

New Methods on Old Castles: Generating New Ways of Seeing

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THE USE of new methods on old castles generates new ways of seeing and leads to new interpretations. Three types of analyses are demonstrated on four late 13th-century castles from North Wales. Feature Analysis involves the use of a decision-tree to help in the determination of room function. Access Analysis via access diagrams is used to understand the functional organization of rooms within each castle. Finally, a Comparative Analysis employing access diagrams, plans, a table and a cumulative graph is performed to note developmental trends in the castle designs, to detect differences between the castles, and to lead to new interpretations or new working hypotheses.

In academic research it is often useful, interesting and provocative to reconsider old data sets through the lens of new theories and methods. When new approaches are employed they often can ‘generate new ways of seeing’ which can suggest new interpretations, answer old questions, suggest new ones, and even challenge the basic assumptions of previous research.¹ This study will employ ‘new’ methods on an ‘old’ data set — medieval castles. The new methods, each of which will be discussed in more detail below, are ‘new’ with respect to the data set upon which they will be applied. In other words, they have been employed to a greater or lesser extent on other archaeological data, but in general, have not been used on medieval castles.² These new methods will be used within one of the following analytical frameworks:

1. *Feature Analysis*: This analysis will use a decision-tree to determine the likely function of rooms or spaces within the four castles that form the subject of this research;
2. *Access Analysis*: This analysis will use access diagrams, in conjunction with the results from the Feature Analysis, to understand the defensive and residential organization of the castles;

¹ G. Fairclough, ‘Meaningful constructions — spatial and functional analysis of medieval buildings’, *Antiquity*, 66 (1992), 348–66, p. 355.

² The single exception is Access Analysis which has been used on a few castles: Fairclough, op. cit. in note 1; P. A. Sattleberger, ‘A review of methods for the spatial analysis of buildings: a case study of castles of the late medieval period of England and Wales’, unpublished M.A. dissertation, University of York (1990).

3. *Comparative Analysis*: This analysis will use a table, a cumulative graph, and the access diagrams to delineate differences in the percentage of functional spaces between castles. This final analysis will be used to note developmental constants and trends in the castle designs and to detect differences between the castles as they were planned and the castles as they were actually built and used.

THE DATA SET

The data set chosen for this study consists of the four royal castles built by the English king, Edward I (1272–1307), in North Wales — Conwy Castle, Gwynedd (Caernarfonshire), Harlech Castle, Gwynedd (Merioneth), Caernarfon Castle, Gwynedd (Caernarfonshire) and Beaumaris Castle, Anglesey (see Fig. 1 for the location of the castles and Figs. 2–5 for the ground floor plans of these castles). These castles were begun in 1283 (1295 for Beaumaris) during the conclusion of Edward's second war with the Welsh and were intended to consolidate his conquest of Wales. As such, they were constructed as formidable fortresses intended to act as the centres of Edward's new administration in Wales. They were also intended to serve as residences, on a permanent basis for the King's officials (including the castles' constables and the Justiciar of North Wales), and on occasion for the King (and/or Prince of Wales) and his retinue. Two of them, Caernarfon and Beaumaris, were left unfinished in the 14th century, most likely as a result of financial and political troubles.³ From an architectural point of view, they have been seen both as the culmination of the development of military (and administrative) structures in Britain over the previous two centuries and as a late 13th-century beginning to the later medieval emphasis on the social function of castles.⁴

These four castles were chosen for three main reasons. The first is that they are sufficiently preserved to be analysed by Feature Analysis and Access Analysis.⁵ Second, their construction is well documented, including particulars about the workforce, cost and sequence of construction.⁶ Third, they were chosen because all four were designed and at least partially constructed under the supervision of the same man, Master James of St George, a Savoyard master mason employed by

³ The Royal Commission on Ancient and Historical Monuments in Wales and Monmouthshire, *An Inventory of the Ancient Monuments in Caernarvonshire: Volume III: West: The Cantref of Llyn* (London, 1964), cxx.

⁴ N. J. G. Pounds, *The Medieval Castle in England and Wales: a Social and Political History* (Cambridge, 1990), pp. 6, 185; D. J. Turner, 'Bodiam, Sussex: true castle or old soldier's dream house?', 267–77 in W. Ormrod (ed.), *England in the Fourteenth Century* (Woodbridge, 1986), p. 276.

⁵ Though two of the castles (Beaumaris and Caernarfon) were never finished, many structural clues survive that allow researchers to reconstruct their intended complete plan. For an explanation of each 'completed' element in the intended plans of Beaumaris and Caernarfon see J. R. Mathieu, 'The use of space in four Edwardian castles', unpublished M.A. dissertation, University of York (1994).

⁶ See especially J. G. Edwards, 'Edward I's castle-building in Wales', *Proc. Brit. Acad.*, 32 (1946), 15–81; A. J. Taylor, 'The date of Caernarvon castle', *Antiquity*, 26 (1952), 25–34; A. J. Taylor, 'Castle-building in Wales in the later thirteenth century: the prelude to construction', 104–33 in E. M. Jope (ed.), *Studies in Building History: Essays in Recognition of the Work of B. H. St J. O'Neil* (London, 1961); A. J. Taylor, 'The king's works in Wales 1277–1330', 337–408 in H. M. Colvin, R. A. Brown, and A. J. Taylor (eds.), *The History of the King's Works Volume I: The Middle Ages* (London, 1963).

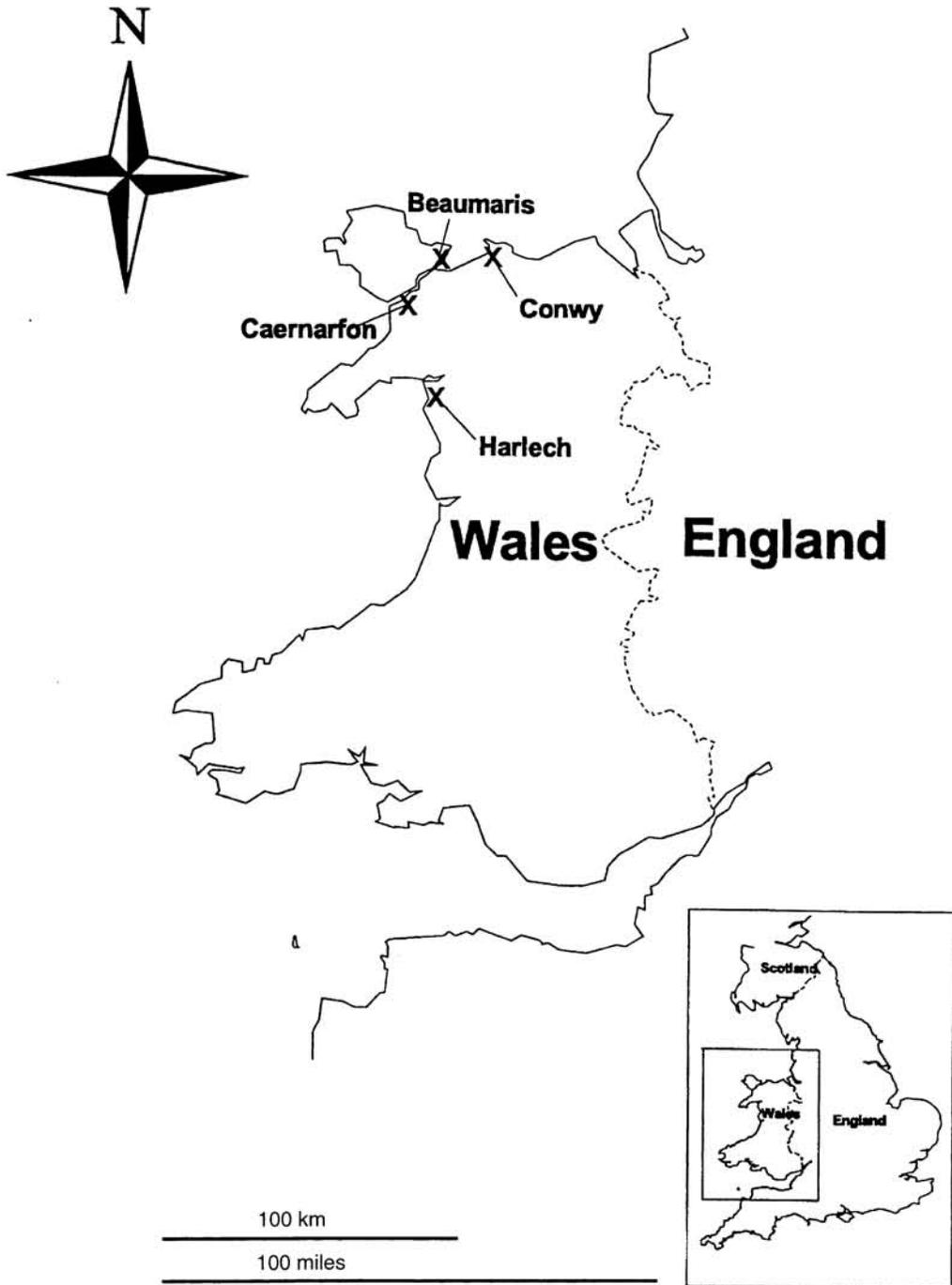


FIG. 1
The location of the four castles in Wales.



FIG. 2

Conwy Castle — ground floor plan. Digitized from RCAHM (1956), Crown copyright.

Edward I from 1278.⁷ Because the designer of the castles was the same individual, differences between the castles are more likely to reflect developmental trends (if not of castle-building in general, then at least in castle-designing by a master) rather than stylistic differences between castle builders.

THE SEQUENCE OF CASTLE PLANNING

In order to study the developmental trends in the four castles (as will be done later in this study), it was necessary to determine the sequence of their planning. Lacking any direct evidence of this, their sequence of construction was used to suggest the order in which they were probably planned. The sequence of construction for the four castles was as follows:

Conwy Castle begun in March 1283.⁸

Harlech Castle begun in May/June 1283.⁹

Caernarfon Castle begun in June 1283.¹⁰

Harlech Castle's eastern half mostly finished by 1284, completely finished by 1287.¹¹

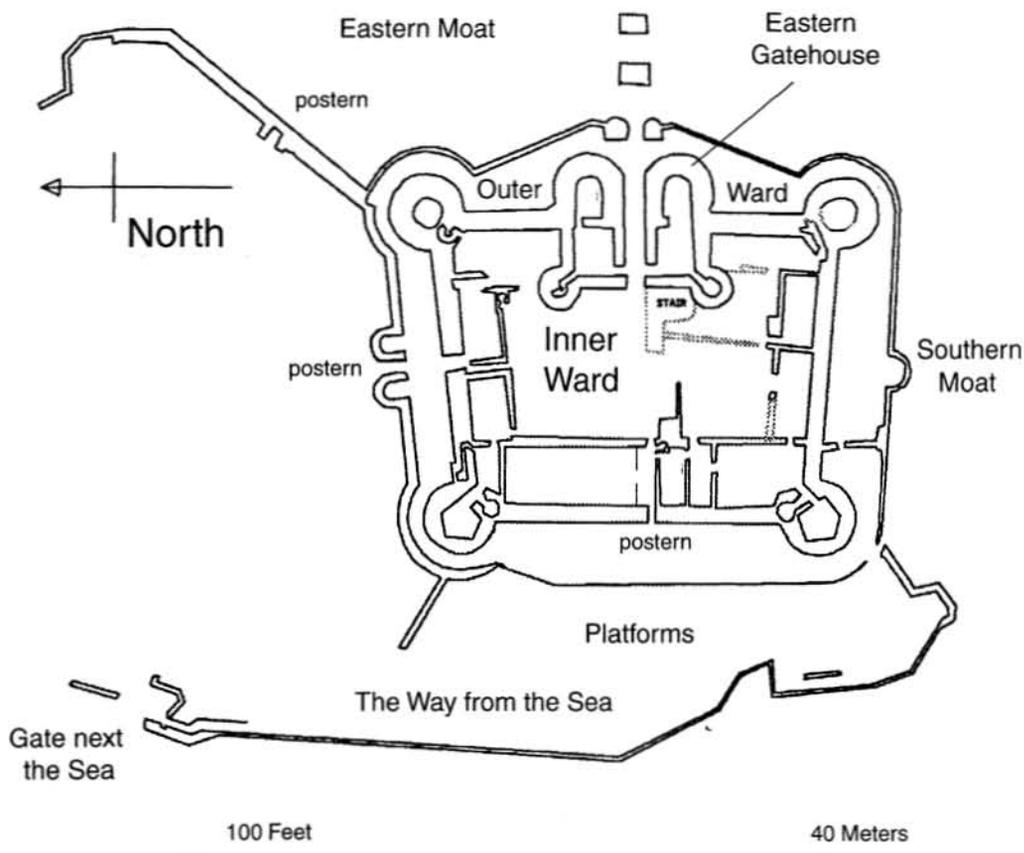
⁷ A. J. Taylor, 'Master James of St. George', *Eng. Hist. Rev.*, 65 (1950), 433–57; A. J. Taylor, 'Harlech castle: the dating of the outer enclosure', *J. Merioneth Hist. Rec. Soc.*, 1 (1951), 202–03; Taylor (1952), op. cit. in note 6; A. J. Taylor, 'The castle of St. Georges-D'Esperanche', *Antiq. J.*, 33 (1953), 33–47; Taylor (1963), op. cit. in note 6; A. J. Taylor, 'Caernarvon castle and town walls', *Archaeol. J.*, 132 (1975), 287–89; A. J. Taylor, 'Castle-building in thirteenth-century Wales and Savoy', *Proc. Brit. Acad.*, 63 (1977), 265–92.

⁸ Edwards, op. cit. in note 6, 38.

⁹ Taylor (1963), op. cit. in note 6, 357.

¹⁰ Edwards, op. cit. in note 6, 43; Taylor (1963), op. cit. in note 6, 375.

¹¹ Taylor (1963), op. cit. in note 6, 360.



————— Digitized directly from *The History of the King's Works Plan*

..... Implied Structures or Foundations

FIG. 3

Harlech Castle — ground floor plan. Digitized from *H. M. Colvin et al., The History of the King's Works (London, 1963), Crown copyright.*

Caernarfon Castle's Eagle Tower's first three floors nearing completion in 1285.¹²

Conwy Castle finished in 1287.¹³

Caernarfon Castle's southern half mostly finished by 1287.¹⁴

Harlech Castle's western towers finished in 1289 — Harlech Castle finished.¹⁵

¹² Taylor (1963), *op. cit.* in note 6, 375.

¹³ Edwards, *op. cit.* in note 6, 38.

¹⁴ Edwards, *op. cit.* in note 6, 49; Taylor (1952), *op. cit.* in note 6.

¹⁵ Taylor (1963), *op. cit.* in note 6, pp. 361, 363.

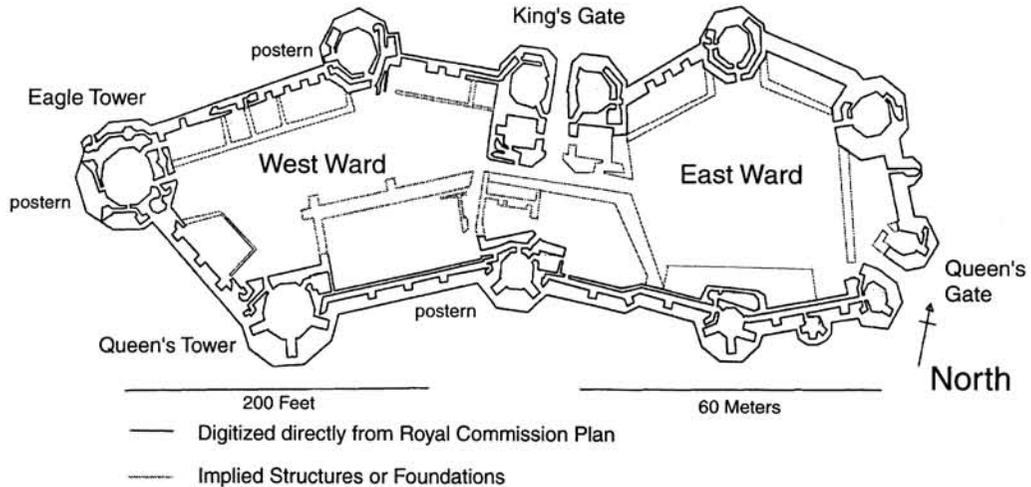


FIG. 4

Caernarfon Castle — ground floor plan. Digitized from RCAHM (1960), Crown copyright.

Beaumaris Castle begun in 1295.¹⁶

Caernarfon Castle's northern half begun in 1295.¹⁷

Beaumaris Castle left unfinished in the 14th century.¹⁸

Caernarfon Castle left unfinished in the 14th century.¹⁹

By considering in particular when each castle was *begun*, it is likely that the castles were planned in the following order: Conwy, Harlech, Caernarfon and Beaumaris. For this reason, the castles will be studied for developmental trends in this sequence.

DATA COLLECTION AND ORGANIZATION

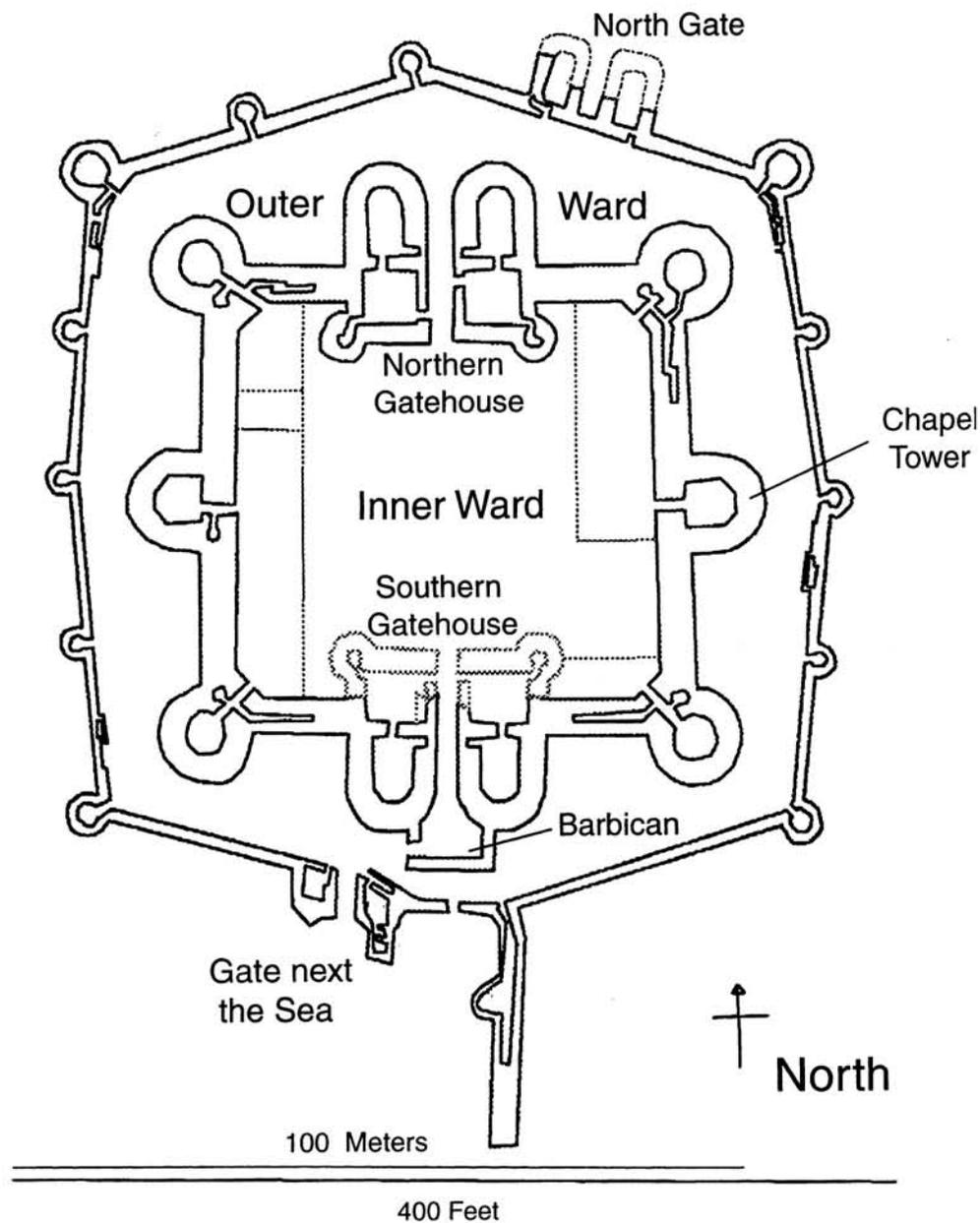
The data collected for this study was that which was both readily accessible and amenable to Feature Analysis and Access Analysis. This included (1) the inter-accessibility of spaces to each other, (2) the number and location of fireplaces, ovens, doors, stairs, windows and garderobes (latrines), and (3) the size and exposure of windows.

¹⁶ Edwards, *op. cit.* in note 6, 29.

¹⁷ Taylor (1963), *op. cit.* in note 6, 378.

¹⁸ Edwards, *op. cit.* in note 6, 30; Taylor (1963), *op. cit.* in note 6, 405.

¹⁹ Edwards, *op. cit.* in note 6; Taylor (1963), *op. cit.* in note 6.



- Digitized directly from Royal Commission Plan
- Implied Structures or Foundations

FIG. 5

Beaumaris Castle — ground floor plan. *Digitized from RCAHM (1937), Crown copyright.*

This information was collected for each castle from plans and descriptions in (1) *Royal Commission* volumes, (2) *CADW: Welsh Historic Monuments* guide books, and (3) *The History of the King's Works*, and finally from personal visits to each castle.²⁰

The information about the inter-accessibility of spaces was organized in an access diagram (see the section below on Access Analysis for a description of this). The information on the various features found in a given room was organized into two databases; one pertaining to attributes of specific features within a room (the Feature database) and one pertaining to attributes of specific rooms (the Room database).

FEATURE ANALYSIS

The first approach used on the four castles was Feature Analysis. The purpose of Feature Analysis is to determine the function of each room in each castle based on the features it contains. The main assumption here is that the 'internal arrangements of a castle reflect the functions which it was intended to serve'.²¹ In other words, qualitative features, such as fireplaces and windows, provide access to certain amenities or resources. Differential access to these amenities or resources can be used to distinguish different functional room types. By identifying a number of amenities or resources (e.g. access to heat, garderobes, good lighting, light exposure, privacy, and depth) and assigning a value to each, an attempt can be made to delineate the resources available to each room.

By deducing what sort of resources would be necessary for the efficient functioning of a room type (e.g. ovens for a kitchen, fireplace(s) for a hall, etc.), a list of expected resources was generated for each functional room type (see Table 1). Based on this list of expected resources, a number of (yes/no) questions were developed to assess whether a given room met the criteria (e.g. Is the lighting good?, Is there a heat source present?, etc.). These questions were then transformed into a decision-tree that would allow a functional designation to be given to a room (see Fig. 6).

This decision-tree was developed independent of the literature on decision-trees as employed in archaeology and on artificial intelligence.²² However, there are a number of similarities between my approach and this literature, including the use of binary questions resulting in bifurcating choices and the fact that positive

²⁰ The Royal Commission on Ancient and Historical Monuments in Wales and Monmouthshire, *An Inventory of the Ancient Monuments in Anglesey* (London, 1937 (1960 reprint)); The Royal Commission on Ancient and Historical Monuments in Wales and Monmouthshire, *An Inventory of the Ancient Monuments in Caernarvonshire: Volume I: East: The Centre of Arllechwedd and the Commote of Creuddyn* (London, 1956); The Royal Commission on Ancient and Historical Monuments in Wales and Monmouthshire, *An Inventory of the Ancient Monuments in Caernarvonshire: Volume II: Central: The Cantref of Arfon and the Commote of Eifionydd* (London, 1960); RCAHM, op. cit. in note 4; A. J. Taylor, *Beaumaris Castle* (3rd edn., Cardiff, 1988a); A. J. Taylor, *Harlech Castle* (3rd edn., Cardiff, 1988b); A. J. Taylor, *Conwy Castle and Town Walls* (3rd edn., Cardiff, 1990); A. J. Taylor, *Caernarfon Castle and Town Walls* (3rd edn., Cardiff, 1993); Taylor (1963), op. cit. in note 6.

²¹ Pounds, op. cit. in note 4, 185; P. A. Faulkner, 'Castle planning in the fourteenth century', *Archaeol. J.*, 120 (1963), 215–35, pp. 223–24; Fairclough, op. cit. in note 1, 355.

²² A. Marshall and G. Marshall, 'A decision-tree approach to the interpretation of archaeological data', *Antiq. J.* 74 (1994), 1–11; R. Quinlan, 'Induction of decision trees', *Machine Learning*, 1 (1986), 81–106.

TABLE 1

THE NECESSARY, PROBABLE AND DEAD-GIVEAWAY CRITERIA USED TO DETERMINE THE FUNCTIONAL ROOM TYPES

Criteria in *italics* were not used in this study. Hall/bedrooms are a compromise room type between halls and bedrooms based on their relative size.

Functional Room Type	Necessary Criteria	Probable Criteria	Dead-Giveaways
Accommodation	no heat source and single access	private latrine	
Bedroom	fireplace, small area and good lighting	<i>private latrine</i>	
Chapel	eastern exposure, good lighting	no heat source, <i>ritual features</i>	
Chapel-related	visual contact with chapel	no heat source, single access, poor lighting	
Guardroom	shallow depth	poor lighting, multiple access	
Guardroom/ accommodation	no heat source, single access, arrow loops		
Hall	large area, heat source (fireplace(s)), good lighting	multiple access, <i>shallow depth</i> , <i>public latrines</i>	multiple fireplaces
Hall/bedroom			
Kitchen	heat source (oven)		
Lobby	multiple accesses	no heat source	
Storage	no fireplace, single access, poor lighting		access via ceiling

answers to the questions produce the best results since negative answers incorporate all cases where the data is negative *and* where it is simply lacking.²³

This decision-tree was created by working back and forth between 'known' functional rooms in each castle and the decision-tree design until the tree segregated the functional room types appropriately. In other words, many rooms in each castle had been previously assigned a function based on historical documentation, their architecture and/or common sense. An analysis of these 'known' functional rooms' internal features was used to develop the appropriate questions and sequence of questions in the decision-tree. The sequence of decisions used in this tree were ordered to distinguish room functions as quickly as possible. Other sequences could have been employed.

After the decision-tree was completed, each room in each castle was run through it to assign the room a function. This included running the 'known' functional rooms through the decision-tree to see if there were any inconsistencies in their previous designation. A few did arise. For example, a possible mis-identification of the function of a room is Caernarfon's supposed 'chapel' on the first floor above the King's Gate entrance passage.²⁴ The decision-tree designated this room as a likely 'hall' mainly because of the fact that the room lacks a window with an eastern exposure — a feature of most (if not all) chapels.²⁵ Therefore, the

²³ Marshall and Marshall, *op. cit.* in note 22, pp. 3, 11.

²⁴ Taylor (1993), *op. cit.* in note 20, 29.

²⁵ Pers. comm., Lawrence Butler.

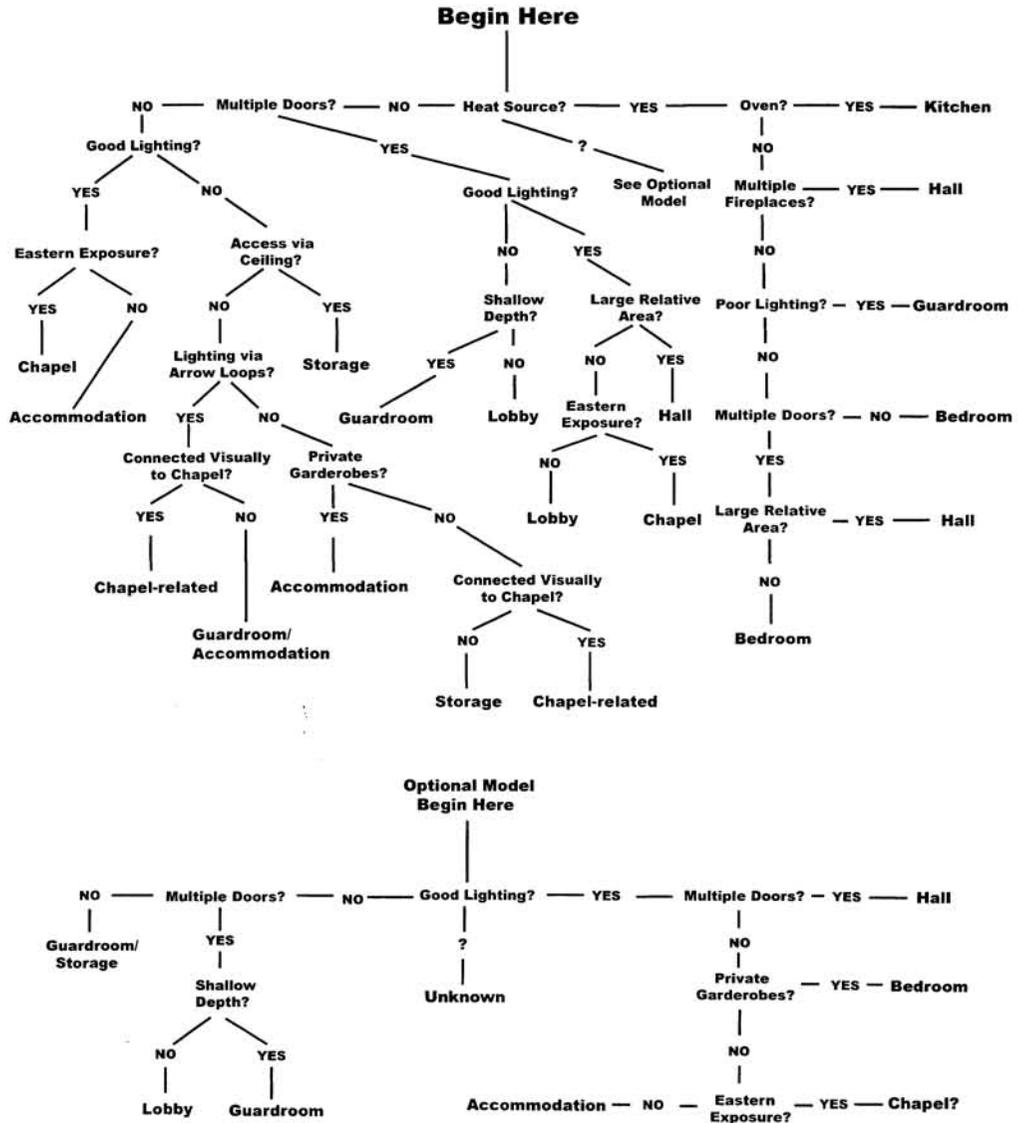


FIG. 6

Function determination decision-tree, with optional model (below).

decision-tree approach raises some doubt as to whether the 'double *piscina* or sink in the east wall' of the room cited by Taylor is sufficient evidence to consider this room a chapel.

After each room was assigned a function, these functions were contextually evaluated, and adjusted if it was clear that the designated function was simply not possible based on other criteria (e.g. a lack of important data related to the room).

Next, the function of each room was recorded in the Room database and on the appropriate access diagram (thereby creating a functionally-annotated access diagram — see the next section). The specific functional designations for each room in each castle will not be presented here due to constraints on space.²⁶ However, the number and percentage of rooms of different functional types will be discussed below in the section on Comparative Analysis.

The main point to be made here is that the Feature Analysis decision-tree approach is superior to informal functional inferences for a number of reasons. First, it requires the researcher to state explicitly the reasons for assigning a certain function to a given room, thereby possibly illuminating issues of functional interpretation. Second, it can suggest possible functions for rooms left uninterpreted in previous analyses. Third, it can raise questions about previous interpretations and suggest reinterpretations of rooms that may have been interpreted erroneously usually in a situation where one piece of evidence is unduly weighted over other conflicting evidence.

Finally, to conclude this discussion of Feature Analysis, I want to make it clear that I am not arguing for the blind application of this particular decision-tree to determine room functions in all castles (let alone all structures). As with any model, it needs to be contextualized and used only as a guide. However, it is argued that researchers should make explicit and apply thoroughly whatever interpretive model they use to infer the function of a space. By doing this, researchers will make it clear how they arrived at their interpretations, not only allowing others to assess those interpretations, but also providing themselves a check to guarantee the consistency of their approach.

ACCESS ANALYSIS

After determining the functions of the rooms in each castle, the interrelationship of these rooms can be considered. In most previous spatial research on castles, the focus has been on the defensibility of the castle in times of war. In contrast to this, some researchers have chosen to focus on the functional relationship of rooms within the castle.²⁷ In particular, Peter Faulkner's development of the spatial analytical method referred to as a *planning diagram*, has provided a perspective of the castle beyond the simple floor plan. By depicting the functional relationships between rooms in a castle, regardless of the floor level, Faulkner was able to emphasize the perspective and interaction of the building's users.²⁸ His planning diagrams give a clear representation of the location, size and shape of rooms (like a floor plan) while also reflecting the 'the social structure of the complete household in residence'.²⁹ His method is particularly useful when trying

²⁶ For these specific functional designations see Mathieu, *op. cit.* in note 5.

²⁷ P. A. Faulkner, 'Domestic planning from the twelfth century to the fourteenth centuries', *Archaeol. J.*, 115 (1958), 150–83; Faulkner, *op. cit.* in note 21.

²⁸ Fairclough, *op. cit.* in note 1, 351.

²⁹ B. M. Morley, 'Aspects of fourteenth century castle design', 104–13 in A. Detsicas (ed.), *Collectanea Historica: Essays in Memory of Stuart Rigold* (Maidstone, 1981), p. 105; Faulkner (1963), *op. cit.* in note 21; Fairclough, *op. cit.* in note 1, 356–57.

to understand the residential and (internal) administrative functions of a castle, especially those with multiple floor levels. This spatial analytical approach was probably the first that could be considered a syntactic approach, meaning that it relied on the assumption that 'the ordering of space in buildings is really about the ordering of relations between people'.³⁰

The better known syntactic approach employed by researchers of buildings in general is popularly known as Access Analysis, or *gamma* analysis. This approach (described in more detail below) was originally developed by Bill Hillier and Julienne Hanson and other colleagues in order to elaborate their theory linking social organization to spatial organization.³¹ However, most researchers have been dubious about *directly equating* spatial organization with social organization.³² Because of this, spatial analysts who have adopted Access Analysis have often done so in a modified or limited manner.³³ These researchers have emphasized the descriptive capabilities of the approach 'to reduce a plan to its essentials'.³⁴ This has helped in the recognition of patterns and variations in patterns, particularly between sites where similarities may have been 'masked by variables such as shape or orientation'.³⁵ For these researchers, Access Analysis, or any formal spatial analysis, is a tool to be used to provide more data, to simplify that data, and to 'try to explore broader ways of seeing'.³⁶

Graham Fairclough was one of the first people to employ a modified form of Access Analysis in castle studies.³⁷ He combined Hillier and Hanson's access diagrams with Faulkner's planning diagrams, thereby conflating the planning diagram's emphasis on 'functional relationships, generally from the viewpoint of someone using the building . . .' with the access diagram's focus 'on an outsider's experience of a building, and thus principally on questions of movement and control, privacy and independence . . .'.³⁸ His access diagrams or, more properly *access/planning diagrams*, are particularly useful when trying to appreciate the

³⁰ B. Hillier and J. Hanson, *The Social Logic of Space* (Cambridge, 1984), 2.

³¹ Hillier and Hanson, *op. cit.* in note 30; B. Hillier, A. Leaman, P. Stansall and M. Bedford 'Space syntax', 343-81 in D. Green, C. Haselgrove and M. Spriggs (eds.), *Social Organization and Settlement: Contributions from Anthropology, Archaeology and Geography* (BAR International Series, 47(ii), Oxford, 1978).

³² R. Samson, 'Introduction', 1-18 in R. Samson (ed.), *The Social Archaeology of Houses* (Edinburgh, 1990), 14; see also M. Batty, 'Review of Hillier and Hanson', *Sociology*, 19 (1985), 161-62, p. 162; M. H. Johnson, *Housing Culture: Traditional Architecture in an English Landscape*, (London, 1993), 31; E. Leach, 'Does space syntax really "constitute the social"?'', 385-401 in D. Green, C. Haselgrove, and M. Spriggs (eds.), *op. cit.* in note 31, p. 400; M. P. Pearson and C. Richards, 'Ordering the world: perceptions of architecture, space and time', 1-37 in M. P. Pearson and C. Richards (eds.), *Architecture and Order: Approaches to Social Space* (London, 1994), p. 30; cf. F. E. Brown, 'Continuity and change in the urban house: developments in domestic space organisation in seventeenth-century London', *Comparative Studies in Society and History*, 28 (1986), 558-90, p. 558.

³³ For example, S. M. Foster, 'Analysis of spatial patterns in buildings (access analysis) as an insight into social structure: examples from the Scottish Atlantic Iron Age', *Antiquity*, 63 (1989a), 40-50; S. M. Foster, 'Transformations in social space: the Iron Age of Orkney and Caithness', *Scot. Archaeol. Rev.*, 6 (1989b), 34-55.

³⁴ M. Locock, 'Spatial analysis of an eighteenth century formal garden', 231-52 in M. Locock (ed.), *Meaningful Architecture: Social Interpretations of Buildings* (Aldershot, 1994), p. 237; R. L. Gilchrist, 'The spatial archaeology of gender domains: a case study of medieval English nunneries', *Archaeol. Rev. Camb.*, 7 (1988), 21-28, p. 26.

³⁵ Locock, *op. cit.* in note 33, 237; Sattleberger, *op. cit.* in note 2, pp. 2, 3, 43.

³⁶ Fairclough, *op. cit.* in note 1, 350; Locock, *op. cit.* in note 34, 235.

³⁷ Fairclough, *op. cit.* in note 1, may have been preceded by Sattleberger's, *op. cit.* in note 2, unpublished work.

³⁸ Fairclough, *op. cit.* in note 1, 351.

defensive organization and symbolic organization of the castle, since remote access is seen both as a sign of protection and as a mark of rank or status.³⁹

In this study, Access Analysis was the second approach used on the four castles. Access diagrams were employed both as a means to provide more data about the castles (i.e. the accessibility of rooms within the castles) and as one framework within which to understand the functional organization of rooms in each castle (the other framework being the castle plans).

The access diagrams were produced with a maximum degree of accuracy (see Fig. 7). The diagrams identify each space within each castle that could be isolated from another space. In other words, passageways and stairs within the castles *were not* represented as connecting lines between rooms represented as symbols (as most published access analysts do). Rather, these structures were treated as spaces in their own right and therefore allotted symbols and places within the diagram. Thus, the connecting lines in the diagrams solely represent direct access between spaces.

This approach was adopted for a number of reasons. Most important was that it more accurately represents all of the spaces in the castles (i.e. there are no non-spaces). Second, from the point of view of spatial analysis, one space is defined by its separation from another space. Therefore any space that seemed likely to be separated from another was treated as a separate space. This can most clearly be seen in the example of the entrance passage of the main gate of a castle. In this approach, the spaces between every obstruction in the passage (e.g. doors and portcullises) are treated as separate spaces because access from one space to the next requires control of the preceding space. As a result, the access diagrams produced for this research are quite elaborate and are therefore not fully reproducible within most publishable contexts.⁴⁰

Though these access diagrams do not follow Fairclough's approach in conflating a planning diagram with an access diagram (i.e. the access diagrams found here do not represent the actual size or shape of the rooms in the castle, nor do they represent the geographical location of the rooms with respect to each other), they are organized to show the relative distance of any given room (or space) from the outside of the castle (found at the bottom of the diagrams). This organization if referred to as *justification*, i.e. where all spaces of a certain depth (in terms of the minimum number of steps taken to reach them from the outside space) are positioned at the same horizontal level.⁴¹ By justifying all of the diagrams from the outside (ignoring minor postern gates), each castle was consistently and simply represented as a defended structure which was seen by the vast majority of the populace only from the outside, and which was intended to be entered only through the main gates.

This form of justification represents the castle in terms of its defensive and symbolic functions. Other forms of justification could be used to emphasize other

³⁹ Faulkner (1963), *op. cit.* in note 21, 228.

⁴⁰ For the full-scale access diagrams see Mathieu, *op. cit.* in note 5.

⁴¹ Foster (1989a), *op. cit.* in note 33, 42.

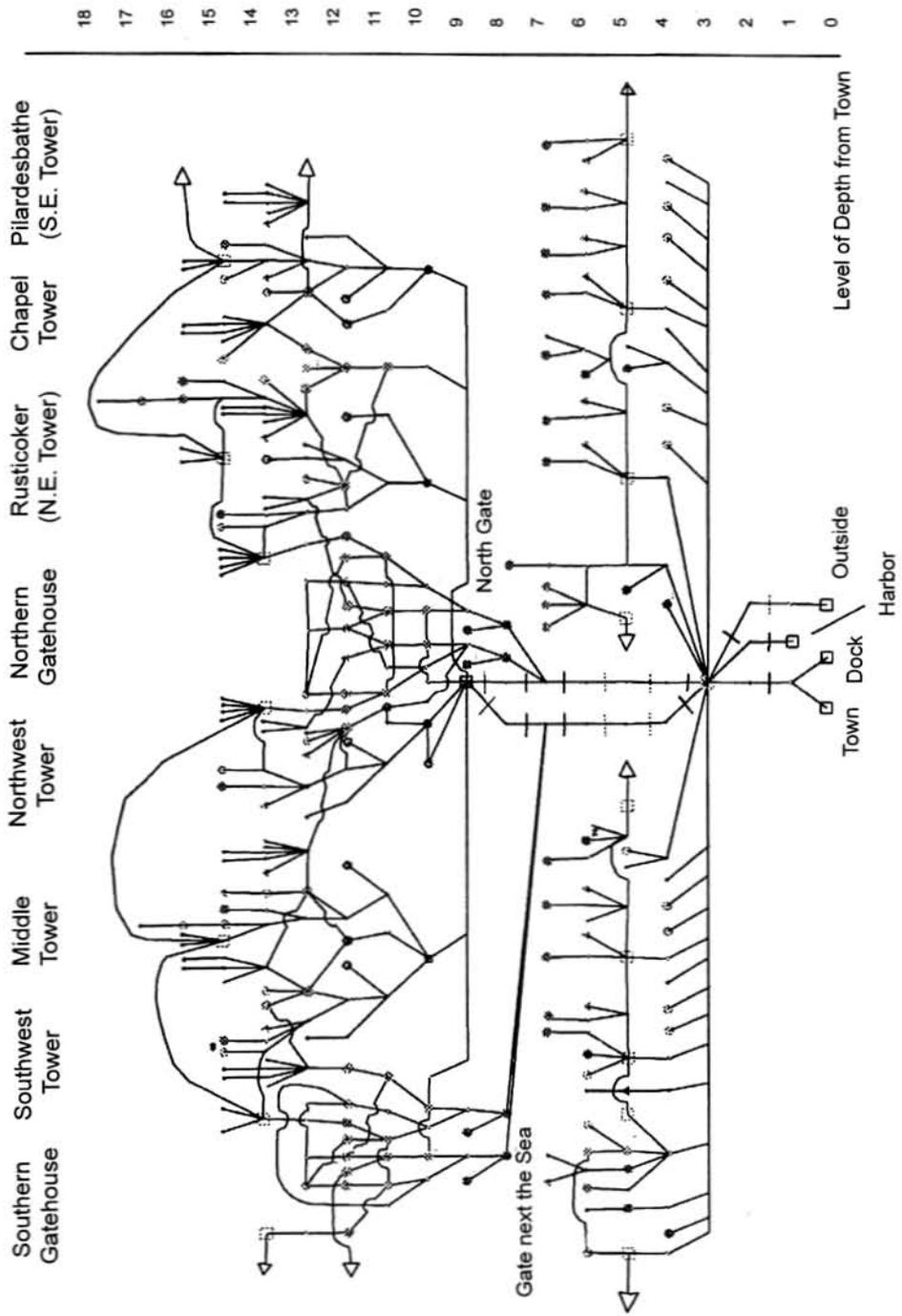


FIG. 7

Beaumaris Castle — intended access diagram. Areas outside the castle walls are at the bottom. The access diagram is justified with respect to these external areas. The numbers along the right hand side of the access diagram label the level of depth of spaces at points along that horizontal.

functions. For example, in order to emphasize the residential function, it would probably be preferable to re-justify the diagrams (e.g. possibly from the hall, kitchen, or bedroom).

For each of the four castles, an access diagram of their actual layout was produced. For Beaumaris and Caernarfon, an additional access diagram of their reconstructed intended layouts was also created.⁴² The access diagrams were used to determine the number of doors in each room which gave access to the outside. This information was added to the Room database, and therefore played a part in the Feature Analysis. As mentioned above, after the Feature Analysis was performed to assign a function to each room in each castle, the appropriate functional designation was then added to each castle's access diagram(s), thereby producing functionally annotated access diagrams. These new diagrams were then analysed to assess the defensive and residential organization of each castle.

DEFENSIVE ORGANIZATION

Before assessing the defensive organization of the four castles it is important to state that this defensive organization is not necessarily an assessment of the defensibility of these castles. Rather, it is an assessment of the organization of that defensibility based on the organization of space.

The defensive organization of the castles was assessed by studying the degree of integration and segregation between the wards of the castle and between structural units within those wards (e.g. gatehouses and towers). In other words, the degree of defensive integration was gauged by looking at (1) how many access points connected the major wards of the castles and what type of access existed (i.e. major gateways, postern gates, or open access) and (2) how many access points connected the towers and gatehouses of each castle to each other and what kind of access existed (i.e. mural passages, wall-walks and/or access through the ward).

At Conwy, all the towers were found to be integrated (i.e. connected) at two levels — the ground and the wall-walk. The eastern and western wards of Conwy were also integrated at two levels and connected at three points — the ground level by a gateway between the wards and the wall-walk level by two defended blocking doors (one to the N. and one to the S.).

At Harlech, the gatehouse and two eastern towers were integrated at two levels — the ground and the wall-walk. The western towers (which were built near the end of construction, under the supervision of a different master mason) were integrated at only one level — the ground.⁴³ Since the western towers are not connected to the wall-walk, as the earlier built eastern towers are, a case can be made that they may be a deviation from the original plan (see below for a similar disjuncture between earlier built features and later built features at Caernarfon).

⁴² For the rationale behind each of the reconstructed intended elements in these intended access diagrams see Mathieu, *op. cit.* in note 5.

⁴³ Taylor (1963), *op. cit.* in note 6, 363–64.

The inner and outer wards of Harlech were integrated at one level by three connection points — on the ground by the massive Eastern Gatehouse and by two modest postern gates (one to the N. and one to the W.).

At Caernarfon, the towers and gates were integrated on a variety of levels from one to four. The most integrated parts were the southern series of towers which were built under the initial scheme (before 1295) and which were integrated at four levels — ground, two mural passages, and wall-walk. The northern series of towers, including the King's Gate (which were built after 1295 under a different master mason), were integrated at two levels — ground and wall-walk. The least integrated parts were the Eagle Tower (which was the first element built in its entirety) and the unfinished Queen's Gate; each of which was integrated with the other towers in the castle at only one level — ground. These variations in the degree of integration of the major parts of the castle suggest that the castle was not completed as intended in its original plan.⁴⁴ This interpretation is emphasized by the fact that the disjunctures in integration occur where the earlier built parts of the castle meet the later built parts (e.g. the Eagle Tower's connective isolation from the S. and N. curtains). In combination with the evidence cited above at Harlech, a good case can be made that new master masons did not necessarily follow the initial plans (if actual ones existed) of the previous masons building the castles.

The eastern and western wards of Caernarfon were highly integrated, particularly since the intervening wall and/or structures between the wards were never completed. Though it is unclear how the wards would have been connected at ground level to each other if these structures had been finished, what is clear is that the wards were integrated at three levels along the S. curtain — two mural passages and the wall-walk, and at at least one level along the N. curtain — the wall-walk (and possibly internally via the King's Gate).

At Beaumaris, the inner ward towers and gatehouses were integrated on three levels — ground, mural passage, and wall-walk. The inner and outer wards of Beaumaris were intended to be integrated at one level via two points, the Northern Gatehouse and the Southern Gatehouse. However, the castle as it was actually built had only one connection between the two wards, the unfinished Southern Gatehouse. The Northern Gatehouse's entrance passage was blocked by a wall, effectively turning the structure into a great tower.

The significance of the defensive organization of the castles will be discussed below under the Comparative Analysis.

RESIDENTIAL ORGANIZATION

The residential organization of the castles was assessed by looking at five aspects of their residential architecture; (1) the absolute maximum number of separate households that each castle could have accommodated based on the

⁴⁴ The true intended plan of Caernarfon castle was abandoned in 1295 (Taylor (1975), *op. cit.* in note 7, 289) when the supervision of the castle construction was entrusted to a new master mason (Taylor (1952), *op. cit.* in note 6, 33; Taylor (1963), *op. cit.* in note 6, 378).

assumption (following Faulkner) that a 'household' must consist of at least one bedroom and probably also include some sort of public 'receiving' room like a hall or hall/bedroom, (2) the likely number of separate household accommodations available in each castle based on the assumption that a 'household' probably consists of a number of rooms with at least one of them being a hall, (3) the focal household in each castle, (4) other facilities and accommodation in each castle, and (5) the integration of the residential organization.

The following discussion of the number of households contained within each castle is not meant to imply that all of these households were in use at the same time. Since it would have been rare for the royal household to descend upon any of these castles, much of the time, much of the space and rooms within these castles were not in use. Rather, the discussion is intended to highlight the *potential* number of households the castles were intended to accommodate if the need arose, thereby providing insight into the residential functioning the King required of and had planned for in his castles.

At Conwy, there could have been a maximum of six households (one major one in the eastern ward inhabiting the three southern and easternmost towers, two medium-sized ones in the two northern towers in the western ward, and three minor ones in the remaining towers: i.e. the two southern ones in the western ward and the north westernmost one in the eastern ward). The likely number of households accommodated at Conwy was probably two (one major one in the eastern ward and one in the western ward, for the constable, near the main gate). The major eastern ward household was obviously the focal household. It had the deepest accommodation in the castle, its own kitchen, a number of public rooms, a private chapel and access to the watergate (giving access to the river and the sea). There were three kitchen facilities at Conwy (the one just mentioned in the eastern ward and two more in the western ward) which presumably split the duties of food preparation. The existence of a chapel in the Great Hall in the western ward has been suggested.⁴⁵ Accommodation for the garrison was likely to be in the towers in the western ward. The residential organization of the castle was such that the eastern ward could be isolated from the western ward when it was not needed. Presumably this isolation would never be complete since the watergate entered the eastern ward.

At Harlech, there could have been a maximum of seven households (two major ones in the Eastern Gatehouse, one in each corner tower and possibly one over the hall in the inner ward). The likely number of households accommodated at Harlech was probably two or three (the two major ones in the Eastern Gatehouse and possibly one over the hall in the inner ward). It is unclear which household was the focal household. If there was a household in the inner ward, it was likely the focal household because it would have been the largest and most centrally located. If on the other hand, it did not exist, then the focal household was clearly one of the ones in the Eastern Gatehouse (the other being for the constable). These households had their own private chapels, the only private garderobes in the castle,

⁴⁵ A. J. Taylor, 'The town and castle of Conwy: preservation and interpretation', *Antiq. J.* 75 (1995), 339-63.

the highest towers and a number of public rooms. There were two kitchen facilities in the inner ward which probably worked in tandem to feed the entire castle. The inner ward also housed a chapel that was probably used by the garrison. Accommodation for the garrison was most likely in the towers around the inner ward. The residential organization of the castle was such that the Eastern Gatehouse could oversee control of the entire castle easily, even if the western towers were sealed off.

At Caernarfon, there could have been a maximum of ten households (two in the Eagle Tower, one in the King's gate, two in the Queen's Tower, and one in each of the other towers). The likely number of households accommodated at Caernarfon was probably two to four (the two in the Eagle tower, and maybe one in the King's Gate and one in either the Chamberlain's Tower or the Queen's Tower). The Eagle Tower clearly housed the focal household. This is demonstrated by it having the biggest, best and deepest accommodation, a high percentage of private garderobes, access to the largest public rooms in a tower, access to the highest tower (and also the one with the most parapets), and control over the water gate (a postern which gave access to the river and the sea). All the households were served by one kitchen, but at least five potential households could have had at least one private chapel. Accommodation for the garrison was plentiful in the wards and likely in many of the towers also. The residential organization of the castle was such that many rooms that may not have been needed still had to be kept open in order not to disrupt the flow of movement throughout the castle. The major exception to this was the Eagle Tower, which was physically segregated from the rest of the castle, thereby making it easy to seal off, for example, when the King was not in residence.

At Beaumaris, as it was intended, there could have been a maximum of eleven households (one over the Gate-next-the-Sea, one over the North Gate, two in both the Northern Gatehouse and the Southern Gatehouse, and one in each of the towers around the perimeter of the inner ward, excepting the middle one on the east side, the Chapel Tower). The likely number of households accommodated at Beaumaris, as it was intended, was probably four or five (two in each of the inner ward's gatehouses and possibly a major one along the eastern side of the inner ward incorporating the eastern towers).⁴⁶ If there was no hall and chamber block along the eastern side of the inner ward to function as the main residence, then the Northern Gatehouse clearly accommodated the focal household. This is demonstrated by it having the best public rooms in the castle and access to the only two private garderobes in the inner ward. In addition, it was the largest, highest, and most finished, 'unique' architectural element in the inner ward. All the castle's households were served by one kitchen and apparently one public chapel. The

⁴⁶ As it was constructed, Beaumaris could have had a maximum of only eight (smaller) households. The one above the North Gate and the ones on the second floor of the Northern and Southern Gatehouses were never finished. Also, the first floor one in the Southern Gatehouse lacked its receiving rooms and the five possible households in the inner ward towers lacked their second floor rooms. As constructed, Beaumaris probably had only two households (the one over the Gate-next-the-Sea and one major one on the first floor of the Northern Gatehouse).

absence of any private chapels is marked. Accommodation for the garrison would have been plentiful in the outer ward and likely also in the towers of the inner ward. The residential integration of the castle was such that no one major part could be closed off and left unused. However, the access to practically every room (apart from those in Northern and Southern Gatehouses) was off a public passage or wall-walk, thereby allowing anyone of them to be closed off when not needed (e.g. when only the constable was in residence), without disrupting the access flow of the building.

By performing an Access Analysis on each of the castles (particularly after having performed a Feature Analysis on each), a better understanding of their functional organization has been achieved. In particular, this approach has allowed an assessment of the castles' defensive integration, their household organization (both maximum potential and likely potential), and their wider residential organization. With such detailed appreciations of each castle's functional organization, we can now turn to our Comparative Analysis of the four castles.

COMPARATIVE ANALYSIS

The final approach used on the four castles was a Comparative Analysis. Though such an analysis of two or more castles is by no means new, the comparisons performed here were done in a number of new ways. First of all, using the sequence of castle construction described above, the four castles were compared through the use of a table, a cumulative graph, and access diagrams to see any developmental trends. Second, the same methods were used to compare the extant structures of Beaumaris and Caernarfon with their intended structures in order to delineate any differences between their actual and intended functioning and organization.

In each of the following subsections, there will be a discussion of the method employed (if not previously described), the trends or differences noted by comparison of the castles, and possible interpretations for these trends and differences. These interpretations should be viewed as new working hypotheses that may direct future research. In particular, some of the interpretations are presented as an initial assessment of functional aspects of these castles. It is hoped that these observations will come to mean more when they can be compared to similar analyses of other castles in the future.

COMPARING THE FOUR CASTLES: THE TABLE

In order to compare the four castles for developmental trends, a table was produced (Table 2) which shows the number and, more importantly, the percentage of major room types found in each castle.⁴⁷ This was done by grouping the

⁴⁷ Table 2 gives the traditional number and percentage of functional room types for Conwy. The most recent reinterpretation (Taylor (1995), *op. cit.* in note 45) sees the Great Hall in the outer ward as actually consisting of one chapel, one storage space, two bedrooms and a hall. This interpretation would change the numbers or percentages in the table resulting in a slightly higher percentage of private, accommodation, storage and chapel space and a slightly lower percentage of public, guardroom and kitchen space. These new percentages do not, however, effect the trends noted and so they were not used in this study.

TABLE 2

THE NUMBER AND PERCENTAGE OF MAJOR ROOM TYPES IN EACH CASTLE

The percentages in the table exceed 100% since most of the room type categories overlap. These numbers and percentages deal with rooms, not the amount of space in rooms. Numbers and percentages in *italics* represent those considered to be exceptions to the norm. a. Public rooms consist of halls, hall/bedrooms, and lobbies. b. Private status rooms consist of hall/bedrooms and bedrooms. c. Accommodation consists of hall/bedrooms, bedrooms, accommodations, and guard/accommodations. d. Guardrooms consist of guard/accommodations, guardrooms, and guard/something rooms. e. Storage space includes prisons. f. Chapel space includes chapels and chapel-related rooms. g. Kitchen space includes bakehouses and breweries.

Major Room Types	Conwy	Harlech	Caernarfon (as intended)	Beaumaris (as intended)	Caernarfon (as extant)	Beaumaris (as extant)
a. Public Rooms	9 (17.3)	12 (27.9)	28 (30.8)	30 (30.0)	25 (31.3)	15 (20.5)
b. Private Rooms	16 (30.8)	12 (27.9)	16 (17.6)	25 (25.0)	16 (20.0)	11 (15.1)
c. Accommodations	22 (42.3)	15 (34.9)	35 (38.5)	44 (44.0)	34 (42.5)	30 (41.1)
d. Guardrooms	10 (19.2)	3 (7.0)	19 (20.9)	29 (29.0)	14 (17.5)	25 (34.2)
e. Storage Space	8 (15.4)	9 (20.9)	8 (8.8)	13 (13.0)	8 (10.0)	13 (17.8)
f. Chapel Space	3 (5.8)	7 (16.3)	11 (12.1)	3 (3.0)	10 (12.5)	3 (4.1)
g. Kitchen Space	3 (5.8)	2 (4.7)	1 (1.1)	1 (1.0)	1 (1.3)	1 (1.4)

'functional room types' produced by the Feature Analysis into 'major room types'. These latter classifications overlap in some instances, expressing the multiple functions of some rooms within the castles. The new classifications grouped the functional room types as follows: halls, hall/bedrooms, and lobbies were classed as *public rooms*. Hall/bedrooms and bedrooms were classed as *private rooms*. Hall/bedrooms, bedrooms, accommodations, and guard/accommodations were classed as *accommodations*. Guard/accommodations, guardrooms and guard/something were classed as *guardrooms*. Storage, including prisons, were treated as *storage space*. Chapels and chapel-related rooms were classified as *chapel space*. Finally, *kitchens* were treated as their own category.

By laying out the percentage of major room types for each castle side by side with the sequence of construction moving from left to right, constants or trends may be detected. Note that the intended versions of Caernarfon and Beaumaris are given pre-eminence in the comparison since it is the developmental trends of how the castles were conceived rather than how they were built that is of most interest. The values given in the table for the actual versions of these two castles will be discussed later. The constants and trends noted in the table were:

Trend 1 Public Rooms. With the exception of Conwy (17.3%), the evidence shows that about 30% of the rooms in each castle was intended to fulfil a public function.

Trend 2 Private Rooms. With the exception of Caernarfon (17.6%), at least 25% of the rooms in each castle was intended to fulfil a private function.

Trend 3 Accommodations. All four castles have at least 35% of their rooms fulfilling an accommodational role.

Trend 4 Guardrooms. With the exception of Harlech (7.0%), at least 20% of the rooms in each castle was intended to fulfil a guardroom function.

Trend 5 Storage Space. With the exception of Caernarfon (8.8%), at least 13% of the rooms in each castle functioned solely in a storage capacity.

Trend 6 Chapel Space. Beaumaris had the smallest percentage of chapel space of all four castles and seems to have been the end result of a downward trend in Chapel Space.

Trend 7 Kitchen Space. There seems to have been a trend towards the unification of cooking facilities into one room.

What can be drawn from these observations? First of all, Trend 3 shows that accommodation was an important function performed by all four of these castles, with the final castle built, Beaumaris, having the highest percentage of accommodational rooms (44%), if it had been finished. Second, Trends 1, 2, 4, and 5 suggest that when comparing the castles to each other, the first three castles which were built seem to have been exceptional (or deficient) in the percentage of at least one major room type. For example, Conwy seems to have been lacking in public rooms, Harlech seems to have been lacking in guardrooms, and Caernarfon seems to have been lacking in both private rooms and storage space. Third, Trends 6 and 7 suggest that Beaumaris's low percentage of chapel space and kitchen space was the result of a consolidation of these specific functional room types into fewer rooms or just a single room.

Bringing all these trends together, and also considering the symmetrical layout of Beaumaris, a good case can be made that Beaumaris should be considered the ideal castle type toward which the designer (Master James) was working. Along the way, he overcame apparent deficiencies that existed in the previously designed and built castles. If we take Beaumaris as the exemplar of late 13th-century castle design (as many researchers do), what can we say about late 13th-century castle functioning? First, there seems to have been a trend towards the unification of kitchen and chapel facilities, suggesting an increased efficiency of the use of space and the expenditure of effort in castle daily life. Second, the ideal castle dedicated roughly 30% of its rooms to public functions, 25% to private functions, 45% to accommodations, 30% to guardroom functions, about 15% to storage, and only about 5% to chapel, kitchen and other very specific functions.⁴⁸

COMPARING THE FOUR CASTLES: THE CUMULATIVE GRAPH

Cumulative graphs are frequently used in Palaeolithic archaeology to illustrate the percentage of stone tool types found in an assemblage. By graphing these percentages in a cumulative fashion (i.e. by adding the percentage of one tool type to the percentages of all the previous tool types shown in the graph), the researcher is often able to show functional differences between assemblages. These functional differences are indicated by discrepancies in the slope of the line as it passes over a

⁴⁸ It should be borne in mind that these functional categories overlap in the sorts of rooms they include.

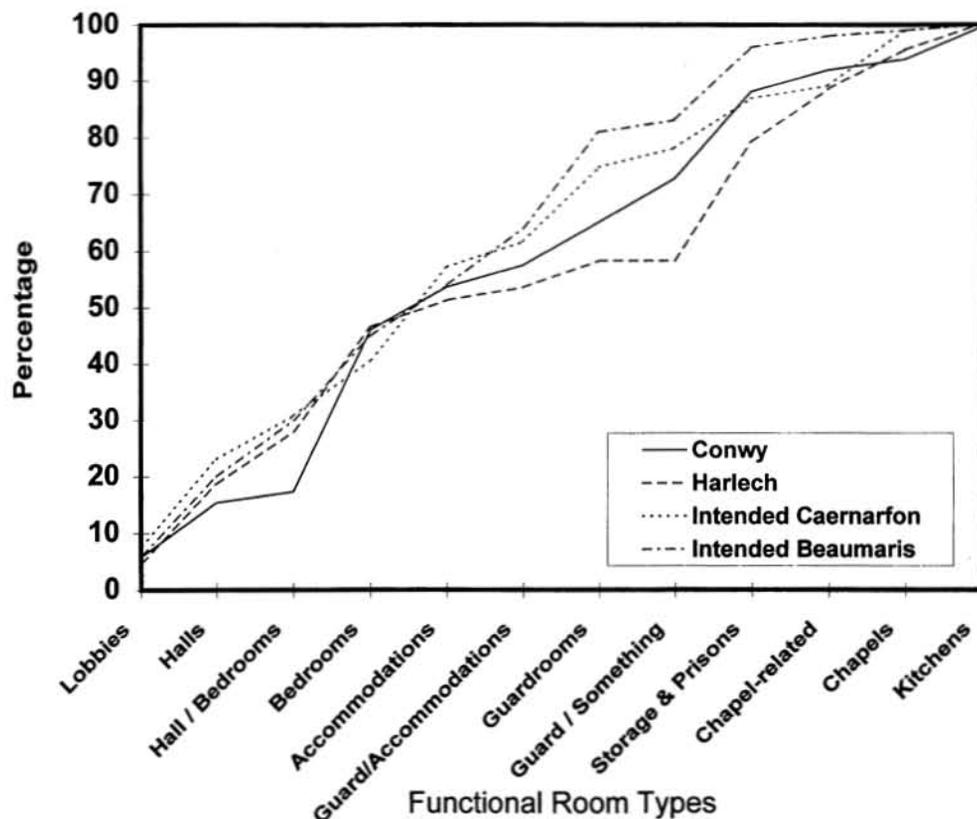


FIG. 8

Cumulative graph of the percentage of functional room types.

specific tool type. For example, a steep slope represents a large percentage of the type(s) being passed over by the line. In contrast, a horizontal line would indicate no examples (or a very small percentage) of the type(s) being passed over by the line.

By using a cumulative graph in this study, it was hoped that distinctions between the castles in terms of the percentage of functional room types at each castle could be highlighted in a way that would not be as evident from the use of tables of numbers and/or percentages. The cumulative graph shown here (Fig. 8) compares the four castles as intended (i.e. Conwy, Harlech, Intended Caernarfon, and Intended Beaumaris). It is organized to show the functional room types along the x-axis in the following order: lobbies, halls, hall/bedrooms, bedrooms, accommodations, guard/accommodations, guard/something, storage and prisons, chapel-related, chapels, and kitchens. The purpose of this organization was to have a general progression from very public rooms (e.g. lobbies and halls) to less public rooms (e.g. hall/bedrooms) and then to private rooms (e.g. bedrooms and

accommodations) and finally into more functionally specialized rooms (e.g. storage and prisons, chapels and kitchens).

The major constant or trend that is apparent in this graph is that all four of the castles had nearly the same total percentage (about 45%) of high-status room types. This is evidenced by the convergence of all the lines (representing the cumulative percentage of functional room types up to that point) near the 45% mark. If chapel space is considered a high-status room type, then the castles appear to be divided 50:50 between high-status rooms (i.e. lobbies, halls, hall/bedrooms, bedrooms and chapels) and low status (practical function) rooms (e.g. accommodations, guardrooms, storage and service rooms like kitchens). Though this 50:50 split in the percentage of status room types may not be surprising, it would be interesting to perform comparative assessments on other buildings from other places and/or periods. This could lead to a better understanding of the similarity or dis-similarity of other buildings which are considered castles or are often compared to castles (e.g. forts and other defended sites).

COMPARING THE FOUR CASTLES: THE ACCESS DIAGRAMS

In the section on Access Analysis above, the defensive and residential organization of each of the castles was assessed. With that analysis in mind, a comparison of the four castles' defensive organization suggests that the major structural units within the castles (e.g. the towers and gatehouses) went from being integrated at two levels at Conwy and Harlech (as apparently intended — evidenced by the initially built eastern half of the castle) to being integrated at *at least* three levels as at Caernarfon (as apparently intended — evidenced by the four levels of integration of the initially built southern half of the castle) and Beaumaris. Despite the very striking similarities between the floor plans of Harlech and Beaumaris and between Conwy's plan and Caernarfon's plan, *in terms of their defensive organization*, Harlech is actually more similar to Conwy while Beaumaris is more similar to Caernarfon. This would seem to suggest that in planning the two later castles, more attention was paid to the defensive organization of the castles regardless of their formal layout. This is interesting because it raises the issue that large scale (visually-obvious-from-a-plan-view) formal differences between castles may have been of less importance to the designers and users of castles than other smaller scale (visually obscure) differences. This realization suggests the need to reconsider the importance that scholars have placed on many of the more obvious formal differences between castles.

A comparison of the residential organization of the four castles reveals a trend over time towards a higher absolute maximum and likely number of potential households at each castle. The maximum number of potential households that each castle could have accommodated increased from six at Conwy, to seven at Harlech, ten at Caernarfon and eleven at Beaumaris (as it was intended). Similarly, the probable number of potential households that could have been accommodated at each castle increased over time from two at Conwy to two or three at Harlech, two to four at Caernarfon and four or five at Beaumaris (as it was intended). These increases in both the maximum and the likely number of potential households that

could have been accommodated at the castles most likely reflect the increasingly hierarchical social organization of late 13th-century society — particularly of those elements who resided in the castles. This would seem to add support to Faulkner's argument that there was increased household organization in castles in the late 13th century which flourished in the 14th century.⁴⁹

Finally, another trend in residential organization is that the castles progressed from a fairly segregated organization at Conwy, where each ward could function separately, to a much more integrated organization at Harlech, Caernarfon and Beaumaris. With respect to the latter two, Caernarfon and Beaumaris, their integration evolved from an inefficient integration to a more efficient integration. In other words, whereas Caernarfon was integrated in such a way that many rooms that may not have been needed still had to be kept open in order not to disrupt the flow of movement throughout the castle, Beaumaris was integrated in a way that allowed unneeded rooms to be closed off without disrupting the flow of traffic through the building.

Combining the trend towards increased defensive integration with the trend toward increased residential integration, we can discern a greater concern by the designer with the rational organization of space in these castles. When we further combine this with the trend noted above concerning the consolidation of kitchen and chapel facilities (especially at Beaumaris) we can see a more general trend towards the increased efficiency in the organization and structure of these buildings.

COMPARING BEAUMARIS AND CAERNARFON: ACTUAL AND INTENDED

The final Comparative Analysis to be carried out here is a comparison of the actual structures of Beaumaris and Caernarfon with their structures as they were originally intended to have been built. Both of these castles were left unfinished in the 14th century, most likely due to Edward I's financial situation (he was heavily in debt) and his shifting of interest from the consolidation of Wales to his invasion of Scotland. This comparison was performed assuming that the reconstructed intended plans of Beaumaris and Caernarfon are accurate.⁵⁰ The comparison involved the analysis of (1) the last four columns of Table 2 discussed above, (2) cumulative graphs like the ones discussed above (Fig. 8) which compared the actual versions of each castle beside their intended versions, and (3) access diagrams of both versions of each castle (see Fig. 7 for Beaumaris' ideal access diagram). Without going into the descriptive detail outlined above when comparing the four castles in a developmental sequence, the results of the Comparative Analysis follow.

At Caernarfon, the table and the cumulative graph showed that there would have been little difference in the percentage of functional room types between the

⁴⁹ Faulkner (1963), *op. cit.* in note 21, 221.

⁵⁰ See Mathieu, *op. cit.* in note 5. The 'intended form' of Caernarfon represented in the access diagrams does not reconstruct the pre-1295 plan, but rather represents the castle as it was built, with the addition of intended, but unfinished, structures which are relatively clearly evidenced by the surviving architecture.

intended and actual forms. The major differences between Caernarfon's intended and actual forms were seen in the access diagrams. The castle as envisaged would have been *more* defensible against access through the King's Gate, but its eastern ward would have been *less* defensible overall since there would have been access from both the King's Gate and the Queen's Gate. The defensive organization of Caernarfon as originally envisaged would have had more integration between its towers, probably consisting of four levels of inter-connectability as seen in the (earlier built) southern half of the castle. Caernarfon's intended residential organization would have had a true division between its two wards, possibly increasing the functional distinction between the two wards.⁵¹

At Beaumaris, the table and cumulative graph showed that the intended form of the castle would have had a higher percentage of high-status public and private rooms (halls, hall/bedrooms, and bedrooms) and a lower percentage of low-status accommodations, guard/accommodations, and storage rooms. In other words the intended structure would have appeared as more of a castle/palace and less as a garrisoned military outpost. In terms of defensibility, the intended structure would have been *more* defensible in terms of the height of its inner curtain wall and towers. However, in terms of normal entry into its wards, if gateways are more vulnerable to attack than curtain walls, then the castle as envisaged may have been *less* defensible due to the additional (unblocked) gates into the outer ward (North Gate) and inner ward (Northern Gatehouse). It does not appear that Beaumaris would have been any more or less defensively organized if it had been finished. The major difference would have been in its residential organization. Beaumaris would have been able to accommodate either more households or larger ones, and it might have had its focal household on the eastern side of the inner ward, rather than in the Northern Gatehouse.

Finally, the intended plans of both castles indicate that there was a concern that both castles have a direct access to the outside that did not lead into their attached town. At both Caernarfon and Beaumaris, the intended plans include a second major gateway into (or out of) the castle that would have provided access to the countryside without going through the town. The reason for such an element in these castle plans is unclear. It could involve issues of defence (e.g. access to the land outside the town to launch a sortie against an enemy or to greet a relieving army if the town had been occupied by an enemy) and/or symbolic display (e.g. another major architectural feature where symbolism could be used to bolster the status and power associations of the Crown). It is interesting to note, however, that when Edward I's finances took a turn for the worst and while his attentions were focused elsewhere (Scotland), it was these extra gates which were left unfinished. This might point to a lack of any real need for such a facility, or possibly even to second thoughts about the advisability of multiple entrances to the castle, particularly if they circumvented the protective town walls. In particular, at Beaumaris the blocking of the Northern Gatehouse entrance and the addition of a

⁵¹ For a discussion of the wards' functional distinctions see J. R. Mathieu, 'A new interpretation of Caernarfon castle', *Medieval Life*, 9 (1998), 11-15.

barbican in front of the Southern Gatehouse (which seems to have been built in the early 14th century as an afterthought) might lend further support to the argument that the castle's inhabitants reassessed the advisability of having a castle with too many entrances.⁵²

CONCLUSION

The overall approach adopted in this study has involved the use of a number of spatial analytical approaches on the architectural remains of four castles. Feature Analysis, employing a decision-tree, was used to determine the likely function of each room in each of the castles. Access Analysis, employing access diagrams, was used to determine the functional (both defensive and residential) organization of each of the castles. Finally, a Comparative Analysis, employing a table, a cumulative graph, access diagrams, and the castle floor plans, was used to note (a) developmental trends in the design, construction, and intended use of the castles and (b) differences between the design, construction, and use of the intended castle structures and the castle structures as they were actually built.

The Comparative Analysis of the castles suggested that the first three that were built (Conwy, Harlech and Caernarfon) may have been 'deficient' in terms of the percentage of rooms performing certain functions. In comparison to these three, Beaumaris may have been the ideal castle towards which the designer was working. This ideal dedicated roughly 30% of its rooms to public functions, 25% to private functions, 45% to accommodations, 30% to guardroom functions, about 15% to storage, and about 5% to chapel, kitchen and other very specific functions. Overall, all four castles seemed to be divided 50:50 in terms of high-status rooms and low-status, practical function rooms. Though at present the significance of these percentages remains in doubt, they may eventually highlight some significant aspect of the use of space in these castles, particularly when future comparisons can be made with other buildings that have been assessed in a similar manner.

The major developmental trends noted during the Comparative Analysis were (1) a trend towards more defensively and residentially integrated castles, (2) a trend towards the accommodation of more potential households in the castles (both in terms of the maximum number and the likely number), and (3) a trend towards the more rational and/or efficient organization of space within these castles, seen especially in the consolidation of kitchen and chapel facilities, and the increased defensive and residential integration.

The Comparative Analysis of the intended castles of Caernarfon and Beaumaris with their actually built forms revealed the following. Caernarfon would have been better defensively integrated in its intended form (though not necessarily more defensible) and it may have had a stronger functional distinction between its wards. Beaumaris would have been much more of a high-status residential structure if it had been finished (rather than the garrison-like structure we have). Its defensive integration would have been the same, however, its defensibility

⁵² Taylor (1988a), *op. cit.* in note 20, 12.

would have been improved against attack along its curtain walls, but possibly reduced against attacks aimed at its entrances.

Finally, the Comparative Analysis, in particular the assessment of the intended residential organization of Beaumaris, would seem to contradict Michael Thompson's subdivision of the four castles into two primary functional groups: residences (Caernarfon and Conwy) and garrisons (Beaumaris and Harlech).⁵³ From the analysis presented above, the four castles seem clearly to have all been intended as residences, rather than garrisons. Though their later use, especially as seen at the unfinished Beaumaris, was as garrisons, this should not lead us to assume that their original intended function was as a garrison. Thompson's functional distinction should therefore be discarded. In its place an appreciation of the chronological development of the spatial organization of these castles should be emphasized, particularly noting the minor importance played by the actual formal plan of these castles in this improved spatial organization.

To conclude, the analyses employed and the interpretations suggested in this study raise many new questions for further research. In particular, an assessment of the usefulness of the Function Determination Decision-Tree on other castles would be interesting. Would the decision-tree need to be adapted for different periods or places? Would it suggest new interpretations for rooms in some castles or offer further confirmation of their functional interpretation?

A related question might focus on the percentage of functional room types generated by the decision-tree for other castles. Do the trends noted over the time period represented by these four castles (c. 1283–1300) correspond with long-term trends? Or do these castles stand out as something unusual, possibly even the representatives of a type of castle only produced by this particular master mason? How do other castles compare in terms of their functional room type percentage? Are all castles split evenly along high- and low-status lines?

Similarly, would the use of access diagrams on other castles result in a better understanding of their spatial organization? Are the organizational trends identified here typical of wider trends in castle development or are these an aberration? Were these castle designs truly innovative and cutting-edge, or were they simply a small step in a long sequence of changes? Are these changes associated with the rationalization of spatial use or do they reflect other trends in medieval society (e.g. increased social differentiation)?

The types of comparisons that could be made using the 'new ways of seeing' illustrated here are numerous. My hope is that these new approaches will be more widely adopted in the future analysis of castles (and other structures) and that even more new approaches will be developed. I hope that this study has shown the potential usefulness of employing these new methods on old castles, and thereby making a case for the re-examination of other old data sets through the lens of new theories and methods.

⁵³ M. Thompson, *The Rise of the Castle* (Cambridge, 1991), 122.

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