

Vale of Leven: Britain's First National Health Service Hospital, 1951–55

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ABSTRACT

While some of the major hospitals built in Britain following the creation of the National Health Service have attracted scholarly attention, Vale of Leven — the first NHS hospital — has been largely overlooked. Erected in 1952–55 at Alexandria, to the northwest of Glasgow, it was built with funds provided by the civil defence budget and was designed as both a potential emergency hospital during wartime and a peacetime general hospital to meet the needs of the local population. The architect, Joseph L. Gleave (1907–65), regarded the project as an opportunity to design a hospital based on the principles of the modern movement and, when it opened, it was applauded as the first 'modern' hospital built by the NHS. As with the emergency hospitals built at the outset of the second world war, the design was based on a separation between circulation (the 'spine') and accommodation, which comprised standardised but expandable modular units plugged into the spine, allowing flexibility for future change. Although Vale of Leven Hospital was not replicated, aspects of its planning and design were influential in the short term, and its legacy can be seen in the more compact standardised model of the nucleus hospitals developed in the 1970s.

In histories of hospital architecture in Britain, the 1950s is something of a missing decade, eclipsed by the innovations that took place in the 1960s and 1970s. Yet, in the ten years that followed the creation of the National Health Service in 1948, there was an intense effort by architects — many brought up on the tenets of the 'modern movement' — to create new designs that would meet the demands of the new health service. This article, which builds on recent work on the rise of the modern hospital by Annmarie Adams and Jeanne Kisacky, focuses on the first new hospital to be built by the NHS, Vale of Leven Hospital at Alexandria, northwest of Glasgow.¹ Here the architect Joseph L. Gleave (1907–65) sought to reconcile the need for flexibility with economy by treating the design as a 'spine' (for circulation) to which standard units (wards and other facilities) were attached, a concept descended from the emergency hospitals built following the outbreak of the second world war. Made possible by finance supplied under the civil defence budget — a response to the perceived threat from the Soviet Union — and completed in 1955, Vale of Leven Hospital was hailed as a new type of modern hospital.

The brief for the design was twofold. It was to be reproducible, with a standardised unit that could be built quickly and replicated on any site in Scotland as part of the

cold war civil defence plans; but also to function primarily as a peacetime hospital, addressing the need for hospital accommodation in the district. Returning to first principles and considering the essence of the problem, Gleave identified flexibility of use as the most important criterion for a modern hospital. He sought to achieve this within a standard envelope, the only fixed dimension being the size of the unit and ceiling heights; moveable partition walls allowed maximum flexibility of internal arrangement and the potential for subsequent rearrangement to meet changing medical needs. The hospital was also readily extendable by the addition of further units, or by adding another storey to the existing units. The same arguments had been used in favour of the traditional pavilion plan hospital, to which additional ward pavilions could be added with ease, if space allowed. Gleave succeeded in giving an appropriately 'modern' image to this well-established concept, through the construction methods employed, the layouts and internal finishes.

Yet, by the early 1960s, Vale of Leven had been almost forgotten, overshadowed by the major programme of hospital construction heralded by the government's 1962 *Hospital Plan*.² Despite growing interest in the social and political history of the National Health Service and the development of modern hospital architecture, this neglect has continued. Accounts of the immediate post-war period have concentrated on the inadequacies of Britain's hospitals. Following the assertion by Richard Llewelyn-Davies in 1960 that 'we have built hardly anything new' since 1945, the leading scholars of post-war hospital architecture in Britain, Jonathan Hughes and Elain Harwood, have focused on the achievements of the 1960s and the work of architects such as Llewelyn-Davies, John Weeks and Powell & Moya.³

Vale of Leven Hospital also provides a parallel to the better-known work of the Nuffield Provincial Hospitals Trust, which was then developing an experimental ward unit at Larkfield Hospital, Greenock, not far from the Vale of Leven. David Theodore has argued that Nuffield's studies in hospital function and design 'initiated a new understanding of architectural research on the model of medical research'.⁴ The Nuffield Trust had been founded on the eve of the second world war as an independent advisory body and, after the establishment of the NHS, set up a multidisciplinary team to investigate hospital design and function. The work of the team, directed by Llewelyn-Davies from 1950, was widely covered by the medical and architectural press and resulted in a report published in 1955 and two experimental ward units that were built to test the team's theories, one in Scotland (Larkfield Hospital) and one in Northern Ireland (Musgrave Park Hospital). Vale of Leven was readily ignored after 1960 because it failed to deliver the ideal of flexible space that had been its goal, working well for ward units but not for more specialised departments such as operating theatres and outpatient clinics. Nevertheless, the main principle of its design — standardised units — is evident in later hospital buildings, re-emerging in the 1970s in the Ministry of Health's ambitious 'harness' project, which proposed an entire hospital composed of standardised departments 'harnessed' to a highly serviced corridor or hospital street.⁵ When the harness programme was abandoned on the grounds of cost, the essence of its layout, based on repeated standard units, mutated into the 'nucleus' hospital that dominated new hospital building in England in the 1980s.

THE CALL FOR NEW HOSPITALS

The creation of the National Health Service provided both an opportunity and a need to reassess hospital planning in Britain. There were in fact two systems, one covering England and Wales, the other Scotland, but which shared the underlying principle of healthcare free at the point of use.⁶ In 1948 most existing hospitals, from small rural buildings with a handful of beds to large teaching hospitals, passed into state ownership.⁷ The buildings ranged in date from the eighteenth century up to the 1930s. In England, the most recent new general hospitals were the Queen Elizabeth, or Birmingham Hospital Centre (Lanchester & Lodge, 1933–38), and Westminster Hospital in London (Adams, Holden & Pearson, 1935–39).⁸ Scotland's comparable hospital was at Foresterhill, Aberdeen, where new buildings for Aberdeen's Royal Infirmary, Royal Hospital for Children and Maternity Hospital were built as a joint scheme in 1928–36 (J. B. Nicol and William Kelly).⁹ Although new hospitals were built during the inter-war years, the majority of buildings dated to the nineteenth century.¹⁰ This led to the general perception that most of the hospitals inherited by the NHS were outdated Victorian relics.¹¹ For the politicians overseeing the development of the new hospital service, such a conclusion might have been amplified by the presence directly opposite the Houses of Parliament of St Thomas's Hospital. A third of this archetypal Victorian hospital, soot-blackened and brooding, had been destroyed in air raids during the war, serving as a reminder of the necessity for reconstruction.¹²

The view that such hospitals were inappropriate in post-war Britain was common. In describing Sheffield Royal Infirmary in 1951, the chair of the regional hospital board, Basil Gibson, noted that much of the infirmary was a hundred years old: 'No hospital of that age can really fulfil modern requirements. You can try to improve it; you can probably do very, very good work there, but it is not a modern hospital.'¹³ Developments in hospital design over the preceding decades featured in the professional journals, such as the special issues of the *Architects' Journal* on hospitals in 1932 and 1937, the latter with an editorial on 'Modern Hospitals' stating that it was intended 'as a reference to the latest ideas in hospital planning'.¹⁴ There had been important changes during the 1920s and 1930s. Free healthcare, once available only to the poorest, had been extended through National Insurance (from 1911) and local authorities were given duties to provide for maternity, child welfare and tuberculosis (from the 1920s).¹⁵ After the first world war, advances in medical science had accelerated and treatment in hospital, rather than at home, became the norm for a broader spectrum of society. The search for a new approach to hospital architecture gathered pace from the mid-1940s, boosted by the creation of the NHS.¹⁶ Could a new image of hospital building be created to match the ethos of this new public service?

Hospital building also had to accommodate increasingly rapid advances in medical science. Llewelyn-Davies, arguably the preeminent post-war hospital architect in Britain, characterised the period between 1945 and 1960 as one of 'revolutionary change in medicine'.¹⁷ Such changes raised important questions about obsolescence. The fight against tuberculosis is a case in point. Tuberculosis cases had declined during the 1920s and 1930s, but rose steeply during and after the second world war, partly due to overcrowding and the large numbers of new cases identified through mass radiography.¹⁸ As a result, by 1948 there was a shortage of suitable beds. In Scotland, the position was so serious that

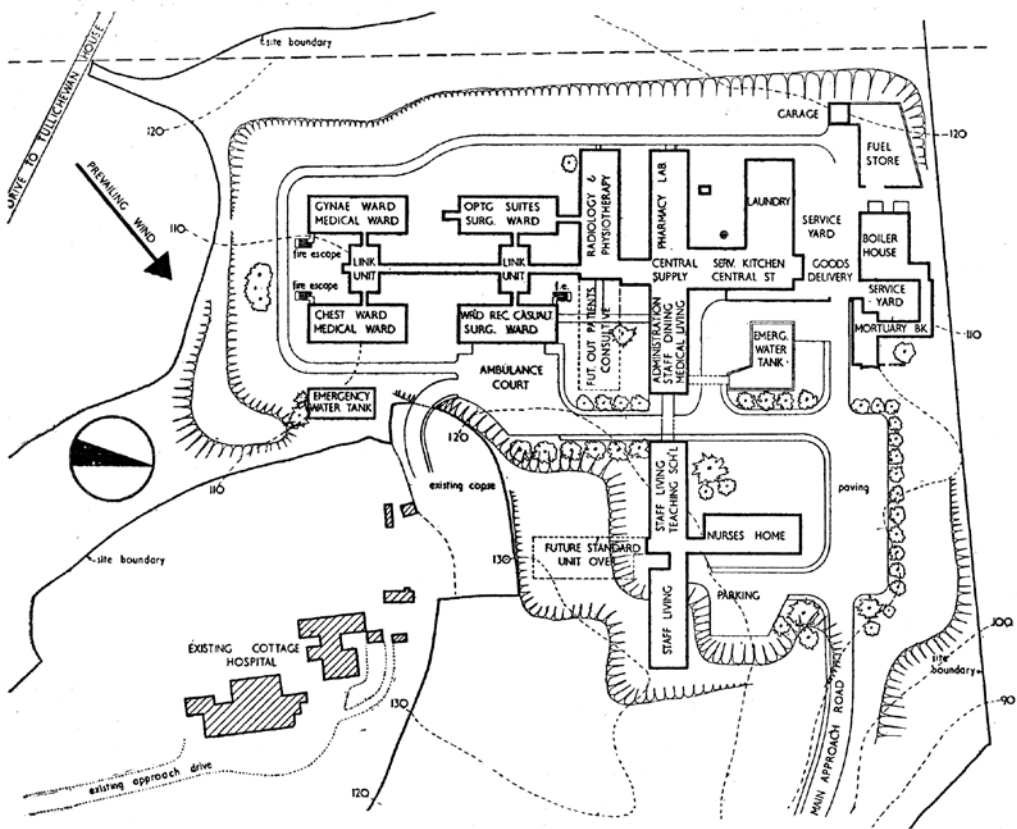


Fig. 1. Vale of Leven Hospital, Alexandria, J. L. Gleave, 1951–55, block plan from the *Architects' Journal*, 3 November 1955

between 1951 and 1956 patients were flown to sanatoria in Switzerland.¹⁹ By 1958 various factors, including hospital vaccines and antibiotics, had reduced mortality, case numbers and the need for hospital accommodation, for tuberculosis as well as other infectious diseases. By then, however, improved social welfare was producing an ageing population and a rise in age-related conditions, and many former isolation hospitals for infectious diseases were being converted into long-stay geriatric hospitals.²⁰

Patient expectations changed as the post-war concept of citizenship redefined the notion of an adequate standard of accommodation. That entailed comfort and amenity for patients, including as much privacy as was compatible with nursing and administrative efficiency.²¹ Yet such standards had to be achieved on a budget and with limited staff resources.²² High standards had also to be achieved more fairly, ironing out the geographically uneven distribution of hospital beds. The regional hospital boards quickly made strategic plans for improvements and developments, drawing on a wartime national survey of hospitals.²³ Limited resources created struggles and tensions between



Fig 2. Vale of Leven Hospital, aerial view from the southeast, photograph of 1966
(© courtesy of Historic Environment Scotland, Aerofilms Collection)

local, regional and national interests.²⁴ In Scotland, the differences in the structure of NHS administration were more favourable to the establishment of an integrated service.²⁵ But there were still limits on what could be achieved. Both the Ministry of Health in London and the Department of Health for Scotland were frustrated by lack of funds, worsened by the need to catch up on years of neglected maintenance.²⁶ Modernising existing hospitals tended to be prioritised as this could be done more quickly and cheaply than building anew, while achieving a nationally perceptible impact.

Successive health ministers highlighted the scale of the problem as they sought to elicit greater investment for hospital building from the Treasury. Iain Macleod emphasised in 1954 that over half the hospitals in England and Wales had been built before 1900, and more than 300 were more than a century old.²⁷ Four years later his successor, Derek Walker-Smith, used the same argument when pleading to redress the balance between hospital and education capital expenditure: 'More than 300 hospitals are more than 100 years old, nearly 1,200 more than 50 years old, many of them quite unsuited to modern



Fig 3. *Vale of Leven Hospital, standard unit on west side, seen from the southwest, photograph of 2022 by the author*



Fig 4. *Vale of Leven Hospital, standard unit on west side, formerly laboratories and pharmacy, seen from the west, photograph of 2022 by the author*



Fig 5. Vale of Leven Hospital, mortuary and boiler house seen from the north, photograph of 2022 by the author

forms of treatment.²⁸ During the 1950s, the numbers of new schools and the quantity of new housing contrasted dramatically with the numbers of new hospital buildings. However, it cost considerably more to build a hospital than a school: even a new outpatient department typically cost more than an entire new school.²⁹

While, in relation to need, the quantity of hospital building in the 1950s may have been small, it was larger than is often assumed. Hughes noted that Scotland fared slightly better than England and Wales in this period, with developments at Edinburgh's Western General Hospital, Kirkcaldy's Victoria Hospital and the new Bellshill Maternity Hospital.³⁰ There were fewer constraints at this time, allowing opportunity to experiment before the volume of design guidance grew after 1957 and strict cost limits were imposed in the early 1960s.³¹ The first decade of the NHS was a fertile period for discussion, travel to investigate hospitals overseas, and formulating ideas about what a modern hospital should look like and how it should be planned.³² From 1948, when the regional boards began planning new hospitals, the Department of Health for Scotland could supply references to recent literature on hospital design, and encouraged preferred planning approaches. These ranged from detailed advice favouring parallel beds in new wards, rather than traditional Nightingale plans, to advocating large American-style 'monoblock' and deep plans for large schemes.³³ In this climate of innovation, the most significant project to be designed and built in the United Kingdom was the Vale of Leven Hospital, between 1951 and 1955.

PREPARING FOR NUCLEAR WAR IN SCOTLAND

In both concept and design, Vale of Leven Hospital was a leap forward from pre-war hospitals. Originally planned with 150 beds for general medicine and surgery, alongside an outpatient department, staff accommodation, specialist departments, offices and services, the design was based on the idea of standardised two-storey units linked to a central spine (Fig. 1). Low-rise and compact, it nestles in a valley to the south of Loch Lomond and continues to serve as the district general hospital (Fig. 2). The original buildings are now shabby, their domestic scale overshadowed by a multi-storey maternity unit opened in 1971, and partly obscured by the later additions and infill. Yet, although the staff section has been demolished, the essence of the original hospital remains easily discernible (Figs 3–5).

While the appearance of the hospital was modern and forward-looking, the basic concept of standardised accommodation units arranged off a communication spine originated in the emergency hospitals erected during the second world war — of which Law Hospital in Lanarkshire was the prototype (Fig. 6). In both, the standard units housed wards, theatres, clinics, administrative offices and staff accommodation. While the emergency hospitals adopted single-storey huts, at Vale of Leven the standard units were built of two storeys and designed to take an additional storey if required. Overall, Vale of Leven was a much more sophisticated version of the emergency hospital.

Scholarship in recent decades has situated the welfare state in the context of the cold war, making the case that the two were directly connected.³⁴ Ramesh Mishra has argued that the expansion of the welfare state was a by-product of the cold war, a western response to communism.³⁵ In this view, the rapid expansion of health services in the Soviet bloc acted as a stimulus in Britain. For some this was from a desire to emulate the socialist ideology and achievements; for others it was to produce an attractive alternative that might discourage working-class unrest and communism.³⁶ Hospital architecture has rarely been seen in this light, however.³⁷ At Vale of Leven, the connection with the cold war and civil defence was fundamental and direct, and accounts for its early date. As the cold war intensified, rearmament stole resources from welfare. Rearmament began in 1950 and the following year the fledgling NHS was facing stringent cuts.³⁸

The key individual behind the building of Vale of Leven was the senior civil servant in the Department of Health for Scotland, Norman Graham.³⁹ He was an influential figure in the post-war Scottish Office, bringing substantial experience to the task of hospital reconstruction. Graham had joined the department in 1936 and had been involved in planning emergency hospitals before the second world war. He also had an intimate knowledge of the Emergency Medical Scheme (EMS), initiated by the Civil Defence Act of 1939, which instigated the rapid provision of thousands of hospital beds in mansion houses, hotels and hutted annexes added to existing hospitals. In Scotland, seven new emergency hospitals were built, set away from centres of population: Killearn Hospital in Stirlingshire; Law in Lanarkshire; Ballochmyle in Ayrshire; Bridge of Earn, near Perth; Stracathro, near Brechin; The Peel in the Borders; and Raigmore, by Inverness. The plans were commissioned from local architectural firms by the Office of Works. Completed by the end of 1939, Law Hospital, to the north of Carluke in Lanarkshire, consisted of four sections, each comprising four separate single-storey huts housing two twenty-bed wards. An administration block, reception, kitchen and stores were located centrally; staff blocks



Fig 6. *Law Hospital, Carlisle, Lanarkshire, aerial view from the west, photograph of 1953*
 (© courtesy of Historic Environment Scotland, Aerofilms Collection)

and an isolation unit completed the complex. The huts in each section were connected by corridors or covered ways, and were generally called spider blocks. Many of the EMS huts were of timber construction clad in asbestos sheeting; others were built of brick with precast hollow slab roofs and concrete floors. The design was severely functional and can be traced back through the military huts of the first world war to the prefabricated hatted hospital of Renkioi designed by Isambard Kingdom Brunel in the Crimean war.⁴⁰

Graham resumed his position at the Department of Health for Scotland after a period in London during the war, latterly as principal private secretary to Stafford Cripps, the minister of aircraft production. Placed in charge of the hospitals division, he played a central role in setting up the NHS in Scotland. The department oversaw the five regional hospital boards that were responsible for implementing policy and the strategic development of the hospital service. In 1950, Graham was facing mounting dissatisfaction from the regional boards as their plans for much-needed hospital building schemes were

dashed by budget cuts. With his experience of pre-war defence preparations for hospitals, and his understanding of the power of centralised bureaucracy gained during wartime, Graham realised that funding granted for cold war civil defence hospitals could equally satisfy wider peacetime needs. In Scotland, that new funding amounted to £1 million, almost as much as its entire annual budget for new hospital buildings.

As co-ordinator of the civil defence programme, Graham oversaw a planning process closely informed by that of 1938, beginning with a survey of hospital resources.⁴¹ During 1950, information was gathered to allow for an outline of civil defence schemes to be prepared for each of the five regions administered by the hospital boards. Of those, the western region was much the largest and Glasgow was the most obvious target in the event of another war. The threat of an atomic bomb attack required plans for evacuating central hospitals. The department calculated that, in wartime, general hospitals would be reduced to 10 per cent of their peacetime capacity, dealing with ordinary emergency cases and/or as casualty clearing stations. Those evacuated would be sent to outlying 'cushion hospitals'.⁴²

Graham primed the regional boards to consider the needs of civil defence in drawing up their plans for future hospital development, noting that civil defence needs should influence the prioritisation of projects and even, to some extent, their form. As an inducement to follow his advice, he stated that such projects would be put in hand 'at the earliest possible date'.⁴³ In a confidential letter to Henry W. Scarth, secretary of the Western Regional Hospital Board, Graham explained how that might work in practice.

It should be understood that this letter relates entirely to work which will have to be carried out in any event for peace-time purposes but is now to be accelerated and perhaps modified to meet the needs of Civil Defence. This work will therefore form part of the Board's ordinary programme and other projects of less urgency from the Civil Defence point of view will have to give place.⁴⁴

With Glasgow and Clydebank deemed especially vulnerable targets, the civil defence scheme had to provide for the potential evacuation of a considerable number of hospitals centred on Glasgow, Clydebank and Greenock. Existing hospitals were identified as potential cushion hospitals for evacuees in all the outlying districts except that to the northwest of Glasgow. For this district, Graham concluded that 'The strongest case is for a hospital in the Vale of Leven area which could serve Clydebank and Dumbarton as well as the Vale of Leven itself.'⁴⁵

The Western Regional Hospital Board took the hint and proposed a new hospital on a site adjacent to the existing Henry Brock Cottage Hospital, which had been established in a converted house in 1924.⁴⁶ Its proximity to the main centre of population in Alexandria made it convenient for both patients and staff. Located in Scotland's central industrial belt, Alexandria had developed as an industrial town since the nineteenth century, its population increasing in the twentieth as new industries were drawn there, including the Argyll Motor Works, which was converted to a torpedo factory by the navy before the second world war. New housing estates had been built, principally by the local authority, and expansion continued in the first decade after the war, albeit primarily with temporary housing.⁴⁷

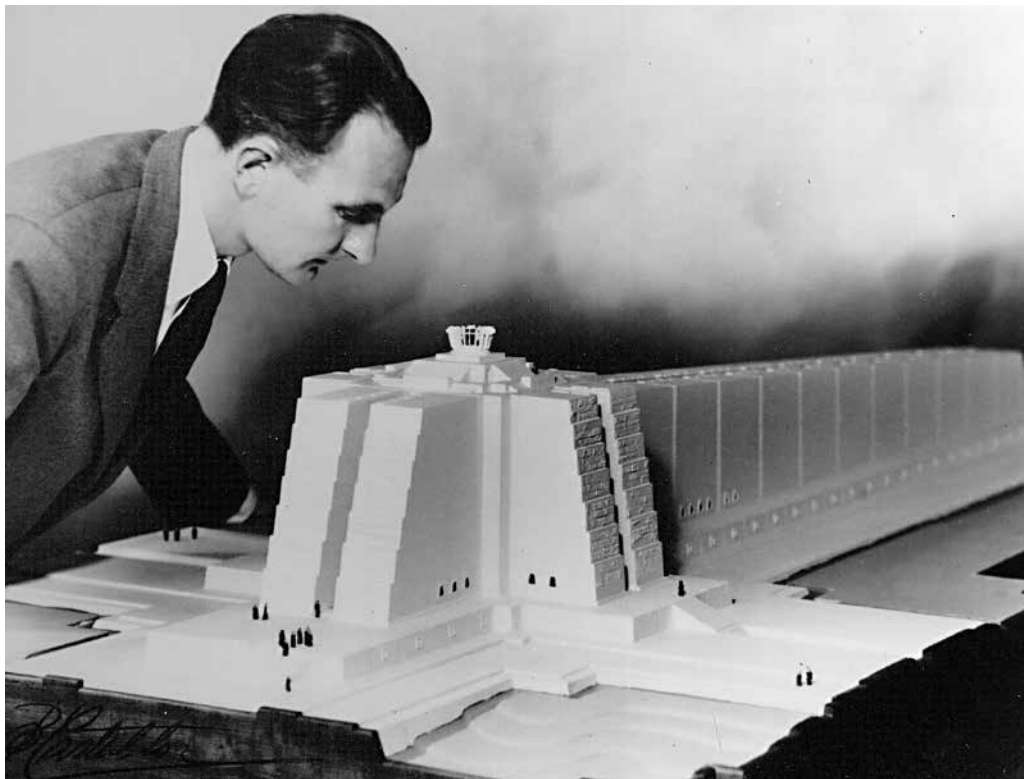


Fig. 7. Joseph L. Gleave inspecting the model of the Columbus memorial for the Dominican Republic, photograph of c. 1946 (© courtesy of Historic Environment Scotland, Convery Prenty Shields Architects Collection)

Plans for the new hospital took shape between the autumn of 1950 and summer of 1951, at which point Graham and Alexander King Bowman, the senior administrative medical officer of the Western Regional Hospital Board, agreed the number of beds and services required.⁴⁸ By June 1951, department officials were estimating the total cost as £400,000 — a considerable portion of Scotland's £1 million total for civil defence.⁴⁹ The hospital was to provide 150 beds and up to 280 in an emergency. This size was in line with the average number of beds at most general hospitals in Scottish cities outside Edinburgh and Glasgow at that time, though smaller than comparable general hospitals in England.⁵⁰ Ancillary accommodation was to be larger than usual to allow the hospital to function at its emergency capacity. Hence the two operating theatres had to allow for an extra operating table and the kitchen had to be large enough to cater for 600. The laboratory and laundry were intended to serve other surrounding hospitals, and the administrative offices were to accommodate the local board of management as well as hospital staff.⁵¹

From the outset, Graham envisaged that the accommodation would be provided in standard units, not just for wards, but also for theatres, X-ray, staff residences and other

accommodation, just as the EMS hospitals had been designed on the premise of one-hut-fits-all.⁵² But he was clear that he wanted a new type of building rather than standard EMS huts.⁵³ Speed of construction was the most convincing argument for standardisation. However, there were lessons to be learned from the experience of using the emergency hospitals during the war: large numbers of beds were provided in anticipation of huge numbers of casualties, but these had not materialised and so the empty beds were given to civilians, especially those on surgery waiting lists. Accordingly the 1943 departmental committee on post-war hospital problems in Scotland had recognised that these hospitals were 'an integral element in the country's general health services', and the 'qualifications for direct admission' had been 'progressively widened'.⁵⁴ While financed from the civil defence budget, therefore, Vale of Leven Hospital was designed primarily for peacetime needs, with emergency use as a secondary consideration, justifying rejection of the standard EMS hut.

Similar issues regarding temporary versus permanent construction arose with the post-war school-building programme. To accommodate the increased number of pupils after the Butler Act of 1945, thousands of standard prefabricated huts (known as Horsa huts, from the Hutting Organisation for Raising the School-leaving Age) were built throughout Britain, but they were unpopular and more progressive county councils, such as Middlesex and Hertfordshire, sought alternatives.⁵⁵ With regard to hospitals, such temporary huts were judged unsuitable. When a group of Fife MPs suggested that huts similar to those of the emergency hospitals might be built in order to speed up the provision of a new general hospital, the proposal was rebuffed by the secretary of state: 'any hut that was to be suitable for hospital purposes could not be of a make-shift nature'.⁵⁶

DESIGN AND CONSTRUCTION

The Western Regional Hospital Board gave the task of reimagining the EMS hospital to Joe Gleave of the Glasgow firm Keppie Henderson & J. L. Gleave. The commission seems to have come his way in late 1950 or early 1951, although how he secured the appointment is unclear. Born in Manchester in 1907, Gleave had studied architecture at Manchester University's architecture school in the 1920s, overlapping with Leslie Martin and Sadie Speight. Gleave was renowned for having won an international competition to design a memorial to Christopher Columbus in the Dominican Republic in 1931. The project had stalled but been revived after the war, and a model of the enormous structure was displayed at the Royal Institute of British Architects gallery in London in 1946 (Fig. 7). By then Gleave was head of the School of Architecture and Planning at Edinburgh College of Art, a post he first held in 1935 and resumed after war service; but in 1948 he had joined Keppie & Henderson in Glasgow, working on the expansion of the university including the engineering department extension.⁵⁷ Hence Gleave was in the public eye with the revival of the Columbus project; his time at Edinburgh College of Art meant that he was undoubtedly known at the Scottish Office; while his connection with Glasgow University likely brought him to the attention of Bowman and the regional board, or at least provided assurance of West Coast allegiances. Moreover, there was a shortage of architects specialising in hospital work and a willingness to entrust work to a younger generation without hospital experience.⁵⁸

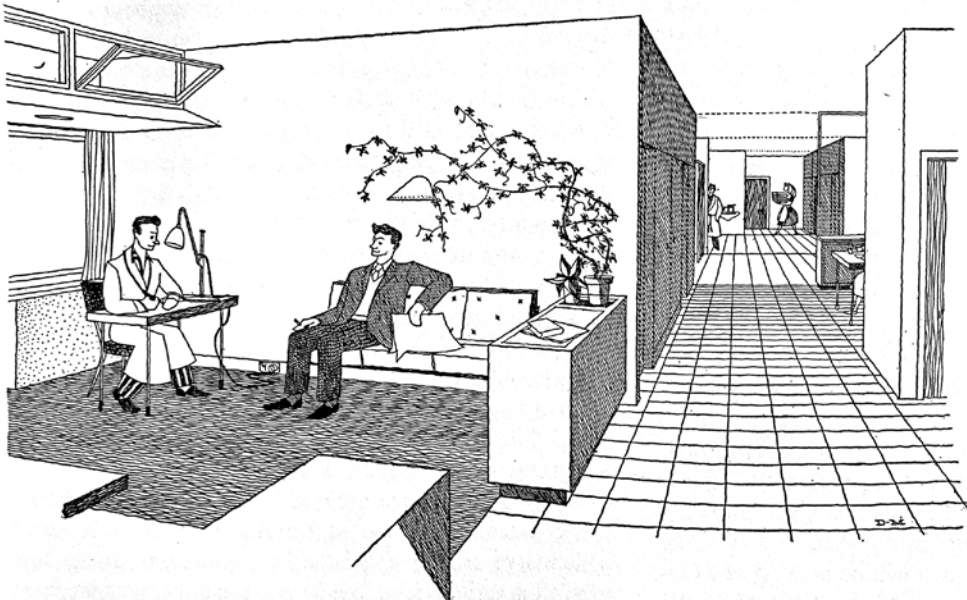
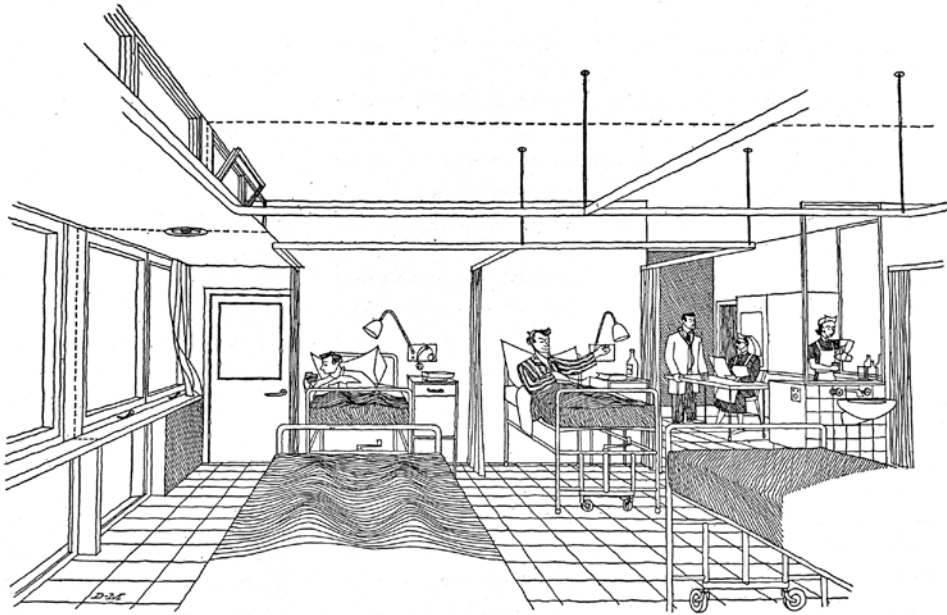


Fig. 8. Larkfield Hospital, Greenock, interiors of the ward and day space in the experimental ward unit designed by the Nuffield Provincial Hospitals Trust, from *Studies in the Functions and Design of Hospitals*, 1955

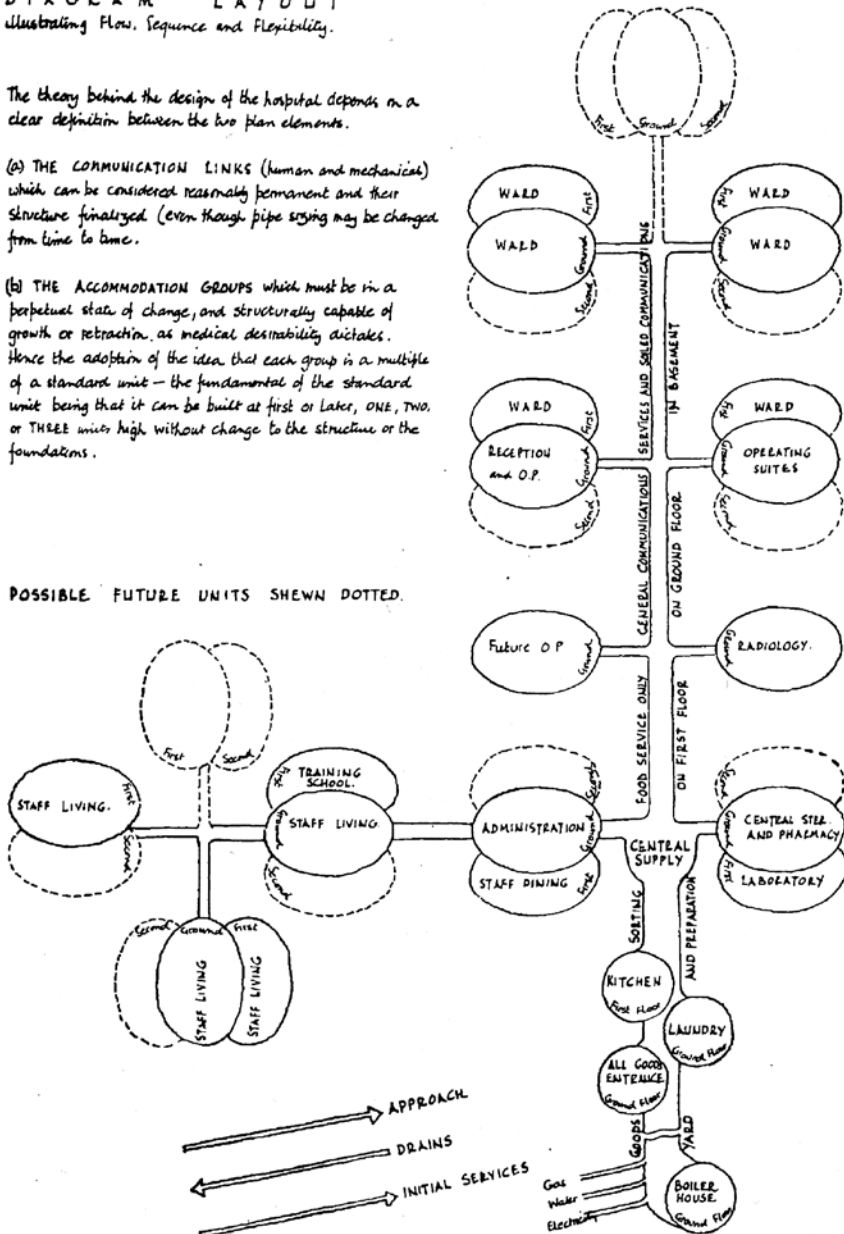
DIAGRAM LAYOUT
 illustrating Flow, Sequence and Flexibility.

The theory behind the design of the hospital depends on a clear definition between the two plan elements.

(a) THE COMMUNICATION LINKS (human and mechanical) which can be considered reasonably permanent and their structure finalized (even though pipe sizing may be changed from time to time).

(b) THE ACCOMMODATION GROUPS which must be in a perpetual state of change, and structurally capable of growth or retraction, as medical desirability dictates. Hence the adoption of the idea that each group is a multiple of a standard unit - the fundamental of the standard unit being that it can be built at first or later, ONE, TWO, or THREE units high without change to the structure or the foundations.

POSSIBLE FUTURE UNITS SHEWN DOTTED.



NEW HOSPITAL AT ALEXANDRIA, DUNBARTONSHIRE
 Diagrammatic layout

Fig. 9. Joseph L. Gleave, diagrammatic layout of Vale of Leven Hospital, from the Royal Sanitary Institute Journal, 74, no. 5 (1954), p. 659

For the design of Vale of Leven, Gleave started from first principles: in his own words, 'the correct approach is to clear our minds and start afresh'.⁵⁹ His belief in researched design and planning places him squarely within the generation of architects who came to prominence in the post-war years. The same principles are evident in the contemporaneous design by the Nuffield Provincial Hospitals Trust of an experimental ward block for the Western Regional Hospital Board at Larkfield Hospital, Greenock, constructed at the same time as Vale of Leven Hospital (Fig. 8).⁶⁰ Gleave focused his research on economy of staffing and maintenance, minimising walking and service distances, in parallel with an analysis of hospital requirements. His conclusion was 'the over-riding necessity for extreme structural flexibility'.⁶¹ To meet the inevitably changing requirements of the medical profession, the building needed to be adaptable, and a form had to be found that would allow its functions to evolve.

As Gleave wrote in 1954, the design was based on 'a clear definition between the two plan elements', namely the 'communication links' both for people and services and 'accommodation groups'. The latter would be in a 'perpetual state of change': more might be added, or they might be removed.⁶² In his 1951 manual on hospital design, the Swedish architect Gustaf Birch-Lindgren likened a hospital to a living organism that is constantly growing, and Gleave also used the analogy of a tree, with a solid trunk and delicate, more ephemeral leaves.⁶³ The diagrammatic layout that he produced of the hospital has something of an organic appearance (Fig. 9), emphasised by the leafy ovals depicting the angular standard units.

Gleave's design for Vale of Leven Hospital was an early instance of architectural interest in flexibility as a means to mitigate obsolescence. Flexibility became synonymous with hospital design and was central to the conclusions of Nuffield's *Studies in the Functions and Design of Hospitals*, published in 1955. Gleave's solution attracted the attention of John Weeks, a notable advocate of flexibility in hospital design in the 1960s, who commended Vale of Leven's 'lively forward-looking ideas' which he saw as embodying 'in a primitive form' provision for internal adaptability and expansion.⁶⁴ The idea of adding and removing units re-emerged in the 'indeterminate' plan of Northwick Park Hospital, by Weeks and Llewelyn-Davies, which aimed to build the potential for organic growth into the design (its first stage opened in 1970).⁶⁵ While the analogy of the tree was not uncommon, it is worth noting that Weeks also described Northwick Park as 'just like a tree [...] new branches could grow as required, whilst others could wither away'.⁶⁶

Gleave believed that allowing for future additions or extensions did not have to compromise aesthetics. Changes ought to be made on a prescribed architectural scale, 'the standard unit of form and the modular unit of surface pattern [...] giving a measure of architectural cohesion to the growth'.⁶⁷ At Vale of Leven, the two main elements — the 'trunk' and the 'leaves' — were given appropriately contrasting architectural treatment: heavy masonry emphasised by punch-hole windows for the trunk, and a lightweight modular timber skeleton or 'birdcage structure', in Gleave's words, for the 'leaves' (Figs 10 and 11).⁶⁸ The communication spine formed a 'hospital street' — a three-level corridor separating services from staff and visitors.⁶⁹ While a spine corridor was hardly a new concept, terming it a 'street' reflected emerging ideas in hospital design that were evident in later schemes such as Wexham Park in Slough by Powell & Moya (commenced in 1961) and Ninewells in Dundee by RMJM (commenced in 1964).

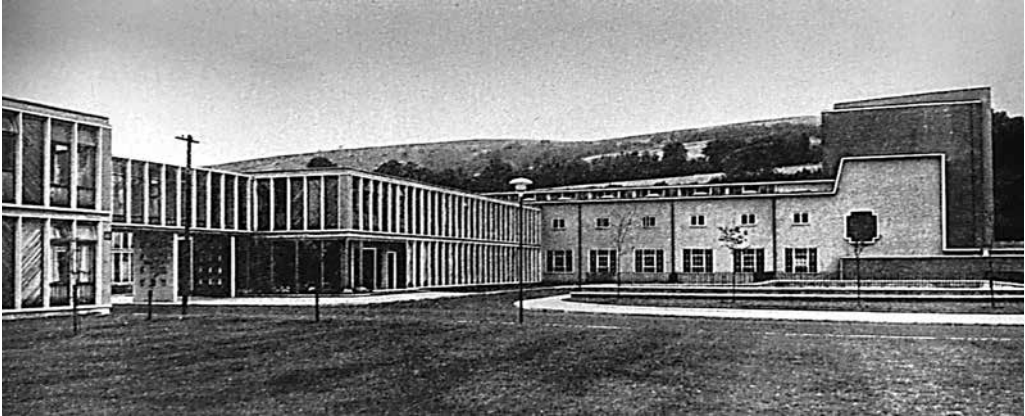


Fig. 10. Vale of Leven Hospital, north end of service spine containing services and water tower, with standard units to the left, photograph from the *Architect & Building News*, 29 September 1955, p. 388

The overall layout and spacing of the standard units were affected by the potential to raise them by an additional storey. Sufficient space needed to be left between the blocks so that they would not overshadow each other. To produce the optimum compactness of layout, the spine of the hospital ran on a north–south axis with the rectangular ward units aligned parallel to it, facing east and west. This allowed closer positioning than if they had been turned through 90 degrees, although it was counter to pre-war ideas favouring long, south-facing wards to maximise sunlight.⁷⁰ The standard units, measuring 100 ft by 40 ft, were steel-framed, with reinforced concrete floors and roofs and prefabricated wall units designed on a 40 in (3 ft 4 in) planning grid. This was the module recommended by the investigations of the RIBA's Architectural Science Board into dimensional coordination under the direction of Llewelyn-Davies in 1951. Llewelyn-Davies and Leslie Martin had used a 40 in module for their London, Midland and Scottish Railway stations between 1946 and 1948, and it was also the module Walter Gropius had chosen for his General Panel system in 1947, 40 in being close to one metre (39.3 in). According to Hartland Thomas at the Council of Industrial Design in 1952, this was the dimension best suited to the human scale, while panels of that dimension could be handled more easily on site than the larger 8 ft module trialled for the Hertfordshire schools.⁷¹ The smaller unit also increased the opportunity to marry an industrialised process with design, giving good flexibility and potential for interchangeability between different manufacturers' components.⁷² The parallel with the Hertfordshire schools programme is particularly evident in the similarity of the Vale of Leven standard units to the prototype classrooms built in 1950 at the Clarendon secondary modern school at Oxhey, also on a 3 ft 4 in grid (Fig. 12).⁷³ This type of modular building composed of prefabricated elements designed for difficult site conditions gave it potential to be replicated elsewhere in the country.

The Department of Health for Scotland intended that, just as the EMS standard huts had been built throughout the country during the second world war, Gleave's

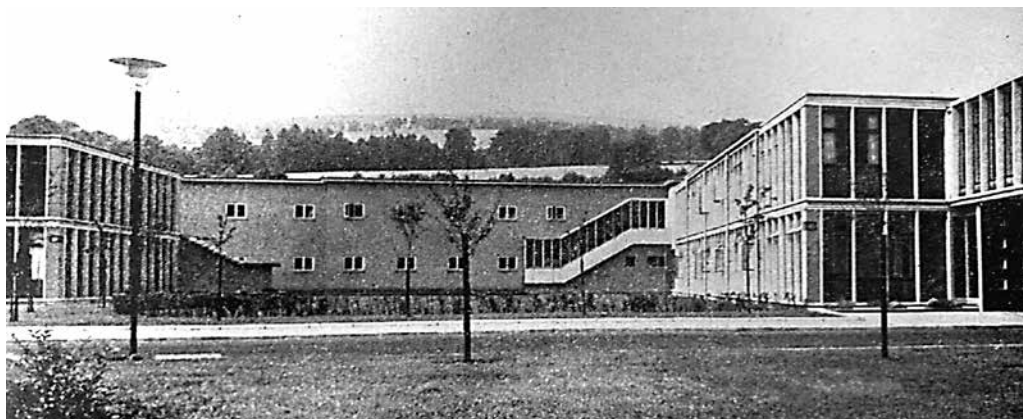


Fig. 11. *Vale of Leven Hospital, service spine with standard units in the foreground, photograph from the Architect & Building News, 29 September 1955, p. 389*

Vale of Leven standard unit would be used elsewhere as part of the civil defence programme. To that end, the department negotiated with Gleave for the copyright to his design. In mid-1951, Gleave agreed to a one-off fee to sign over his rights and supply the department with a set of plans, working drawings and estimates. Similar agreements were reached with the structural engineering consultants, George David, Crawford & Partners, and the heating, ventilating and electrical consultants, Ian Hunter & Partners. The plans were intended to be adaptable to any site and were to be given to the architects of civil defence schemes at Killearn and Kirklandside hospitals.⁷⁴ Gleave was later appointed architect for the Kirklandside extensions, but nothing appears to have been built there. However, at the Princess Margaret Rose Hospital, Edinburgh, two of the Gleave-designed two-storey units were built some time after June 1951.⁷⁵ The department had pressed the South Eastern Regional Hospital Board to build such units within the region and the board accepted them for Princess Margaret Rose, a specialist children's orthopaedic hospital in need of additional accommodation. The board proposed that these 'emergency hospital units' would be used 'in the meantime' for normal orthopaedic cases.⁷⁶ For the engineering work they appointed Ian Hunter & Partners, the consultants engaged on Vale of Leven.⁷⁷

It was also in the summer of 1951 that work started on site for Vale of Leven Hospital. Problems with the supply of materials, particularly steel and cast-iron pipes, caused some delays, and work continued on the design of the internal layout of non-ward areas. Given the experimental nature of the building, one ward unit was completed as a pilot before work started on any of the others so that Gleave could check whether modifications were necessary. Work progressed rapidly thereafter and was largely complete by the summer of 1954, although the cost had risen from the original estimate of £400,000 to around £600,000. Nevertheless, construction had proved to be quick and efficient with pre-ordering of materials and off-site fabrication of the main elements. Each unit was built in carcass and clad in approximately twelve weeks.⁷⁸ Developing



Fig. 12. *Clarendon secondary modern school, Oxhey, Hertfordshire, prototype classrooms by Bruce Martin and R. de Yarborough Bateson, 1949–51, photograph of c. 1950*
(© Architectural Press Archive / RIBA Collections)

pilot standard units followed the approach of the Building Research Station, notably in working up model houses intended for mass production.⁷⁹ Similarly, the Nuffield Provincial Hospitals Trust constructed experimental ward units such as that at Larkfield Hospital, and also at sites in Belfast and Corby.⁸⁰

INTERIOR: LAYOUT AND PLAN

The ward design was very different from the traditional Nightingale type found in most hospitals. Ceiling heights were lower than usual, but Gleave argued this created an 'intimate and non-institutional character to the wards'.⁸¹ The plan of the standard unit (Fig. 13) was roughly symmetrical, comprising two nursing stations each with thirteen beds (twelve in open bays of two, three and four beds, plus one of one bed), plus a bathroom/WC. Near the centre was a shared patient lounge, or 'day room'. A sluice room near the entrance to the ward was the only ancillary room for the nurses on the ward; the others (including ward kitchen, trolley store, clinical rooms and bed lift) were located beyond a lobby between the spine corridor and the ward, to reduce disturbance for patients.

Aspects of the design drew on the well-known Rigs layout, in which wards were compartmentalised into bays, usually of four beds laid parallel to the windows, separated by glazed screens. This arrangement had originated on the Continent and took its name from the Rigshospitalet in Copenhagen designed by Martin Borch in 1910, which was the most widely publicised early example (Fig. 14).⁸² The Rigs layout gave a feeling of greater privacy for patients, a significant consideration in improving patient amenities and raising accommodation standards in line with NHS ideologies. Placing the beds parallel to the windows rather than at right angles to the window wall meant that light did not shine directly into the patients' eyes from the window opposite. Glazed screens allowed good visibility for nurses, and in many pre-war examples the screens were limited to 6 ft in height and raised a foot off the ground to encourage air circulation. The photograph in Figure 15 shows one of the bed bays at Vale of Leven Hospital with the part-glazed partition raised off the ground following the Rigs model.

The inclusion of a day room on the ward was also an important development. Early published plans of Vale of Leven show the space labelled as 'Visitors' Sitting-Waiting room', but later it was more clearly defined as a day space for patients (Figs 13 and 16). Day rooms on wards had become increasingly common in the first half of the twentieth century, but were often small.⁸³ Surgeons and physicians found that getting a patient mobile after illness, surgery or childbirth hastened recovery, and increasing numbers of medical professionals promoted it in the 1940s, particularly in the US, where the term 'early ambulation' was coined.⁸⁴ Early recovery freed beds more quickly and increased 'through-put'. The subject was investigated as part of the Nuffield's investigations and preliminary findings were published in the *Lancet* in January 1951, early enough to have influenced Gleave's design.⁸⁵

The operating theatres and outpatient clinic proved more difficult to organise within the standard unit.⁸⁶ The single access point from the spine corridor caused problems in the theatre suite, with congestion around the scrub-up area and in front of the theatres, and difficulties separating 'clean' from 'dirty' areas. Ideas on the design of operating theatres were evolving rapidly, so arrangements considered acceptable in 1951 soon became outdated. Standard units for laboratories and staff accommodation were less problematic. For the nurses' accommodation, various layouts were considered including twin rooms and single rooms of varying size, of which the larger was selected (although the rooms were not centrally heated).

One of the most conspicuous ways of providing a high standard of accommodation was through the interior fittings and furnishings adopted. Streamlined and elegant fitted cupboards in wood at Vale of Leven suggest a Scandinavian aesthetic, but were also practical. The desk area of the nurses' station was raised on a low step so that the patients could be kept in view while seated (Fig. 17).⁸⁷ In the day rooms the furnishings were of a kind more usually associated with the home than a hospital, and a modern home at that. When the hospital opened in 1955 its interiors captured the attention of the press. *Picture Post* found the decor and furnishings the most cheerful of any hospital to date; settees in yellows and reds furnished the outpatient waiting room, 'grouped informally round the magazine tables', and there were bright wall colours and curtains.⁸⁸ The choice of soft furnishings was delegated to the matron who, according to *Picture Post*, chose the colourful motifs on the curtains to 'help "keep your pecker up"'.⁸⁹

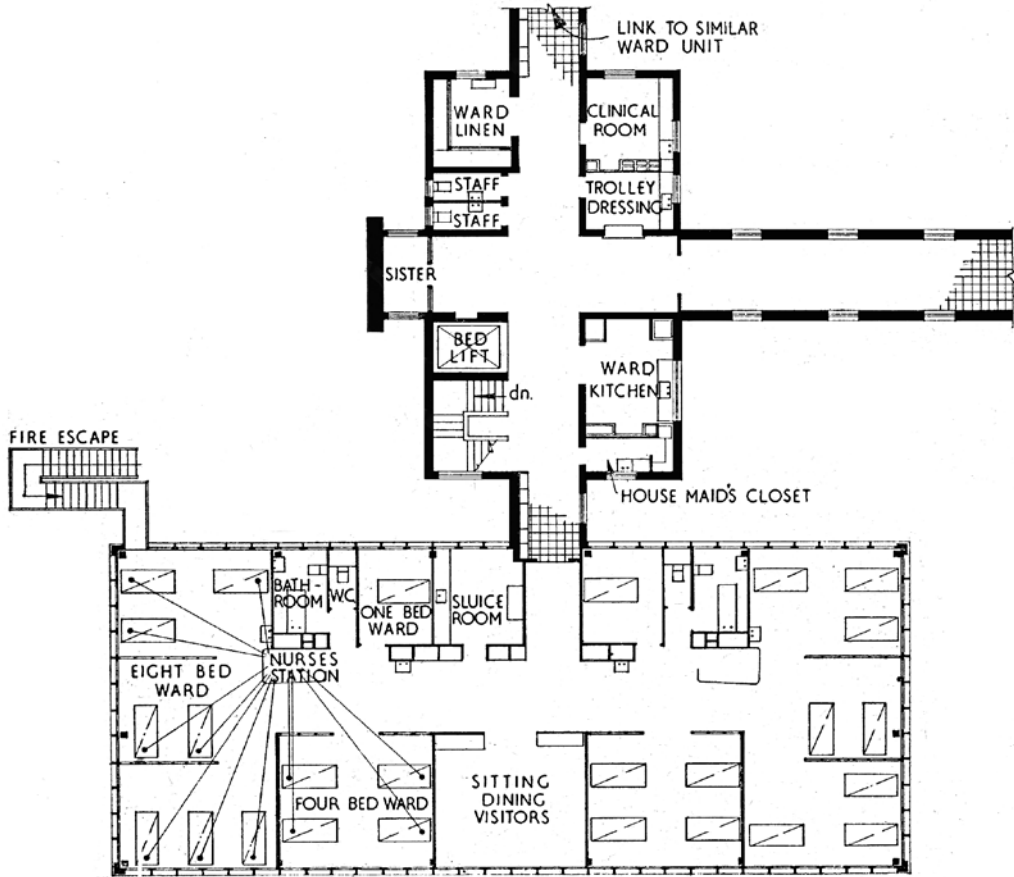


Fig. 13. Vale of Leven Hospital, typical ward unit floor plan, from the *Architects' Journal*, 3 November 1955, p. 594

It was rare for *Picture Post* to feature new hospitals, indicating the significance, and success, of Vale of Leven. The article was entitled 'The Hospital of the Future?'. Its 'exclusive peep' focused on the contrast with familiar pre-war hospitals. 'The old-fashioned ward has vanished', it announced, emphasising the contrast between Vale of Leven Hospital and 'our age-old, sprawling hospitals with their austere interiors and vast wards'.⁹⁰ Vale of Leven was a 'new model' hospital, of 'revolutionary design', where the wards were a 'patients' paradise'.⁹¹

The colourfulness of Vale of Leven's interior can be seen in the photographs published in the *Nursing Mirror* soon after the hospital opened, with restful pale grey walls in the bed bays and a cheerful deep pinkish red in the day room (Figs 15–17).⁹² Choosing colours to produce cheerful or calming effects in a hospital was not new. A scientific approach to the properties of colour had emerged in the late nineteenth

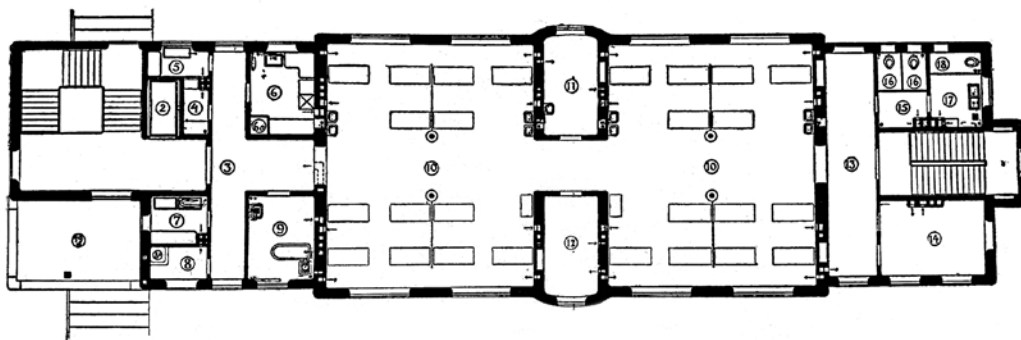


Fig. 14. Rigs Hospital, Copenhagen, Martin Borch, 1910, typical floor plan, from E. F. Stevens, *American Hospital Architecture of the Twentieth Century*, 1921

century, and most notably in the early twentieth century with the development of the Munsell system, a numerical classification of colour that addressed three qualities: the basic colour (hue), its intensity (chroma) and its light or luminance (value).⁹³ The colourfulness of the Festival of Britain had popular appeal, but commercial paint ranges were fairly drab until the publication of the Archrome range in 1953, developed for the Hertfordshire schools programme.⁹⁴ Nuffield's *Studies in the Function and Design of Hospitals* devoted a section to colour, with diagrams of the Munsell system and a plan of Larkfield Hospital's experimental ward unit indicating its colours with Archrome paint references.⁹⁵

THE LEGACY OF VALE OF LEVEN HOSPITAL

In addition to the articles in *Picture Post* and the *Nursing Mirror*, Vale of Leven received widespread coverage in architectural and medical journals, including lengthy, well-illustrated articles in the *Architect and Building News*, the *Architects' Journal* and *The Hospital*.⁹⁶ Gleave gave a paper describing Vale of Leven at the Health Congress in Scarborough in April 1954, which was published the following August.⁹⁷ The audience included architects and administrators responsible for shaping the direction of the hospital building programme at national and regional level. In the printed discussion, Maxwell C. Tebbitt, the superintending architect to the Ministry of Health, congratulated Gleave on his 'most interesting and far-seeing conception, which took into account the needs of flexibility in design to meet ever-changing medical requirements' and stated that the ministry was 'watching with considerable interest the growth of the Alexandria Hospital'.⁹⁸

Vale of Leven was not the only potential model for new hospitals, however. The Nuffield Provincial Hospitals Trust, which was well known and respected by those in charge of developing the National Health Service, published its *Studies in the Functions and Design of Hospitals* the same year that Vale of Leven opened, providing a source book on the design of wards, outpatient services and operating theatre suites, as well as advice on lighting (natural and artificial), colour, sound, heating and ventilation, fire protection and planning



Fig. 15, 16 and 17. Vale of Leven Hospital, bed bay in a ward (top), patients' day room (middle) and ward unit with nurses' station (bottom), photographs of 1955 from *The Hospital*, December 1955, pp. 807–09 (Wellcome Collection)

to meet demand. Even before publication, Nuffield's work had been disseminated in the architectural and medical press. The floor plan of the Larkfield experimental ward unit was published in the *Architects' Journal* and the *Lancet* in late 1951, while the trust's work regularly featured in both the *Lancet* and the *British Medical Journal*.⁹⁹

Offering a broad framework for hospital planning and design, Nuffield had a far wider influence than Vale of Leven Hospital. The 1955 publication made clear that it did not aim to produce a definitive blueprint for future hospitals, something it considered impossible to achieve. 'Hospitals do not fulfil simple, uniform, and unchanging functions', but analytical studies and experiment could 'illuminate some of the [...] problems'.¹⁰⁰ Because of the breadth of the Nuffield team's research, covering many of the logistical questions facing the NHS as it replanned Britain's hospital service, their experts were widely consulted by those involved in the planning process. A team from the Eastern Regional Hospital Board engaged on the preliminary stages of Ninewells Hospital, Dundee, visited both Vale of Leven and the Nuffield experimental ward unit in 1958, and was impressed by the size and layout of Vale of Leven's wards. The team's advice informed the recommendations given to the architects, Robert Matthew, Johnson-Marshall (RMJM).¹⁰¹

By the end of the decade, several more 'modern projects' had been completed in Scotland, but tight cost controls frustrated architects and administrators alike. In July 1959, the *Scotsman* ran a full-page article on 'Quality in Scottish Hospital Design', which, while generally positive, lamented the lack of new buildings on the scale of some of those outside Britain.¹⁰² The author of the article was John Holt, the chief architect of the South Eastern Regional Hospital Board, hardly a disinterested observer. Already Vale of Leven seems to have been forgotten; Holt made no mention of it and asserted an 'absence of completely new hospitals', adding:

If architectural criticism can be offered to complete works in Scotland, it is perhaps that many designs show a lack of imagination. The architects are not alone responsible for such a situation and maybe the tradition of hospital design coupled with financial control dominates the scene. The brilliant architectural forms of the hospital for maritime workers in Rio de Janeiro by Firmino Saldanha, or the Niemeyer day nursery, is lacking in Scotland.

Saldanha's hospital, a soaring slender tower on a podium completed in 1955, contrasts with the low-rise solutions of Vale of Leven or the first generation of buildings erected by the South Eastern Regional Hospital Board and indicates the direction in which the board was moving. When Holt was writing, a tower-on-a-podium scheme was on the drawing board, planned as phase two of the redevelopment of Victoria Hospital, Kirkcaldy.¹⁰³ This model, the 'matchbox on a muffin', dominated hospital design in Britain in the 1960s, as Jonathan Hughes has shown.¹⁰⁴

In 1961, with a national hospital-building programme in prospect, the Department of Health for Scotland launched a series of 'Hospital Design in Use' studies, of which Vale of Leven was the first. These aimed to review new hospitals after they had been in use for a few years to discover what lessons could be drawn for the planning of future hospitals.¹⁰⁵ Teams from the department paid a number of visits to each hospital to gather evidence. On one of their visits to Vale of Leven they were presented with a list

of '40 ways in which the design is wrong'.¹⁰⁶ A pre-publication draft was circulated to the regional and local management boards. The local board of management's response was that the report, while 'in no way flattering to the hospital [...] brings out all the mistakes and defects in the light of our experience since the hospital opened'.¹⁰⁷ The main fault highlighted in the report was that the hoped-for flexibility of the standard units had not materialised and they did not work well for theatre suites, the radio-diagnostic department or the out-patient department.¹⁰⁸ The bed layout of wards was excellent for supervising patients, but otherwise judged only 'acceptable'; the report suggested closed rooms were preferable to open bays. A greater proportion of single rooms was also needed, as well as improvements to the ancillary accommodation.¹⁰⁹

Despite its largely negative conclusions, the draft report was also sent to William Tatton Brown, chief architect to the Ministry of Health, and the Treasury. Making a virtue out of self-criticism, A. A. Hughes, assistant secretary at the Department of Health for Scotland, hoped the Treasury would 'welcome this assurance that we are in no sense complacent about the things we have done already'.¹¹⁰ It was important that the department was seen to be accountable and public money was being carefully spent. Hughes also sent a copy to Gleave. The study's criticisms caused Hughes some embarrassment. Hesitantly he led up to the thornier matters: 'we have naturally had to include those comments where we feel that the provision in the hospital is not as truly related to the need as it might have been', assuring him that the report would 'in no way imply failure on the part of the architect'. As the guidance for designing the hospital was provided by the department, 'the blame can be allowed to rest where it falls'. Hughes ended positively, hoping Gleave would be pleased to find that many of the concepts built into the hospital had succeeded 'even against the advances of modern medicine'.¹¹¹

By this time Gleave was designing new hospitals at Fort William, Inverness and Glasgow, and thus the assessment of Vale of Leven could have assisted his subsequent work. He concurred with the study's aims and considered it to be a 'very good effort and quite fair'.¹¹² Although his first impression was that it was over-critical, he accepted that was inevitable given the progress in thought on hospital planning since the hospital was built. He went on to highlight Vale of Leven's importance, associating his work with the rigorous planning processes of the time, evident in the Nuffield studies:

I have always felt that the main contribution of the Vale of Leven was not the building or the planning, but the general approach to hospital design with as much research as we could manage and with as many fresh ideas as possible thrown in so that there was no question of architects just picking up hospital building where it was left off 30 or 40 years before. This started, of course, when you decided you were not prepared to accept a standardised E.M.S. hospital.¹¹³

Some of the report's criticisms related to failures in either the fabric or engineering services. After its publication in 1963, the heating and ventilation specialists, Ian Hunter & Partners, were particularly aggrieved by the implied criticisms of their work.¹¹⁴ Newspaper headlines such as 'Report on a Cold, Noisy Hospital' and 'Design Defects Alleged' made uncomfortable reading.¹¹⁵ Some of the failings stemmed from economies

enforced against the engineers' advice, some from subsequent misuse of equipment.¹¹⁶ It was an abiding problem; cost-cutting measures following estimates often marred performance or longevity in new hospitals of this period.

Gleave's other hospitals were principally on restricted urban sites: the Queen Mother's Maternity Hospital, Yorkhill, Glasgow (built 1958–64), is a tower-on-podium design with staff accommodation in the tower and wards in the podium. The requirements of the brief for this specialist teaching hospital were significantly different from a general hospital, but the same concerns were at the heart of the design: flexibility, efficiency and control of the flow of the different users. The contemporary Belford Hospital at Fort William is a diminutive version of Yorkhill, adapted for a small general hospital with a maternity unit and services for accident cases arising from its proximity to Ben Nevis and surrounding mountains. Wards and outpatient clinics were at ground or upper ground level, while a three-storey 'tower' provided staff accommodation. The wards were arranged on a linear plan, closer to Nuffield's Larkfield unit than to Vale of Leven, with enclosed bed spaces. Before his early death in January 1965, Gleave was engaged on the design of the central hospital for Inverness at Raigmore; here he proposed a range of solutions including a circular ward tower, prompting Robert Scott Morton, senior architect at the Scottish Home and Health Department, to observe that 'Mr Gleave is nothing if not original'.¹¹⁷ Vale of Leven Hospital had given Gleave a profound general understanding of the needs of hospital planning, but he did not develop its principles in his later work.

The 1963 'Design in Use' report on Vale of Leven concluded that a 'mass produced prefabricated structural system which could be put together in various ways to give flexibility in planning might be worth developing'.¹¹⁸ Standardisation became increasingly significant in NHS hospital design from the early 1960s, but focused on standard briefs for hospital departments, including dimensions and costs, rather than a standard model for a complete hospital. Prefabrication and industrialised building methods offered the prospect of cost savings and faster construction, but such economies required a large volume of building, and in Scotland — where the hospital building programme was less ambitious than that for schools or housing — proprietary building systems or consortia were rarely used for hospitals. Furthermore, there were few contractors based in Scotland that were able or willing to take on such commissions. Model plans or standard units were most common for less complex requirements such as maternity or geriatric units. In England, Birmingham Regional Hospital Board developed a prototype geriatric unit, completed in 1963, with a construction system designed for maximum flexibility in planning and adaptability to a variety of hospital needs. A programme of building followed across the region, adopting dimensionally coordinated standard components, dry construction and speedy erection techniques. By 1965, an additional 150 geriatric beds had been provided in standard units at Heath Lane, Shifnal and West Heath hospitals.¹¹⁹

In 1970, Whitehall officials questioned why so many Scottish hospital buildings had been built using traditional methods of construction, especially compared to England where standardisation was now firmly accepted. The most notable example being developed at that time was the Ministry of Health's 'harness' system for an entire hospital composed of standardised departments. Crucially, it prioritised future growth

over flexibility.¹²⁰ In 1969, the Scottish Home and Health Department (the reorganised Department of Health for Scotland since 1962) had decided not to participate in the harness programme due to the differences in the structure of the Scottish hospital service and its traditions of organisation and nursing. Their experiences favoured flexible spaces that allowed for change as well as expansion.¹²¹ Harness proved too complex, and too expensive, and was modified to the simpler nucleus plan that concentrated on standardised planning rather than a comprehensive system of design and construction.¹²²

CONCLUSION

The first new NHS hospital, Vale of Leven was one of a small but significant number of hospital building projects completed during a decade usually side-lined in favour of the boom years of the 1960s and 1970s. It was one of the first to tackle the challenges of building in flexibility, demonstrating both its benefits and pitfalls. Standardised planning was coupled with rationalised construction and an almost domestic scale, with bright modern interiors subverting a sense of the institutional. The results contrasted dramatically with older hospitals, the grand scale and Victorian architecture of which symbolised a different era of healthcare.

Vale of Leven exemplifies the more experimental and opportunistic culture of the first phase of NHS building, before hospital design became increasingly circumscribed by centrally issued building notes, design guidance and cost limits. Developments and experiments in this earlier period informed that guidance, laying the foundations for what followed. Yet the experience of Vale of Leven showed that it was not possible to find a single envelope that would fit ward units, outpatient clinics and operating theatres alike, and attention therefore moved to establishing the standard components and optimum layouts of each element of a hospital, rather than standardising the elements themselves.

In subsequent decades, Vale of Leven was recognised as an early attempt to prevent obsolescence through flexibility. In 1965, looking ahead to 'Hospitals for the 1970s', John Weeks acknowledged the benefits of pavilions identical in size and shape that would provide 'efficient envelopes for [...] a wide range of departments'.¹²³ These ideas would re-emerge in the nucleus layout that dominated hospital-building in England in the 1980s, when finances were again severely restricted.

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BIOGRAPHY

From 1991 to 2018, Harriet Richardson Blakeman worked on the Survey of London, initially as part of the team working on a national survey of hospitals conducted by the Royal Commission on the Historic Monuments of England and latterly on the volume on Oxford Street. She also contributed to the volumes on Knightsbridge, Clerkenwell, Battersea and South East Marylebone. She is also the creator and author of the online resource *Historic Hospitals: An Architectural Gazetteer* (historic-hospitals.com). In 2018, she moved back to Scotland, where she is currently a doctoral student at the University of Edinburgh researching the architectural history of post-war hospitals in Scotland. Email: harriet.blakeman@gmail.com

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- 33 NRS, HH101/498, 'Hospital Planning', R. J. Peters, 22 May 1951; HH101/505, discussion between the Department of Health and the South Eastern Regional Hospital Board over the design of a proposed new hospital at Cameron Bridge, 1954. On the global dissemination of ideas, see Julie Willis, Philip Goad and Cameron Logan, *Architecture and the Modern Hospital: Nosokomeion to Hygeia* (Abingdon, Oxfordshire: Routledge, 2018).
- 34 See, for example, Mark Swenarton, Tom Avermaete and Dirk van den Heuvel, *Architecture and the Welfare State* (Abingdon, Oxfordshire: Routledge, 2015); Herbert Obinger and Carina Schmitt, 'Guns and Butter? Regime Competition and the Welfare State during the Cold War', *World Politics*, 3, no. 2 (2011), pp. 246–70; David Edgerton, *Warfare State: Britain, 1920–1970* (Cambridge: Cambridge University Press, 2006).
- 35 Ramesh Mishra, 'Social Policy in the Postmodern World: The Welfare State in Europe by Comparison with North America', in *Perspectives on the Welfare State in Europe*, ed. by Catherine Jones (London: Routledge, 1993), pp. 18–42 (pp. 31–32).
- 36 Obinger and Schmitt, 'Guns and Butter', p. 247.
- 37 For instance, hospitals are only briefly remarked on in Swenarton, Avermaete and van den Heuvel, *Architecture and the Welfare State*.
- 38 NRS, HH101/504, note of a meeting held on 12 June 1951 in the House of Commons between the secretary of state, Hector McNeil, and under-secretary, Peggy Herbison, with the Fife MPs James Henderson-Stewart, Willie Hamilton and Thomas Hubbard, 14 June 1951. See also James E. Cronin, *The Politics of State Expansion: War, State and Society in Twentieth Century Britain* (London: Routledge, 1991), p. 161.
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- 41 Department of Health for Scotland, *Tenth Annual Report of the Department of Health for Scotland 1938*, Cmd 5969 (Edinburgh: HMSO, 1939), pp. 170–71.
- 42 NRS, HH51/343, Civil Defence Casualty Services, regional plan for casualty provision in the western region, outline plans for the casualty service in the western region, 7 September 1950; HH51/332, Civil Defence Casualty Services, memorandum for regional hospital boards, Department of Health for Scotland, 29 August 1949.
- 43 NRS, HH51/343, letter from Norman Graham, Department of Health for Scotland, to H. W. Scarth, secretary of the Western Regional Hospital Board, 15 January 1951.
- 44 NRS, HH51/343, letter from Graham to Scarth, 15 January 1951.
- 45 NRS, HH51/343, notes by Norman Graham on a meeting in Glasgow on 6 September with Dr Smith and Dr Bowman, 7 September 1950.
- 46 NRS, HH101/1123, Land and Premises Acquisition, Vale of Leven Hospital, Alexandria, letter from Norman Graham to P. Stewart Watt, 27 April 1951.
- 47 Margaret S. Dilke and A. A. Templeton, eds, *The Third Statistical Account of Scotland: County of Dunbarton* (Glasgow: Collins, 1959), pp. 189–92.
- 48 NRS, HH51/343, *passim*.
- 49 NRS, HH51/343, letter from A. MacLehose to Norman Graham, 5 June 1951.
- 50 For example, Dumfries Royal Infirmary had 173 beds, Falkirk had 216 (including a large hutted annexe from the war), Kilmarnock had 147 beds, Stirling 230 and Greenock 256. These numbers are small compared to general hospitals in English provincial towns such as Welwyn (315 beds) and Princess Margaret Hospital, Swindon (planned ultimately to provide 600 beds). Figures from *The Medical Directory* (London: J. A. Churchill, 1950), pp. 2541, 2543; [Anon.], 'Queen Elizabeth II Hospital, Welwyn', *The Hospital*, 59, no. 9 (1963), p. 539; [Anon.], 'Hospital', *Architects' Journal*, 11 February 1960, p. 264.
- 51 [Anon.], 'Vale of Leven Hospital, Alexandria, Dunbartonshire', *Architect and Building News*, 29 September 1955, p. 386.
- 52 NRS, HH51/343, letter from Norman Graham to H. W. Scarth, 22 February 1951.

- 53 NRS, HH101/3293, letter from J. L. Gleave to A. A. Hughes, 4 July 1963.
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- 61 Gleave, 'Planning of a General Hospital', p. 656.
- 62 Gleave, 'Planning of a General Hospital', p. 658; 'Vale of Leven Hospital, Alexandria, Dunbartonshire', pp. 388–89.
- 63 Gustaf Birch-Lindgren, *Modern Hospital Planning in Sweden and Other Countries* (London: Constable, 1951). Gleave quoted Birch-Lindgren in his 1954 article 'Planning of a General Hospital', p. 658.
- 64 John Weeks, 'Hospitals for the 1970s', *Medical Care*, 3, no. 4 (1965), pp. 197–203 (p. 198).
- 65 Harwood, *Space, Hope and Brutalism*, pp. 289–90; [Anon.], 'The Northwick Park Hospital Project', *The Hospital*, 59, no. 12 (1963), pp. 729–32; [Anon.], 'Northwick Park Hospital and Clinical Research Centre, II – Architectural Solutions', *British Medical Journal*, 5 September 1970, pp. 577–80.
- 66 Quoted in Hughes, 'Indeterminate Building', pp. 100–01.
- 67 Gleave, 'Planning of a General Hospital', p. 658.
- 68 'Vale of Leven Hospital, Alexandria, Dunbartonshire', p. 389. The expressive escape stairs on the central spine (seen in the photograph in Figure 11) recall Alvar Aalto's Baker House at the Massachusetts Institute of Technology, designed in 1946.
- 69 The ground-floor corridor, or spine, was described as the 'main street' of the hospital in [Anon.], 'Hospital in Dunbartonshire' [sic], *Architects' Journal*, 3 November 1955, p. 598.
- 70 Royal Institute of British Architects, *The Orientation of Buildings; Being the Report, with Appendices, of the RIBA Joint Committee on the Orientation of Buildings* (London: RIBA, 1933); Lionel Pearson, 'Light and Air in the Modern Hospital', *Architects' Journal*, 16 November 1932, pp. 609–22; Lanchester and Lodge, 'Surgical Wards and Operating Theatres', *Architects' Journal*, 16 November 1932, pp. 623–41.
- 71 M. Hartland Thomas, 'Modular Co-ordination', *Architects' Journal*, 18 December 1952, pp. 741–47 (pp. 741–42).
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- 77 LHSA, LHB38/1/4, SERHB, works and buildings committee, minute, 12 July 1951.
- 78 NRS, HH51/343, letter from Forbes Murison, architect, Western Regional Hospital Board, to A. MacLehose, 6 July 1951; letter from A. MacLehose to P. Stewart Watt, 17 August 1951; letter from Forbes Murison to A. MacLehose, 31 August 1951; civil defence programme progress report, 29 October 1951; letter from A. K. Bowman to N. Graham, 16 November 1951; letter from F. Murison to A. MacLehose, 14 February

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- 90 Kerr, 'The Hospital of the Future?', p. 19.
- 91 Kerr, 'The Hospital of the Future?', p. 19.
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- 106 NRS, HH101/2761, note by P. C. Rendle to A. A. Hughes, 30 January 1961.
- 107 NRS, HH101/3293, letter from J. Campbell, secretary and treasurer of the board of management for Dunbartonshire hospitals, to P. C. Rendle, 9 July 1962.
- 108 NRS, HH101/3293, letter from Dr Bainbridge to P. C. Rendle, 23 July 1962.
- 109 Scottish Home and Health Department, *Vale of Leven Hospital*, pp. 60, 14 and *passim*. Closed wards at

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- 110 NRS, HH101/3293, Scottish Home and Health Department file, hospital building and maintenance, design of health service buildings, memorandum on circulating the operational study of Vale of Leven Hospital, 8 May 1962.
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- 112 NRS, HH101/3293, letter from Gleave to Hughes, 4 July 1963.
- 113 NRS, HH101/3293, letter from Gleave to Hughes, 4 July 1963.
- 114 NRS, HH101/3293, note of a meeting on 12 August 1963 with representatives of Ian Hunter & Partners to discuss implied criticisms of the consultant engineers in the report on the 'Hospital Design in Use' series on Vale of Leven Hospital.
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