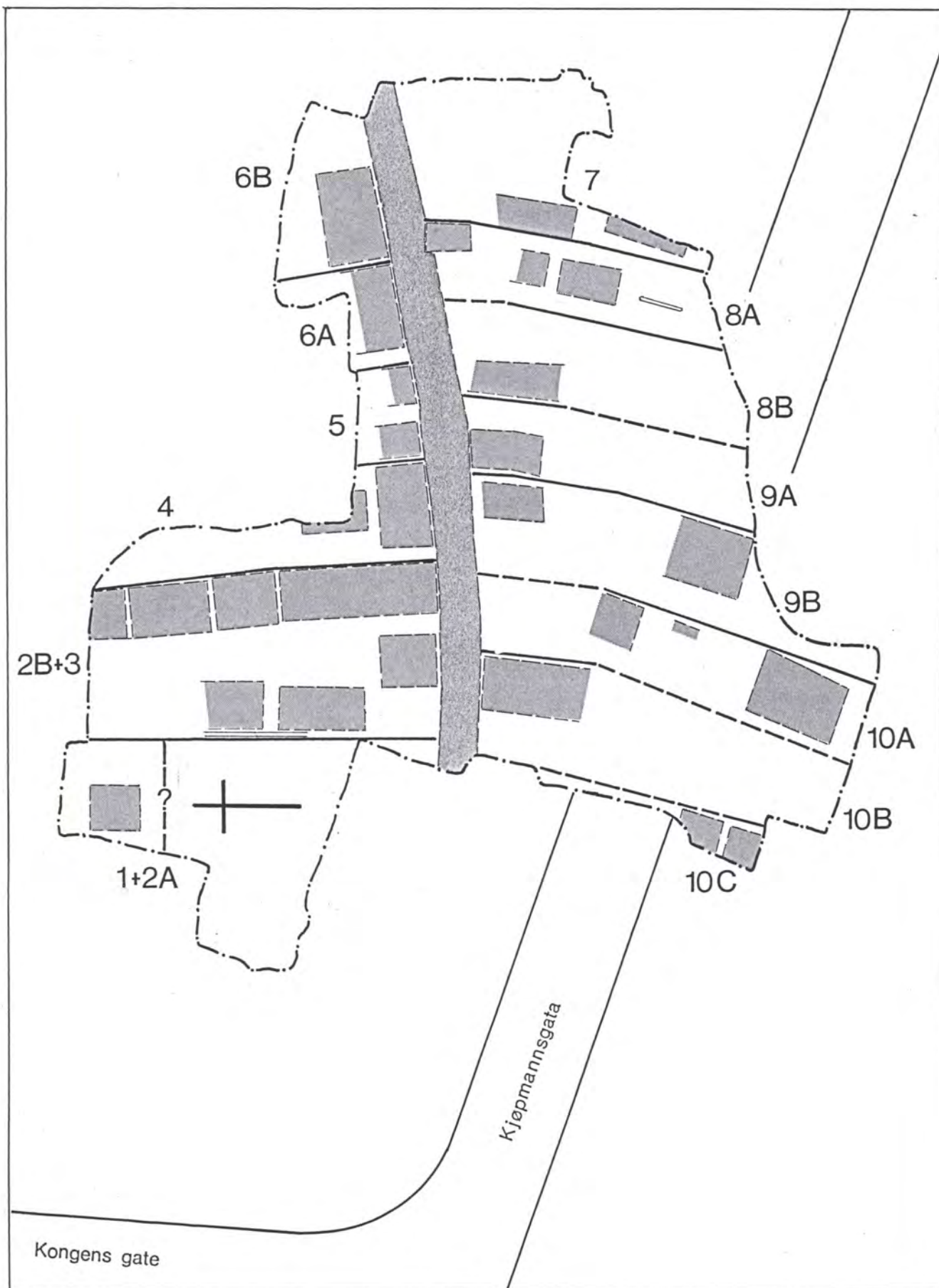
The structural remains on both sides of the street, now known as "Krambugata", consist mainly of cellars constructed of stone or wood. The wooden examples (of which one was "lafted", the rest comprising vertically set split logs) are the earliest cellars, constructed **before** the fire of 1681. The greatest changes in the area on the macro-level are connected with the laying out of the wide public thoroughfare, "Øvre Allmenning", in 1598. This resulted in the disappearance of many of the medieval plots: to the W. of Krambugata half of plots 2B+3 and 4 vanished, and on the E. side plots 9B and 10A-C disappeared.

Besides this, at least one of the long properties towards the river has been sub-divided into smaller units (9A). To the W. of Krambugata it is likely that many of the medieval plots were amalgamated.

Nevertheless, in some instances the medieval plot structure has been more or less preserved. The line of "Øvre Allmenning" appears to have respected the medieval boundaries. To the N. its edge follows the medieval plot boundaries, while to the S., on the W. side of Krambugata, its S. edge follows the line of the former churchyard's N. boundary (although in fact it lies some few metres N. of the true line as seen in Phase 10). Likewise it appears that the boundary between plots 109 and 112 as well as that between 110 and 104 have roots in medieval arrangements.

The street's (Krambugata's) line is inferrable from the remains of buildings formerly fronting it (i.e. their cellars). The street appears to retain its width of 6.2 metres until the fire of 1708.

The line of "Øvre Allmenning" can be detected similarly. Its width is c. 25 metres. Scattered remains of cobbling probably constitute parts of its surfacing. However, these might also comprise the remains of building activity in the line of the street after it was removed from the town plan following the fire of 1681.



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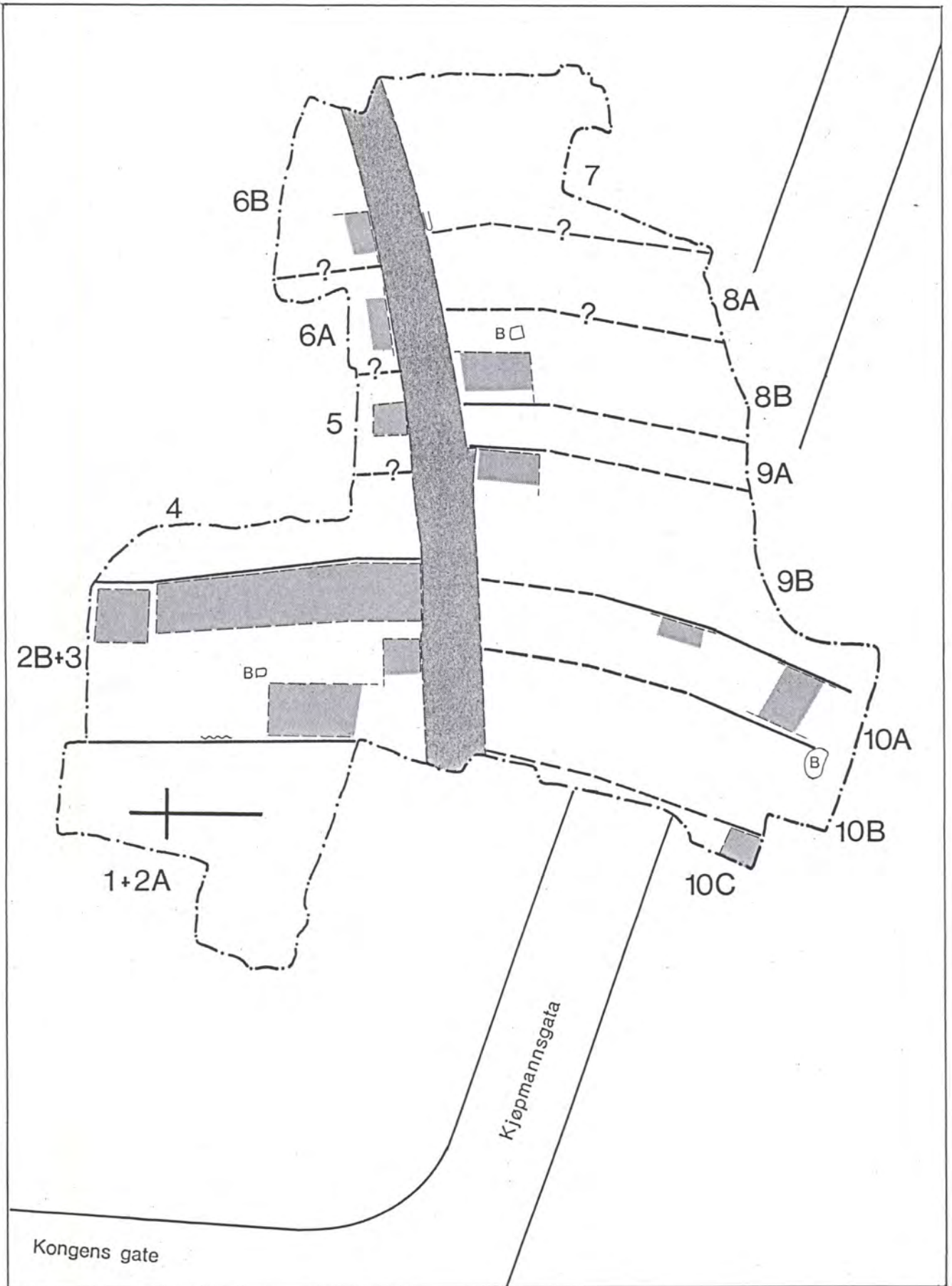
Fase 9 (ca. 1275 - 1375)

Fig. 21.

1:500

10 m





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Fase 10 (ca. 1325 -1475)

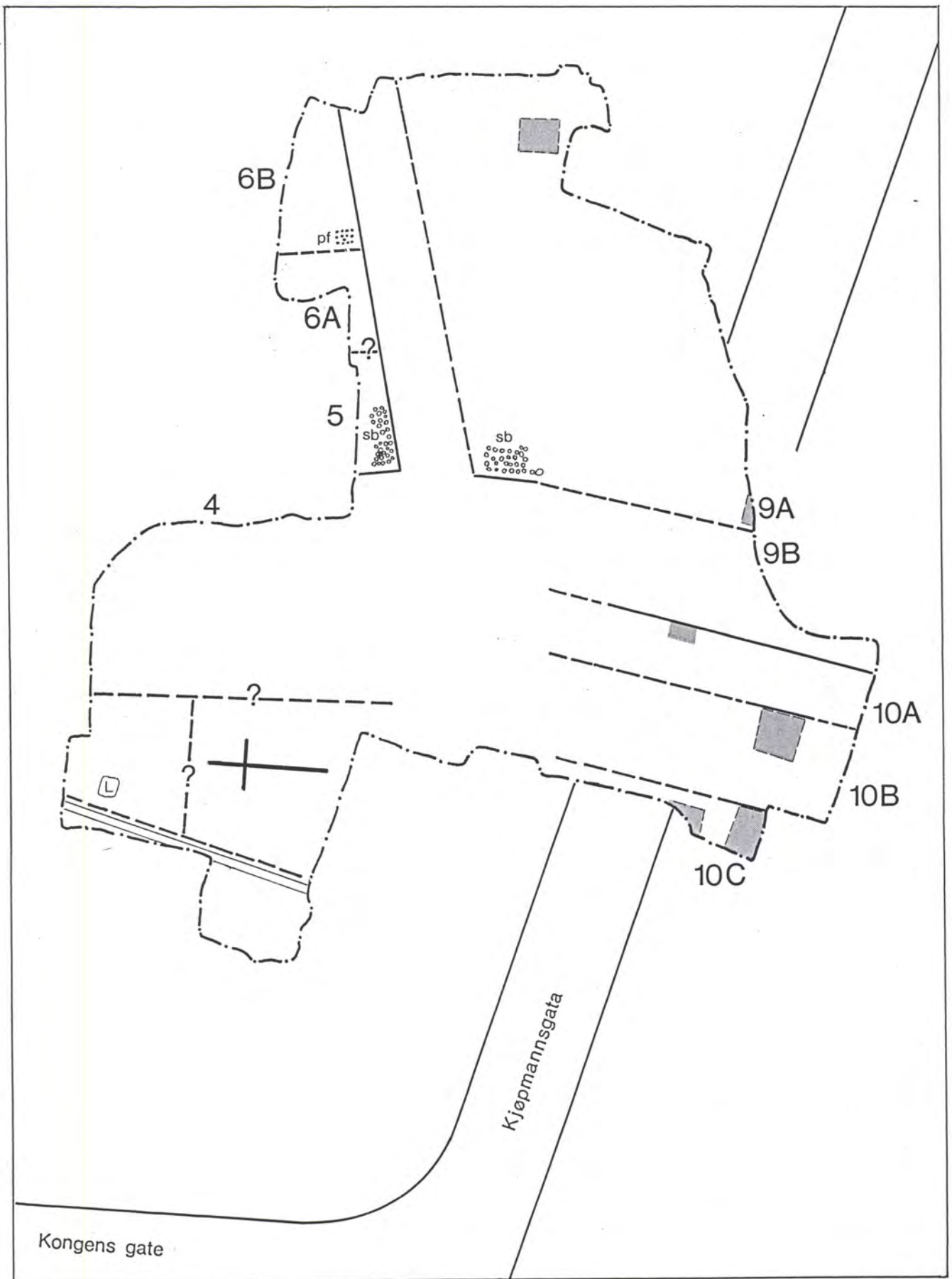
Fig. 22.

1:500

10 m

N

Written records reveal that this part of the town was occupied by some of the wealthier and more prestigious citizens of whom many had influence in the running of the town's affairs. In the second half of the 17th century most of the local community here consisted of members of the merchant class. A number partook in trade with northern Norway ("nordlandsfarere"). Tenants occur in a couple of instances here: these were craftsmen.



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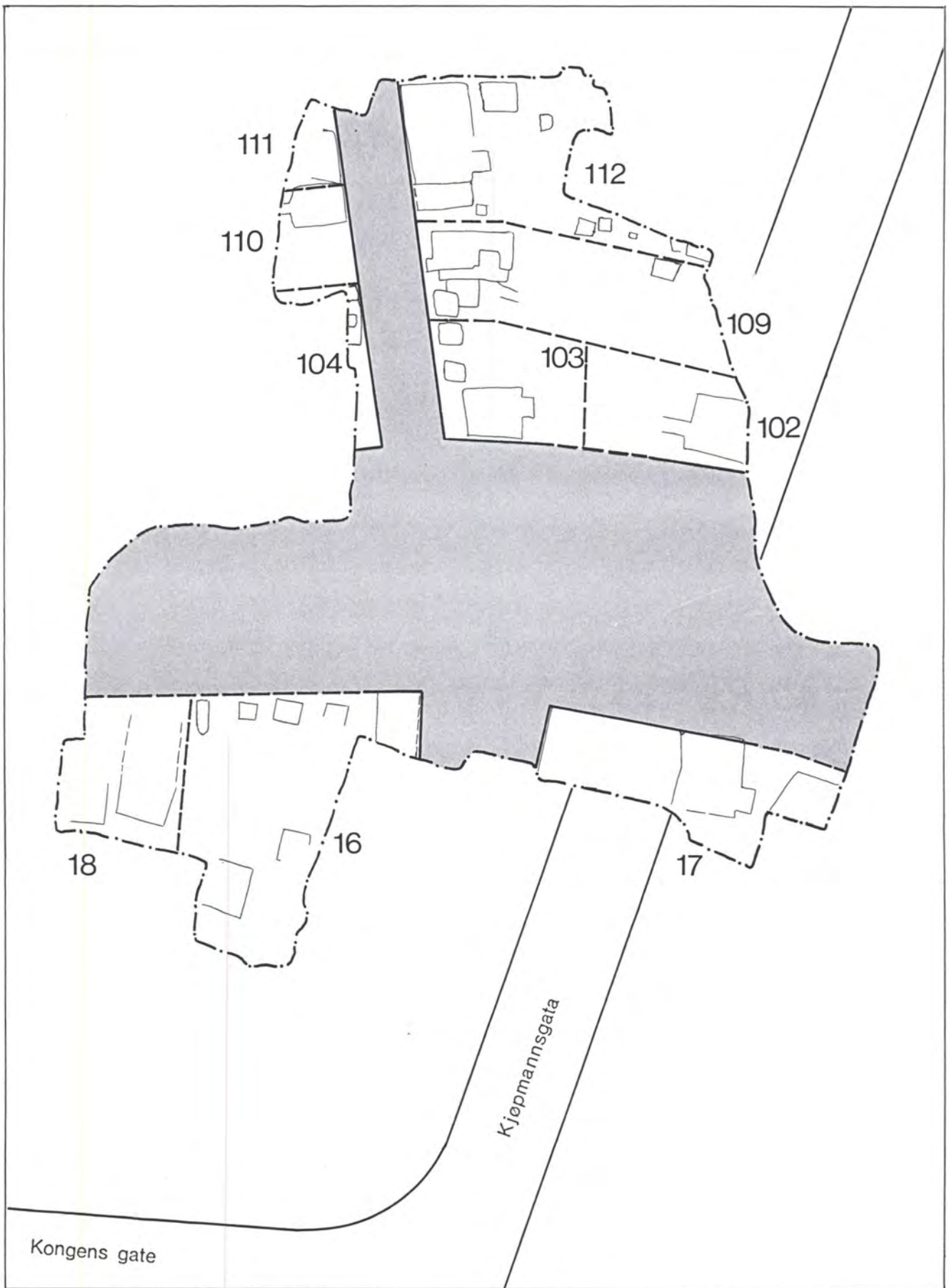
Fase 11 (ca. 1475 - 1600)

Fig. 23.

1:500

10 m





FOLKEBIBLIOTEKSTOMTEN

Fase 12 (ca. 1600 -)

Fig. 24.

1:500

10 m



4. DATING (Ian W. Reed)

4.1. Introduction

The proposed dates presented for each area within the Library Site are based upon a preliminary typological analysis of three chosen leading artefact groups, namely pottery, leather shoes and coins, and supplemented (where available) by radiocarbon dates.

4.2. Principles for Dating

The proposed dates are derived from an evaluation of the occurrence of the leading artefact types and their correlation within the individual area phases. The dates do not take account of the proportionate quantities of artefact types. On certain areas the range of finds from some phases suggested a long period of activity (i.e. there was a relatively broader chronological spread of finds on certain areas in some phases). Furthermore, some areas had quite substantial post-medieval contamination. In these instances comparison was made with material from the over- and underlying phases to exclude material which was either too early or too late. Accordingly, a proposed date was arrived at by an assessment of the latest dating of the earliest artefact types and the earliest dating of the latest artefact types. (The relationships between the proposed dates of the individual areas are presented in Fig. 25).

It cannot be repeated often enough that all datable finds have their limitations, a point made especially clear by the fact that they can only provide a terminus post quem for the layer in which they were found (i.e. that the layer was deposited at or after the date indicated by the finds material in it). Even a coin bearing its year of minting does not give any further information about its find context than this. A cautionary example, so extreme that one could not possibly have drawn the wrong conclusions, lies in the finding of 20 triquetra pennies in a sewage trench in Phase 12 on area FY-Ø. One must also remember that the dating of a context cannot be used to provide a terminus ante quem for the underlying layer or phase.

It should also be pointed out that even if a number of artefacts are found in one and the same layer they are only "associated" in the sense that they have a common context on excavation. This association says nothing about their relative or absolute dates. However, under certain circumstances this relationship can be very important. If, for example, artefacts are found on the floor of a building, and especially if this building has been destroyed in a catastrophic event such as a fire, then their presence together might indicate that they were in use synchronously, or, at the very least, that they comprise objects owned by the occupant of the building when it was destroyed or abandoned.

Hoved-faser	Delfeltfaser																	FO	
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9																		8(?) 7	1200
	8	9	9	6 G12(9)	8 G11	9 G3	10 II	9b 9a	10	11	8 II	8	8 II	8	7 6	7	6 I 5	6 5	
8				5 G11(8b) 5 G10 (8a) 5 G9 (8)			10 I 9 II	8c 8b 8a		10 9	8 I 7 II	8	8 I 7 II	8			6 5	4	4
	7 II	8 II 8 I	8		7b G10	8 G4 8 G5	9 I		9	9									
7																			
	7 I 6	7 6 II 6 I	7 6	4 G8 (7a) 4 G7 (7)	7a G9 7A G8 7a G7	7 G6 7 G7 7 G8	8 II 8 I 7	7 6b 6a	8	8	7 I	7	7 I	7	4 3	4 3	3	3	3
6	5	5	5	3 G6 (6a) 3 G5 (6)	6b G6	6 G9	6	4+5	8	7	6	6	6	6	2	2b 2a	2 II	2	
5																			
	4	4 III	4 II	2u G4 (5)	6a G5		5 4 r.3 4 r.2 5 G10 5 G11 5 G12	4 4	3	7 6	6	5 4	5 4	5 4	5 4	2	2b 2a	2 I	2
4																			
	3	4 II 4 I	4 I	2l G3 (4)	5 G4 4 G3	4 G13 4 G14 4 G15 4 G16	3 III 3 II	2	5 4 II 4 I	5 4	3 II 3 I	3 II 3 I	3 II 3 I	3 II 3 I	1	1	1	1	1
3	2	3	3	1u G2 (3)	3		3	3 I	1	3	2	2	2	2	1	1	1	1	1
2	1	2 II *2 I	2 II 2 I	1m G1 (2)	2 G2	2 G17 2 G18	2 II 2 I	1	2 *1 II	1 y. nivå	1	1	*1 III 1 II	1	1	1	1	1	1
1	1	1	1	1l (1)	1 G1	1 G19	1	1	1 I	1 e. nivå	1	1	1 I	1	1	1	1	1	1

Fig. 25. Main Phases 1-12: Chronology.

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