Werk

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Library Architecture Group

Meeting at Leiden 13.–15. 2. 1984

Program:

13. 2. 14.00–17.00 Uhr New concepts for library buildings with contributions from Germany, Great-Britain and Sweden

14. 2. Conducted tour to new library buildings (Leiden, den Haag, Rotterdam)

15. 2. 9.00–12.00 Uhr EDP and library buildings with contributions from Germany and Great Britain

Participants

Etienne Geiss, Bibliothèque Nationale et Universitaire Section des Sciences, Strasbourg

J. R. de Groot, Rijksuniversiteit Leiden, Bibliotheek, Leiden

H. Faulkner-Brown, Architect, Newcastle upon Tyne

Hans-Albrecht Koch, Universitätsbibliothek, Bremen

Willem R. H. Koops, Rijksuniversiteit, Bibliotheek, Groningen

Franz Kroller, Universitätsbibliothek, Graz

Roland Mathys, Zentralbibliothek, Zürich

Elmar Mittler, Universitätsbibliothek, Heidelberg

Paul Niewalda, Universitätsbibliothek, Regensburg

P. G. Th. Schoots, Gemente Bibliotheek, Rotterdam

Esko Häkli, University Library, Helsinki 17

Edith Fischer, Bundesministerium für Wissenschaft und Forschung, Wien

Robert Würzl, Universitätsbibliothek der Technischen Universität Wien

Thomas Tottie, Universitetsbibliotheket Uppsala

Gerhard Munthe, Oslo

Louis-Daniel Perret, Bibliothèque Cantonale et Universitaire Lausanne

Kenneth Humphreys, Birmingham

Some thoughts on the design of British academic library buildings

HARRY FAULKNER-BROWN

Faulkner-Brown Hendy Watkinson Stonor, Architects, Newcastle upon Tyne

I was asked at short notice to stand in for a colleague who was unavoidably prevented from giving his paper. I was referred to and asked to comment on a recently published report:

HOCHSCHULBIBLIOTHEKEN – Alternative Konzepte und ihre Kosten. Bericht zu einem Forschungsprojekt von Horst Höfler, Lutz Kandel, Achim Linhardt. München; New York; London; Paris: Saur, 1984.

Without the ability to read the publication (in German) I was unable to respond appropriately. Although now I have had access to the publication for the past several months and have studied parts of its translated version, I consider that my original submission at the Leiden seminar remains an appropriate response. It deals with the various aspects of academic library building design, with which I have been intimately involved and the conclusions which have been reached by a process of close co-operation between librarians, architects, structural mechanical and electrical engineering consultants and with quantity surveyors, resulting in a beneficial on-going research and development programme.

I gave a paper titled "British Academic Library Planning 1966–1980" at your LIBER seminar on New Problems in Library Architecture held in Heidelberg in 1980 (LIBER Bulletin 16). Several of the points made in this paper continue to be valid and I have no hesitation in repeating them, since they are fundamental to the development of library building design.

It is pointless to deal with the detailed technical options of library building design without a clear understanding of the desired aims and principles.

Although internal arrangements and library services vary from place to place, generally recent academic libraries have a number of common factors, which I have crystallised into the following ten desirable qualities, or as some of your colleagues call them – Faulkner-Brown's ten commandments.

An academic library building should be

1 flexible with a layout, structure and services which are easy to adapt;
2 compact for ease of movement of readers, staff and books;
3 accessible from the exterior into the building and from the entrance to all parts of the building, with an easy comprehensible plan needing minimum supplementary directions;
4 extendible to permit future growth with minimum disruption;
5 varied in its provision of reader spaces, to give wide freedom of choice;
6 organised to impose maximum confrontation between books and readers;
7 comfortable to promote efficiency of use;
8 constant in environment for the preservation of library materials;
9 secure to control user behaviour and loss of books;
10 economic to be built and maintained with minimum resources both in finance and staff.

The techniques involved in the design of the building should attempt to contribute to the realisation of these qualities.

From what I was able to understand from this previously mentioned German report, a series of conclusions were prescribed which appeared to be recommending a number of economies in the design and use of academic library buildings. I was unable to comment in detail on each of these, merely to describe the experience of these problems in Britain and our own conclusions.

The report among others dealt with recommended changes in the library's aims and reductions in organisation, floor space, principles, comfort and standards of building and mechanical equipment. Our experience leads me to agree entirely with making these changes in European academic libraries and to suggest that we have gone a long way to produce buildings which have maximum appeal to and acceptance by the users, at minimum cost.

Change the aims of the library

The report suggests that academic libraries do not satisfy the needs of the users – professors, tutors or students, they do not make sufficient use of the facilities and collections of the City and other libraries, and they do not provide sufficient multiple copies of most used (text) books, since students need to buy so many books themselves. I cannot really discuss this matter in any details since this is a problem of librarianship rather than building design, but I can say that in all our libraries we do provide a substantial undergraduate reserve collection for short loan books, containing multiple copies of text books usually nominated by course tutors.

There is also a section of reader services dealing with inter-library loans which supplements and extends the collection available to users, most particularly by using the British Lending Library Division (BLLD), placed centrally in Britain at Boston Spa, which, as you know, offers a fast, comprehensive loan service to libraries all over the world. In one of my latest libraries – Newcastle, there is a joint co-operative scheme between the two local Universities, the Polytechnic and the City libraries which sends a library van to Boston Spa every day on a "library milk-run" which gives a very efficient service at quite a low cost.

Change the organisation and reduce library floor space

The principal item recommended was to suggest that the reader accommodation should be more economic and that the collection should be reduced every year. Although most members present will be familiar with the British Government's acceptance of the "Atkinson Report", and although comments on these items were made in Part 2 of my last paper to you (1980), I feel I must repeat it in total –

"The second part of this paper – Government factors and others which have affected the design in libraries – is one which has exercised the ingenuity of librarians and the imagination of architects for some years. The size of academic library buildings is the real subject of this part.

In the sixties and early seventies it was generally accepted by the Government, the agent for which is the University Grants Committee (UGC), that the total number of reader and study places throughout the University was not normally to exceed:

one seat for every three arts undergraduate students
one seat for every five science undergraduate students
one seat for each arts postgraduate student
one seat for every three science postgraduate students

These ratios were applied to FTE (full-time equivalent) student population anticipated at the time of opening of a new library.

The areas allowed for housing books and the collections of the University were based on the size of the existing collection, plus the projected annual acquisition rate multiplied by ten years from the day the building was to be opened.

In May 1973 the UGC sent to all Universities a paper detailing the norms for university library accommodation, whereby the accomodation entitlements were further reduced. We find that reader place provisions are reduced to 1:5 for all arts students and 1:7 for all science students, and book accommodation confined to 5.83 m^2 per 1000 volumes. These norms pertained (amended in February 1974) to control entitlement until 1976.

I would like to quote Sir Frederick Dainton, who then was Chairman of the UGC.

"By the end of 1974 the University Grants Committee had come to the conclusion that they were clearly not going to have enough resources, either in the short term or the long term, to build new libraries at all universities on the scale needed to match an indefinitely growing number of books. Even if this had been possible it was doubtful whether it would have been the most sensible course to follow. Early in 1975, therefore, the Committee established a Working Party unter the Chairmanship of Professor Richard Atkinson to review their policy for the provision of library buildings."

Professor Atkinson and his colleagues analysed the situation in the 44 Universities which are the concern of the UGC and produced a number of facts which confirmed and quantified the assumption that the resources would not match the need as seen.

A report was produced, commonly called "The Atkinson Report", which made a number of recommendations including:

1 The assessment of future university library building requirements on site should be based on the concept of a self-renewing library, that is, a library of limited size in which beyond a certain point material should be reduced at a rate related to the rate of acquisition.

2 The appropriate size for a university's main library building or buildings should be assessed by:
First applying the norm of 1.25 m^2 to planned FTE student numbers;
Secondly adding an assessed provision for any special collections;

Thirdly adding a provision for future growth at a rate of 0.2 m^2/FTE student applied to forecast numbers 10 years ahead;
Finally making adjustment for special circumstances.

3 Only if the area established on a self-renewing basis significantly exceeds the area of existing building should the possibility of building a new library or library extension be considered (unless the project is justified on grounds other than those of the space requirement, e. g. obsolescence).

4 Provision should be made for a local reserve store where the existing buildings, together with any likely to be programmed in the near future, are insufficient to accommodate a university's holdings and no case can be made under recommendation 3 for a new library building or extension.

5 Subject to local circumstances, the size of a reserve store should be limited to the accommodation required for about 5 years' accessions at current rates. Stores should be as simple as possible; in many cases it should be feasible to meet the need by renting rather than purchase or new building. Where the excess of space in existing buildings over the notional area established under 2 is substantial, the possibility of providing the necessary reserve within existing buildings at the cost of some curtailment of open access should be considered.

6 Once a university's reserve store is filled it should be expected to dispose of surplus stock, normally to BLLD.

7 Universities currently facing a shortage of space for books should consider sending a proportion of lesser used journals to BLLD now.

8 The UGC should be consulted if a university intends to accept a donation of more than 5,000 items, so that the financial implications may be fully considered.

I have designed three "Post-Atkinson" libraries and as an architect I have not felt constrained by the new norms. It is left to the design team, including the librarian, how to maximise the use of the allowable floor space within the overall authorised area.

What the report has done is to indicate to the Government that the UGC has a firm, clear policy on library provision. Some results are the reverse to what was anticipated. The recommendations would seem to indicate that the BLLD at Boston Spa would have been swamped with relegated books from the low-use stock of university libraries. Most surprinsingly, the reverse is true. The number of withdrawn books from academic libraries has fallen to about one third of the quantity in the "pre Atkinson" period, whereas public library relegations to BLLD have increased. Perhaps university libraries are concentrating on finding low-use book storage on the campus or in cheap local warehousing premises, or perhaps there has been a contrary reaction by British academic librarians to conserve their collections. Whether this is a short term phenomenon or not, remains to be seen.

Reduce principles – flexibility and expandibility

My first "commandment" is that the building should be flexible. To reduce flexibility unnecessarily is to impair its future use and improperly to reduce the ability to make future changes to the layout and planning arrangements since it is impossible to predict future changes in library methods and facilities.

Flexibility, of course, does not mean that the structure is flexible and will bend or move under stress. A flexible library building is one which permits flexibility in the layout of its planning arrangements with structure, heating, ventilation and lighting arranged to facilitate adaptability. By arranging columns at regular spacing, and by designing the floors to carry a uniform superimposed live load, it is easy to move bookshelves, reader places or other library functions to any part of the building.

The University Grants Committee produced an unpublished preliminary report of a Library Working Party in 1971. One item which is explored thoroughly was floor loading, and found that several library buildings had floor loadings lower than the then accepted standard of 10 kN/m^2. After sampling a number of libraries, and examining books and shelving for weight and measurement, the Working Party's final recommendations were: –

Floor Loading

1 An equivalent uniformly distributed load of 6.50 kN/m^2 can be considered for structures spanning 2.44 m or more, and capable of uniformly distributing the load at right angles to the line of bookstacks.
   (a) In-situ reinforced concrete floors would satisfy this lateral distribution condition.
   (b) Special or proprietary concrete types of floor (e. g. hollow pot, pre-stressed planks) should have sufficient shear resistance between units and ribs to satisfy the conditions described above.

(c) With floors composed of spaced out beams with effectively simply supported slabs between them, the beams would be satisfactory if adequately stiff transverse spreaders were used between them.

2 If there are no spreaders, the beams, if spanning 2.44 m or more, should be designed to carry an equivalent uniformly distributed load of 7.50 kN/m^2.

3 Joists of timber or steel spanning 2.44 m or more and supporting normal timber boarding without special spreaders should be designed for an equivalent uniformly distributed load of 7.50 kN/m^2.

In all cases, the boarding or slabs and joists spanning less than 2.44 m should be checked for the worst cases of shear bending or deflection, caused by the actual line or point loads of the stacks together with a live load of 2.00 kN/m^2 between the stacks.

Convertibility requires that the entire floor area of a library should be capable of taking a book load. Librarians expect most libraries to undergo re-organisation every five years or so, and in some flexible buildings in this country experimental layouts have been tried even more frequently. We have included for book loading throughout the floor area in the revised cost limits.

In most university libraries it is desirable to be able to increase the book storage capacity of the building by planning stacks at closer centres of about say 1.14 m. This involves an increasing load to about 7.50 kN/m^2. This can be achieved quite cheaply, within the proposed expenditure limit. Reduction of stack centres from 1.37 to 1.14 m increases book storage capacity by 12 %. The addition of a shelf throughout the stack can increase capacity by as much as 16 %, and further savings are possible 'in extremes' by reducing cross access aisles, and placing bookshelves against vacant walls. Some libraries shelve their books by size. Most university libraries shelve by only a few sizes, e. g. miniature volumes, standard volumes, folios, quartos and maps. Large research libraries can, however, shelve according to a more narrowly defined range of size. This can effect a saving in space of the order of ten per cent or more. In most libraries the break up of subjects into units of size would, however, disrupt bibliographical sequences too much.

In practise we used 6.5 kN/m^2 on all upper floors and increase this to at least 11 kN/m^2 to support compact shelving on the ground floor slab.

The grid size is an important element in evaluating the economy of structural solutions. The decision to use a particular type of construction is related also to building height. We prefer to distribute mechanical and electrical services in the ceiling spaces in the building so that change of use in the working and storage space can take place without the need to make expensive services alterations. The ceiling space therefore needs to be as free as possible from obstructions such as beams. We therefore favour a continuous "flat slab" type of construction with small square columns with mushroom heads. This type of construction is quite economic up to spans of about 7.5 metres, and since the distance from ceiling to floor above can be kept to a minimum there is a consequent economy in the height of the building and its cost. A structural grid which accommodates six shelves between columns has been generally favoured as being acceptable to users and librarians and can be afforded within government financial cost restraints.

Storey height, of course, has much to do with economy of construction. Because we are able to keep our structure/ceiling zone to a minimum thickness, the floor to floor heights are consequently small, and we currently achieve 1.125 m for the former and 3.675 m for the latter. This gives a floor to ceiling height of 2.550 m which is substantially less than some European standards, but with careful design and arrangement of ceiling profiles we consider this to be adequate, and it seems to have been widely accepted.

The UGC has quite positive controls on expandibility. The Atkinson Report changed a principle of planning libraries and recommended that the self renewing library became finite and made no allowance for expansion. Prior to this the UGC encouraged the reservation of land for expansion adjacent to the library, and we designed the structures so that future extensions would not be inhibited. There was never any allowance in the expenditure limit for increasing the size of services in anticipation of extension.

Reduce comfort and environmental standards

A fresh, constant temperature and humidity not only allows efficiency of use, it encourages it. Discomfort is caused if windows are opened – heat, cold, dirt and noise are offered 'open access' to the interior. Research into the preservation of library materials indicates that a constant environment is necessary, and where this is limited to the comfort of the users, appropriate standards for both are needed.

After much investigation the UGC made the following recommendations:

Rare book rooms should have a complete air-conditioning installation to BS archive standards, i. e. temperature maintained at a steady point within the range 13.0°–18.5 °C and relative humidity within the range 55 %–65 %. A recording Thermohygrograph should be installed and readings regularly checked. These rooms would in most cases contain pre-1820 material, and many ephemeral items or books printed on poor paper, which are now valuable. This recommendation does not involve an increase over existing allowances.

Open access stacks and areas designed for human occupancy should have a steady controlled temperature range of 18.5 °C in winter to 21 °C in summer, and a relative humidity range of 50 % RH to 60 % RH, never to exceed 65 %.

It is expected that close control of temperature will not be necessary, and that from time to time when the external climate is at an extreme, a substantial drift (up to 3 °C) can be tolerated over a period of time. These conditions will not embrittle books and papers, and they will, to some extent, slow down chemical changes within books, but they will not prevent the deterioration of chemically unstable papers, and it is possible that some books in this area will not last more than ten to twenty-five years.

We have for many years applied these standards to all our libraries. In controlling the cost of achieving this, we have adopted the following standards:

1 The building should be as compact as possible, with a plan proportion never to exceed 2 to 1 of external wall.

2 The window to wall ratio should never exceed 25 %.

3 All windows should be sealed except for about 5 % which should be locked, and opened officially only in event of the malfunction of the air conditioning system.

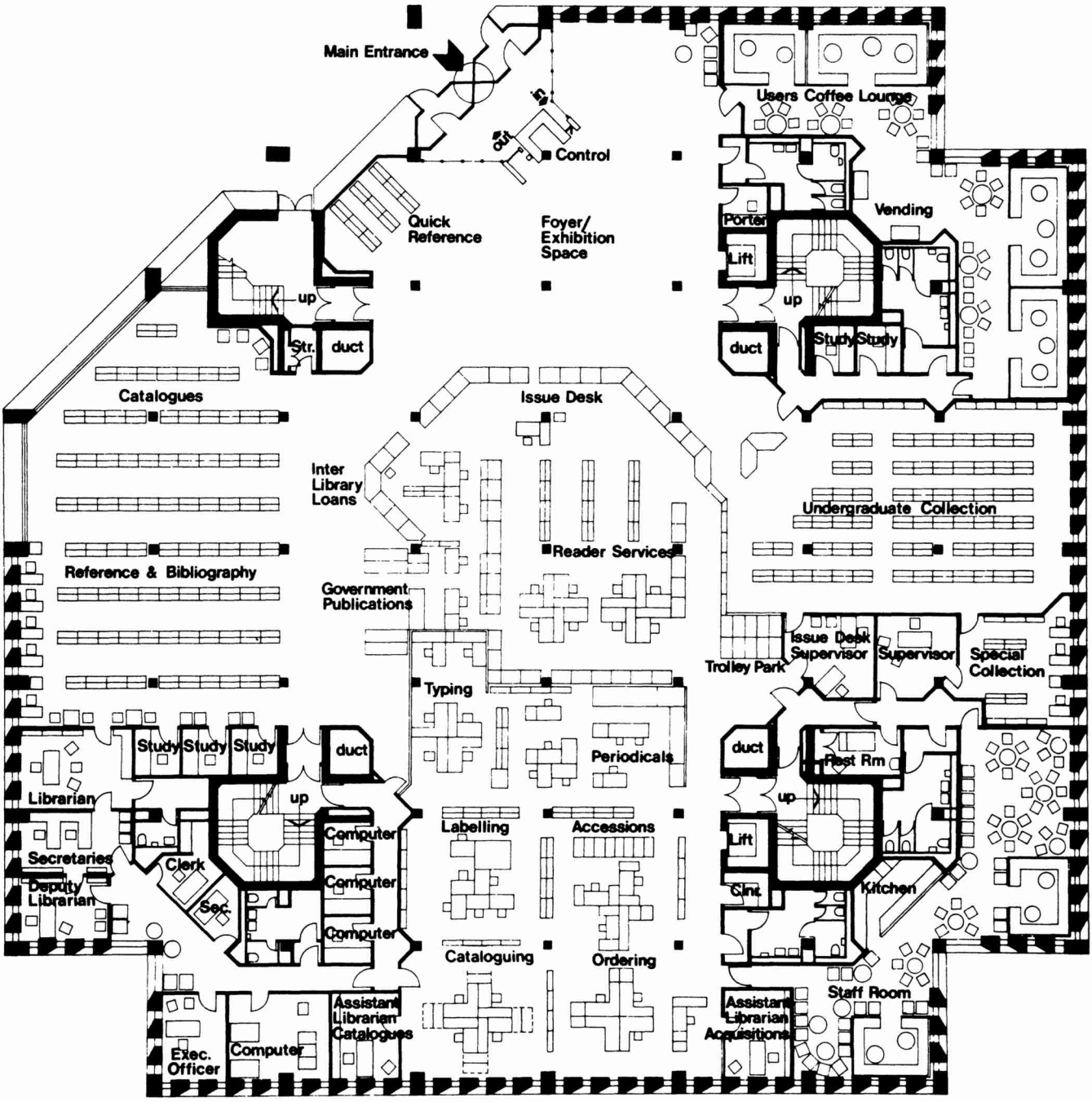
4 All external walls should be heavily insulated and thermally efficient.

5 The air conditioning system should be low velocity distributed in short runs of large diameter ductwork to economise in electric fan energy.

Reduce standards of building and technical equipment

In my 1980 paper I described in Part 3 an exercise we had carried out comparing two compact buildings (A & B) with air conditioning, with naturally ventilated rectangular building (C), with a wall ratio of 4 to 1 length to width, all of equal floor area. The result was that the square compact building with low velocity air conditioning (A) was more energy efficient than the other two. This exercise has now been extended to demonstrate the energy efficiency of building with a number of different plan shapes. They have been evolved by studying the plan shapes resulting from the British Building Regulations controlling escape in the event of fire.

The last University library I built is at Newcastle upon Tyne, and I have spent a great deal of effort making it energy efficient. It ist roughly square on plan (10 800 m^2), has heavy walls to blend with adjacent Georgian terrace houses, well insulated with small shaded windows. It has been divided into four equal square zones each served by a core. Each core has a small self-contained air-conditioning unit above so that each unit supplies a quarter of the total volume of conditioned air. This arrangement has kept the length of air ducts very short and therefore they are able to be large in section area. Low velocity air, a low consumer of fan electric energy, is therefore possible and this library is similar to building A in the previous example.


Main Entrance
Users Coffee Lounge
Control
Quick Reference
Foyer/ Exhibition Space
Vending
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Issue Desk
Inter Library Loans
Undergraduate Collection
Reader Services
Reference & Bibliography
Government Publications
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Librarian
Secretaries
Deputy Librarian
Clerk
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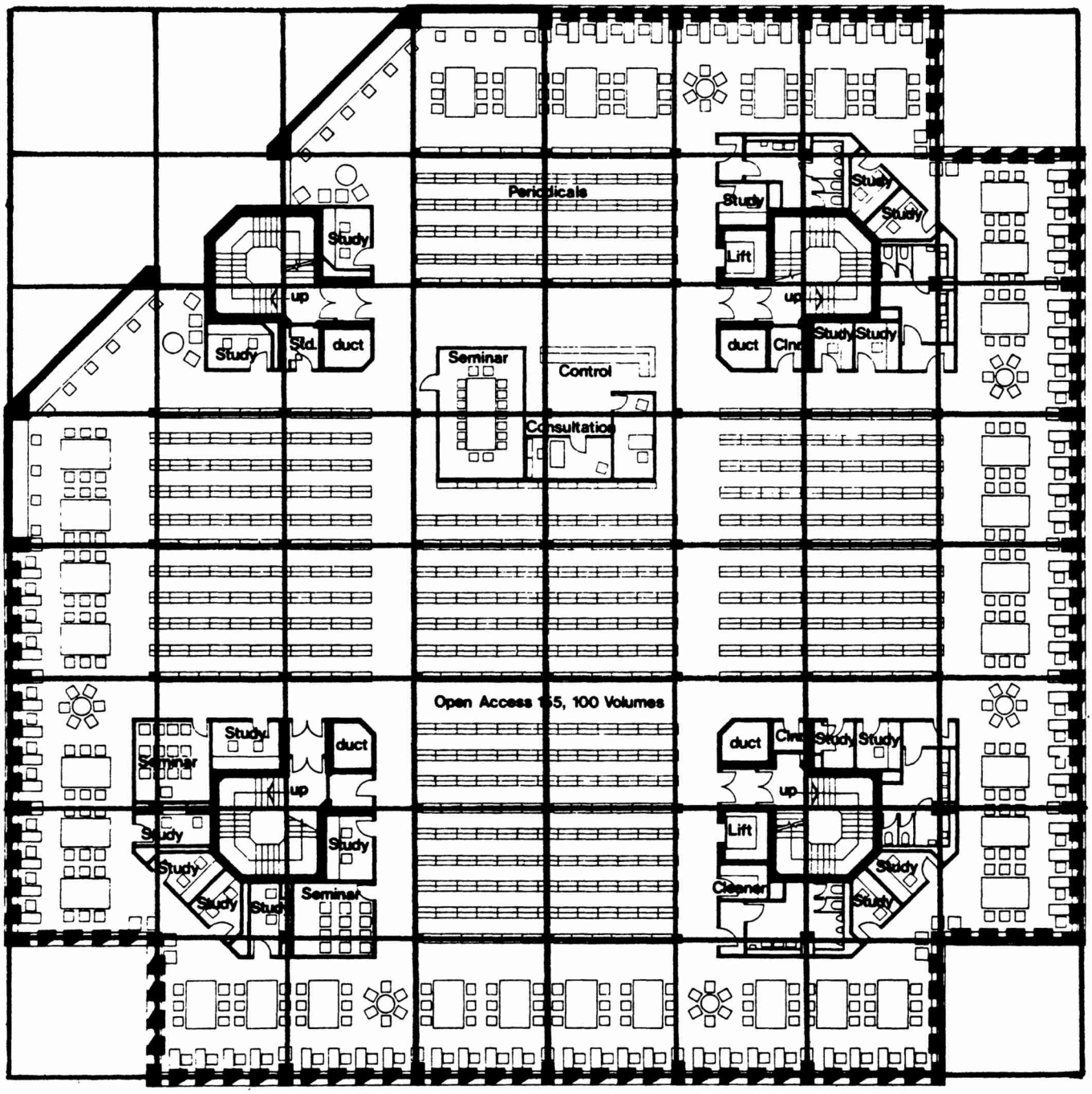
Assistant Librarian Catalogues
Assistant Librarian Acquisitions
Exec. Officer


Periodicals
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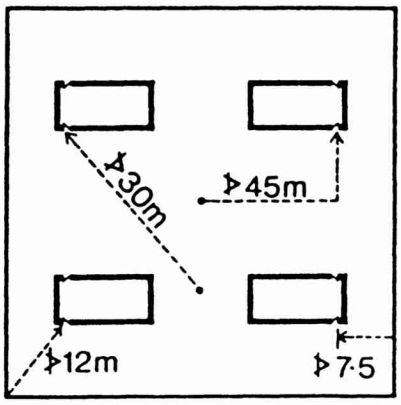
Cleaner
Study

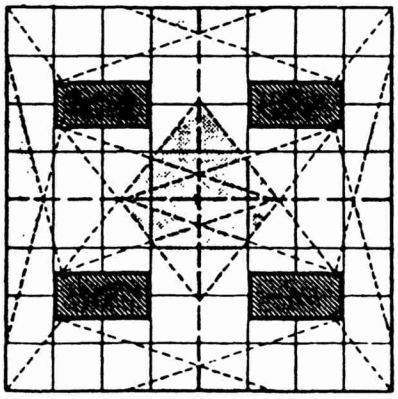
Let us examine the build-up of a library with a small square bay or module size roughly of say 6.50 m. If we assume a building of four floors each of area 2704 m^2 to give a total area of 10 861 m^2, quite a common size for a British university library building, we will have four square zones, each zone consisting of sixteen square bays or modules and for the purpose of this study I have rather generously assigned two of them for the core, each core containing one stair with two doors, spaces for ducts, toilets, lifts and service areas.

The travel distance requirements of Code of Practice No 3 and the several building regulations vary in detail. The most stringent is the Greater London Council (GLC) Code of Practice: means of escape in case of fire, and the travel distances it requires as applied to library buildings, briefly and in general terms are:



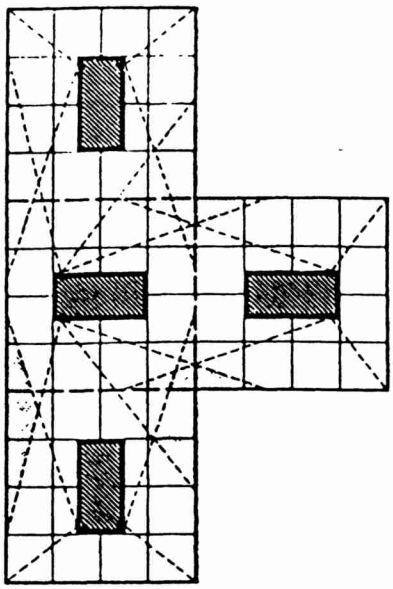
The direct distance to the nearest exit should not exceed 30 m except in a dead end where the distance is reduced to not more than 12 m, with the actual travel distance not exceeding 1½ times the direct distance in any case, to make it 45 m. The shortest distance from the ends of the building to the access doorway to the protected staircase is generally not greater than 7.5 m. Exits are to be remote from one another, sited at intervals not exceeding 60 m apart and distributed uniformly around the perimeter of the storey.

4 zones of 16 bays



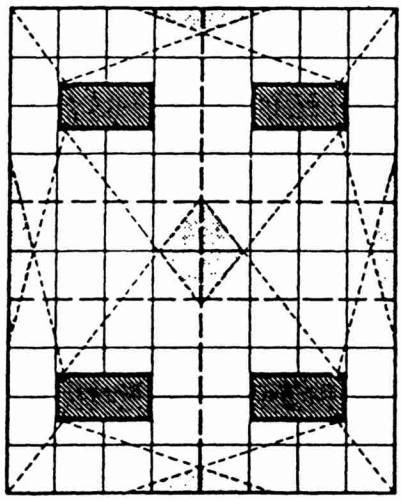
Type 1. 64 bays/floor
256 bays total

When this is applied with the distance realistically set out there are obvious areas of overlapping indicating that there could be an improvement in planning efficiency.



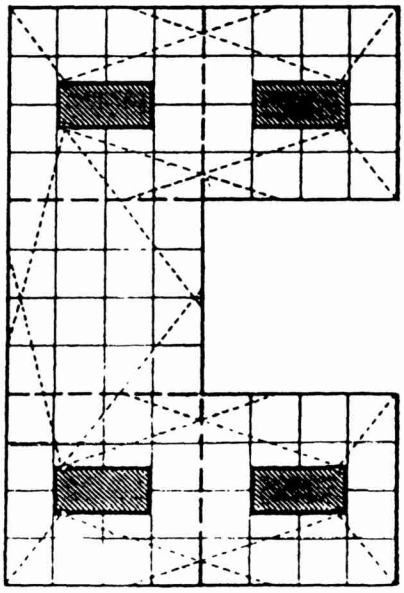
Type 2. 64 bays/floor
256 bays total

Due to site constraints or other factors it might be necessary to re-arrange the zones. The floor area is the same. The wall/floor ratio is greater (..poorer). There are still overlapping zones.



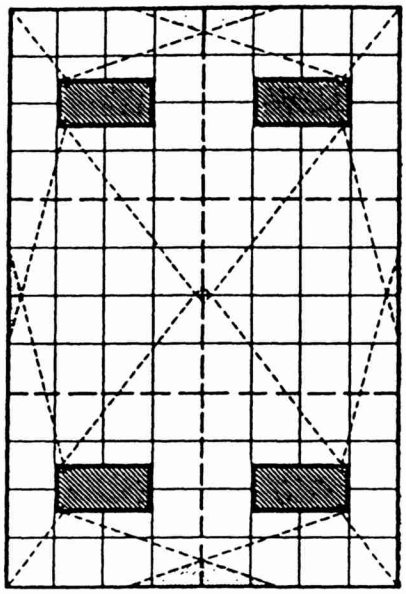
Two half zones can be inserted. Each floor increases by 16 bays ormodules. The wall/floor ratio is improved. There are still overlapping zones.

Type 3. 80 bays/floor
320 bays total



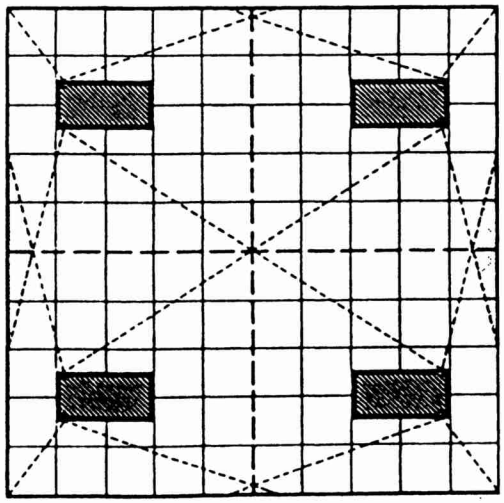
Two half zones can be combined to give same area as 3. Wall/ floor ratio poorer. Still overlapping zones. Core unnecessary in new zone.

Type 4. 80 bays/floor
320 bays total



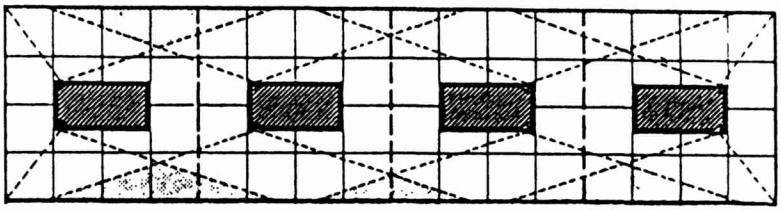
An additional zone can be added without additional cores. Each floor is increased by a further 16 bays or modules. Wall/floor area is improved. Overlapping of zones is now negligible.

Type 5. 96 bays/floor
384 bays total



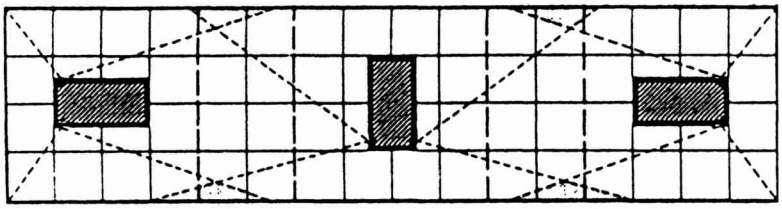
Building is extended by increasing to 100 bays or modules. Wall/floor ratio is improved. Travel distances are at maximum.

Type 6. 100 bays/floor
400 bays total

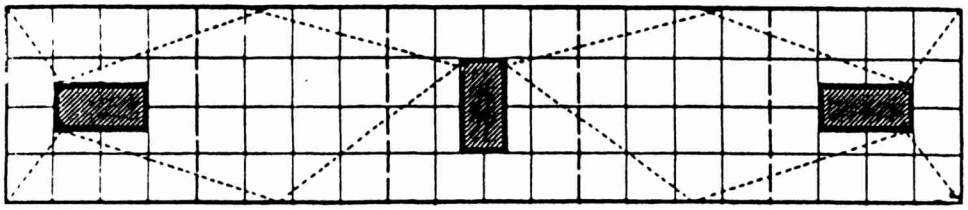


Original series of four 16 bays zones have been re-arranged into a linear plan with either 4 cores or 3 cores. Wall/floor ratio larger than similar area in No. 1 .. poorer. Large overall increase in travel distance.

Type 7. 64 bays/floor
256 bays total

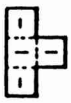


Type 8. 64 bays/floor
256 bays total



Linear plan is increased by a further zone or give area similar to Nos 3 and 4. Poor wall/floor ratio.

Type 9. 80 bays/floor
320 bays total

Type		Area Comparison						Annual energy		
No	Plan	Floor(s)				Wall/ floor	Balance /gross	heating + cooling + lighting + power		
		Bays	F/s	m	ft	%	%	kw/m^2	Btu/ft^2	1982 Cost £/m^2
1		64 128 192 256	1 2 3 4	2704 5408 8112 10816	29107 58214 87321 116428	27.69	36.80	121	38000	4.84
2		64 128 192 256	1 2 3 4	AS No 1		34.60	26.40	127	40000	5.08
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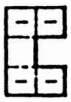
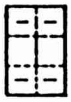
4		80 160 240 320	1 2 3 4	AS No 3		33.20	22.90	133	42000	5.32
5		96 192 288 384	1 2 3 4	4056 8112 12168 16224	43660 87320 130980 174640	23.00	21.80	131	41000	5.24
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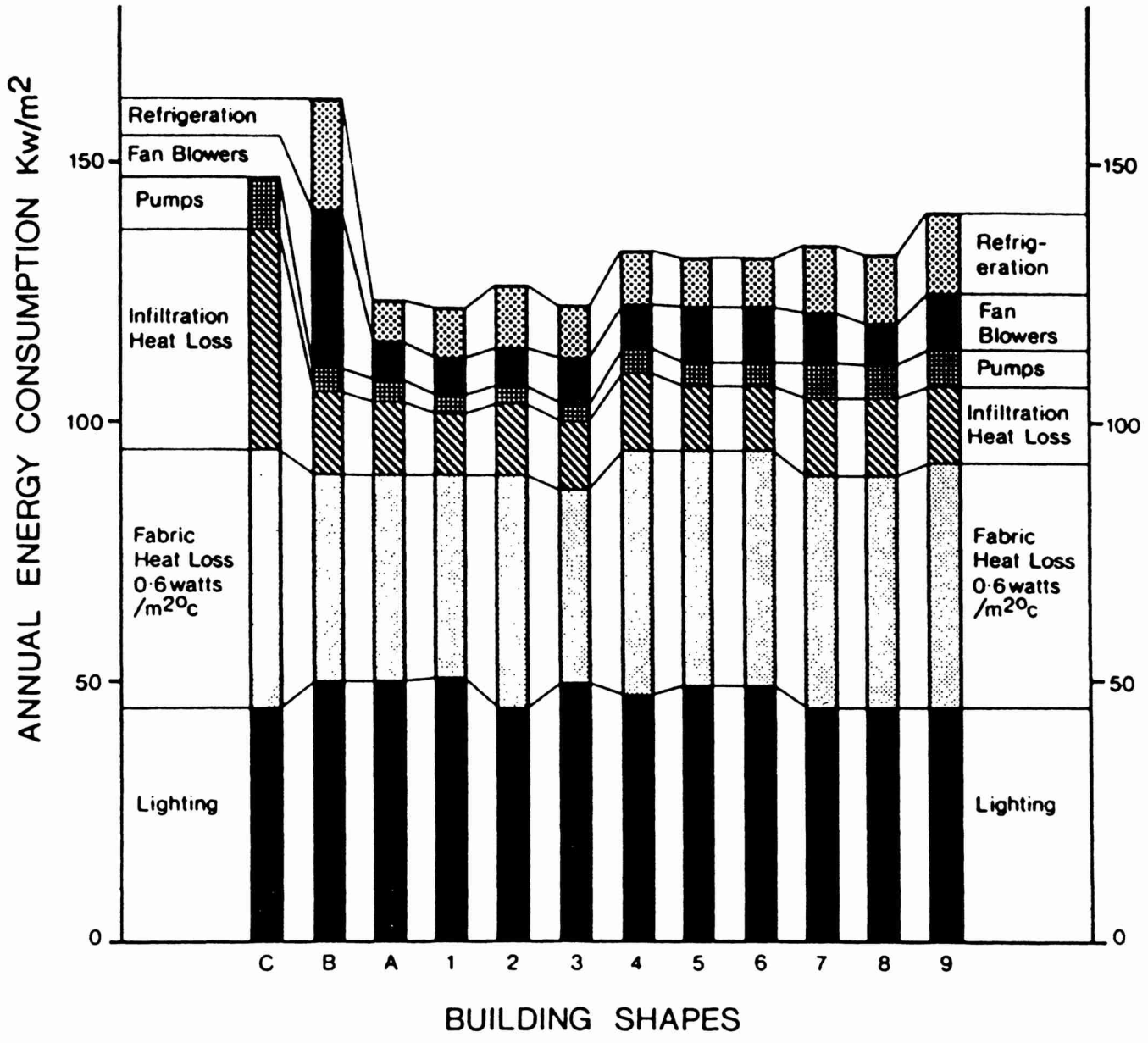
Annual energy consumption



Comparison of annual energy consumption

When these building shapes are compared and are related to the previous examples, the advantages of one to the other can be seen. Diagrams Nos 1 and 3 with 64 and 80 bays or modules/floor obviously lead with the lowest wall/floor ratio and the lowest running costs/m^2. However number six has the lowest balance area and is possibly the lowest in capital cost.

The squarish compact plan so right for library needs seems to be right for energy conservation and economy.

Lighting standards in our buildings have been relatively simple to maintain since the UGC recommendation of 400 lux uniformly distributed throughout (with the exception of service and store rooms) gives adequate illumination both on the working plane and on the spine of books on the lowest shelf. We try to keep our light fittings simple, inexpensive and as high as possible. We have achieved the latter by designing a folded ceiling throughout all public areas. Economy in electrical energy can be effected by having time switches for sections of the book accommodation. It also results in savings in air conditioning capital and running costs since heat gains from lighting are reduced to a minimum.

Conclusion

The British method of producing acceptable library buildings at an economic capital and recurring cost, is to set limits on the area provided (Atkinson) and to apply a unit cost limit. At the moment (1985) it is £ 567/m^2 usable area. This roughly equates to £ 430/m^2 gross area. By not setting standard solutions or norms, the ingenuity of the design team can operate without restraint within the expenditure limit.

New concepts for library buildings: A contribution from Sweden

THOMAS TOTTIE

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When Mr. Kroller asked me to lend a Swedish voice to today's discussion, I was a little hesitant. I am not at present involved to any great degree in questions of building, even though it is true that in Uppsala we are expanding our library system through the creation of relatively small branch libraries. At an earlier period, though, I was concerned with the planning of the biggest modern library building in Sweden: Stockholms University Library at Frescati. I have also some experience of the enlarging and remodelling of older libraries, first and foremost Carolina Rediviva in Uppsala and the Royal Library in Stockholm, the national library of Sweden.

During the earlier part of the twentieth century very few new academic library buildings were erected in Sweden. Extensions were added to Uppsala University Library in 1911–17 and again between 1934 and 1945, and the Royal Library in Stockholm in 1926–27. After the Second World War, Gothenburg University Library was rebuilt in 1951–54, and Lund University Library was expanded in 1954–57. Further extensions were made to the Royal Library (1955–1969) and Carolina Rediviva (1966–1970).

At the end of the nineteenth century Sweden abandoned the old hall-libraries and, following the example of the British Museum, took to building libraries where the bookstack was disposed around one or more reading-rooms. Modern ideas about library management, however, took a long time to penetrate in Sweden. The libraries were built exclusively for closed access and the books were arranged systematically on a locally devised classification system. The number of seats for readers was very limited. Outwardly, these libraries presented an imposing, monumental face to the world.

As long ago as 1878 the Bibliothèque Nationale, under pressure from the ever-increasing production of printed matter, had gone over to numerus currens, or "classement mécanique" as they called it. Germany was soon to follow; there, Georg Leyh conducted a powerful campaign for the system, notably in a series of articles in Zeitschrift für Bibliothekswesen in 1912 and 1914. In Sweden it was not until the nineteen-fifties that the system began to be used, first of all at Gothenburg University Library (to give it its present name) and at the library of the Royal Institute of Technology in Stockholm. In 1956 a system of numerus currens was introduced at the Swedish national library. The other big Swedish libraries were soon to follow its example. The primary reasons for the adoption of numerus currens were financial. Together with the introduction of compact shelvings and a central deposit library for the Stockholm area, numerus currens enabled the libraries to take charge of and house great quantities of literature in an economical fashion.

In another way too numerus currens came to be of significance in the management of libraries. Leyh long ago pointed out how numerus currens could facilitate the placing of the most recent and the most frequently used publications near to the reading rooms, or in some other way make them readily available when required. At the same time, however, it is undeniable that the system entails problems for borrowers when there is direct access to the collection. In this respect the development was headed for a collision with a second influential tendency of the time: open access to the collection. From the nineteen-fifties onward, Sweden, like most other industarilised countries, experienced the beginning of a rapid increase in student numbers and a great development and expansion of the universities. Academic libraries were of course affected by this, and during the sixties and seventies very considerable expansion took place in this area too. In 1964 the National Librarian of Sweden, Uno Willers, tried to establish certain norms of determining the right size for libraries. One of his proposals was that the norm for the ratio of library seats to students should be one seat to every three students in the humanities and social sciences. For libraries in places of higher learning newly founded in towns previously lacking them, a particular initial 'basic area' was also advocated. Another norm proposed by Willers was that the library of a new college should have the equivalent of one employee in a medial salary grade to every 200 students. (The norm was intended to relate to the library complex as a whole, i. e. including departmental libraries and libraries providing student textbooks.) This proposal for the establishment of norms

also implied a certain fixed relationship between the number of students and the size of the book-purchase grant. On this point, however, events took a different course.

The first large library building to which these norms were applied was the new university library at Umeå in northern Sweden. The building was finished by 1968, and provided an influential model for the new libraries soon to follow at Linköping (1969), Ultuna outside Uppsala (1975), Lund (UB2, 1977) and Stockholm (1983).

Umeå University Library was also the first big academic library in Sweden to be built with open access to the greater part of its holdings. The whole plan (like that at Frescati later) shows very clear signs of influence from American conditions. Originally the idea had been to erect subject-oriented reading-rooms with stacks adjoining. In the end, however, it was decided instead to create a large reading area, common to all subjects, for research scholars, and complement this with a students' reading-room. The device of bringing together literature appertaining to different subject-areas, along with seats for readers, allowed great flexibility. The research scholars' area came to be heavily frequented, not, however, only by scholars but also, quite often, by students, who in fact did not need access to the literature housed there. The students' reading-room on the other hand, was little patronised; with only a small quantity of literature to a large number of seats it was felt to be cheerless. One consequence of this low degree of utilization was that the authorities modified the norm by considerably reducing the number of readers' seats in the formula.

One lesson which Umeå, and indeed other Swedish university towns, provided was that the distance between the library and the various departmental buildings was often of decisive importance. This is particularly true of the natural sciences, medicine, and other experimental branches of inquiry. The new library building at the Swedish University of Agriculture at Ultuna outside Uppsala is most attractive, with a large number of readers' seats and totally open access to the collections. Despite this, it is visited relatively seldom by researchers from around the extensive campus. They prefer to send in their orders for books by messenger or post and have the books despatched to their own department. In Umeå and Lund, too, it has become clear that the teacher and research workers in the Faculty of Medicine rarely visit the Library. In Umeå it has recently been decided to accept the implications of this and move the medical literature to a branch library within the hospital area.

As I have already stated, Stockholm University Library at Frescati on a campus site outside Stockholm is the biggest modern library building to have been erected in Sweden. Planning began as long ago as the mid-sixties, but the building was not completely ready until the spring of 1983. Originally it had been intended to be even bigger, but, in consequence of the lessons of Umeå, the number of readers' seats was reduced from 2875 to about 1400. Instead, a large examination-hall was included in the building, intended to function as a buffer-zone. In connection with the Frescati project the National Board of Public Buildings in Sweden sponsored the publication of a handbook on the planning of library premises *(Universitetsbibliothek.* KBS-rapport nr 65, February 1974). This book lists, among other things, a large number of norms for the width of corridors and passages, for readers' seats, lighting, and various kinds of installations such as water, heating, electricity etc. To determine the appropriate size of the areas for readers and for library staff, however, reference is made to a somewhat older publication, which partly goes back in turn to the figures recommended by Willers. (LUP-nämnden. *Behovet av läs- och arbetsplatser inom universitetsbibliotheken.* Stockholm 1973). Subsequently, certain modifications to take into account the effects of the 1977 reform of higher education were made in a report published by the National Board of Public Buildings in Sweden. (*Programmering av lokaler för högskolan.* UHA-rapport 1980: 18.) As the Frescati building, among other instances, has demonstrated, however, these norms have not been considered binding but as susceptible of adaptation to individual cases.

The Frescati Library is still so new that it is too soon to pronounce a definitive judgment on it. What we can say, though, immediately is that it attracts a great number of readers, not surprisingly in view of the fact that Stockholms University has about 28 000 students and is arranged on a campus. As this library building is so new, I have brought with me a quantity of informative matter in English for those who are interested. In this one can see, among other things, the big open-access collections – 8000 shelf-metres – complemented by large closed stacks on three lower storeys. The library is in large part built on the modular-library principle and is very flexible. The majority of the departments within the Faculties of the Humanities and the Social Sciences are housed in a large building-complex immediately to the south of the library. This complex is physically attached to the library building, thus facilitating direct contact between the two. This was done as the result of a suggestion from the American library consultant Professor Ralph Ellsworth, who acted as an adviser at the

planning stage. A similar plan has in fact been recently adopted in Gothenburg by joining together the extended central library with the projected premises of the Faculty of the Humanities. In Gothenburg too, this development will mean that a large part of the collection (some 11 000 metres) will be immediately accessible to the readers. A description of the project has been given by the Chief librarian, Paul Hallberg, in LIBER-Bulletin nr 16 (1981).

Sweden has by no means been exempt from the economic recession of recent years and, just as in Germany and elsewhere, we have had to discuss ways of making economies and increasing the efficiency of our operations. So it was with much interest that I read the report on *"Alternative Baukonzepte für zentrale Einrichtungen an Hochschulen"*, München 1984). My overall impression is that those who wrote the report are more knowledgeable about buildings than about libraries. This is particularly noticeable in Section 2.2, "Veränderung der Betriebsorganisation". Even so, I am in principle favourably disposed to discussing matters of this kind. Discussions of methods may well be needed, and earlier approaches must be critically examined afresh. For instance, it can hardly be economically sensible to build libraries with big open-access collections which are then mainly used as lending libraries. Recently there has also been some questioning as to how far flexibility should go. It has, for instance, been pointed out that these requirements can sometimes lead to considerable difficulties in the environment of the library, difficulties whose solution is neither cheap nor easy. (Cp. Brigitta Bergdahl. *Klimat i bibliothek*. Rapport TRITA-LB 1075. Stockholm, August 1977.) This does not of course mean that we should begin once more to erect inflexible and static buildings where every separate function has its fixed, immovable place. But just how much flexibility is desirable may be discussed in each individual case. Even the old hall-libraries have often shown themselves to be flexible if they were constructed on sufficiently ample lines.

Personally, I believe that the central library in the university system can often be quite well suited to its purposes even if, as in the older type of library, it separates readers and books and in this way economises both on energy and on space. This does, however, assume that readers' need for ready access to the latest literature is met in some other way. In Uppsala, for instance, we have tried to solve the problem by creating branch libraries, containing recent literature, in close connection with the individual departments. This, however, assumes that there exists an overall plan of locales throughout the university so that closely related departments are grouped together. As we all know, this is unhappily by no means always the case.

It is not my intention to comment here on all the suggestions in the German report. One point, though, which I wish to make is that the authors, in my opinion, underestimate the difficulties involved, in large and long-established university libraries, in sorting out and storing elsewhere the less needed volumes. Even if it is true that so-called deposit libraries can sometimes save heavy building costs (above all in big city areas), in the long run their running expenses prove very considerable. I found this out for myself when I was at one period the head of the Library of the Carolin Medico-Surgical Institute, the national library of medicine in Sweden. One would think that, if any type of literature could be sorted out and conveyed to a deposit-library, it would be works on medicine. Nevertheless, the task of bringing in works ordered from the deposit often proved a burden. Unless land-prices are very heavy ideed, it is often cheaper in the long run to erect storehouses adjoining the library istself. We have also become much more conscious now of the cost of maintaining an extensive van-service. The German authors' wish to see a so-called zero-growth library will unquestionably meet the same difficulties as were brought to attention some years ago in the objections adduced against the Atkinson Report.

One feature of the report which is bound to strike a Swedish reader is that the norms which appear to regulate many German university library buildings seem considerably more generous than the corresponding ones – if they are applied at all – in Sweden. At Uppsala University, for instance, there are in all 1800 seats for readers, distributed between the main library, ten branch libraries, and some 130 departmental libraries. The university has all together 15 000 undergraduate students and 3000 graduate students, plus, of course, the academic staff. This works out at about one seat to ten persons. In Stockholm, with a good 28 000 students, conditions – despite the new library building – are less favourable still. In Gothenburg, the Central Library, even after enlargement, will contain only 394 seats for readers. Even bearing in mind that the Gothenburg library system embraces many other entities, this is a modest provision for a university with some 21 000 students.

As far as air-conditioning is concerned, it has for some years been forbidden in Sweden to moisten the air in state-owned libraries, expect in specially selected storehouses. The reason is not only the energy crisis but also the difficulty, in our climate and with modern building-methods, of coping with its effects on outside walls, the roof etc.

As for student text-books, the position in Sweden is that to a very large degree the students buy their own copies. The Uppsala University Library's purchasing budget for foreign literature amounts to nearly seven million Swedish Kronor per year, and of this only some 250 000 kronor is assigned to text-books. Of the c. 4 million Kronor which the departmental libraries spend annually on book purchase, an insignificant amount goes on text-books.

I should like to conclude this little contribution by saying something about my own library, Uppsala University Library and its principal building, known under the name *Carolina Rediviva*. This building was erected between 1819 and 1841. Since then, it has been modified and added to at four periods. It has been successively transformed from an old-fashioned hall-library to a modern university library with six reading-rooms, closed-access collections of some 65 000 shelf-metres, and Sweden's biggest reference-library. The library building – like the library itself – is the largest in Sweden. Of course, an old building has its limitations. In an evaluation carried out by the National Boards of Public Buildings in Sweden after the latest modification and enlargement in 1966–1971 of the 130-year old library building, it was stated that this had been a financially far better alternative to erecting an entirely new building. In this instance excellent initial quality and sensible planning have shown themselves to be profitable.

A new building for the Library of Leiden University.

J. L. DE VRIES

University Library, Leiden

1 Introduction

For many years, Leiden University has been planning new housing for its humanities faculties and its University Library. Leiden has had a university since the sixteenth century; a university which, through the ages, has been an important factor in the town life. Therefore, the University and the Town Council agreed that – although new buildings for most of the science faculties were built on the outskirts of the town, the humanities faculties and the University Library should stay in or near the old town centre.

In the late 1960's a site was chosen on the Witte Singel, one of the canals which forms part of the old defence works of the town. The site was however rather small in relation to the number of square meters of building that needed to be realized. A solution to this problem was found by going up, into the sky: the architect Zanstra designed a building with a low flat part, and a tower of 125 meters high. He thought this would add an interesting element to Leiden, which is traditionally a town with very few high buildings. Not everybody agreed with him. Many people thought that the tower would spoil the Leiden skyline, particularly as it would be so near the old town. We will never know who would have won this battle. In 1971 the Ministry of Education put a stop to all university building in the Netherlands. The drawings for the new Leiden university buildings, including the Library, disappeared into a deep drawer, together with many other plans.

However, the need for new buildings for the humanities faculties and the university library continued to be felt strongly. In 1974 a mixed working group was formed of Ministry, University and Town, to study the problems and the possible solutions. Skyscrapers had by then fallen out of favour, so it was decided to start again from scratch. Nonetheless, the report produced by the working party in 1975 recommended that accommodation should be built for the faculties and the library on the same site as originally chosen, but this time extended with a site opposite the original one, on the other side of the canal, which was formerly used for army barracks.

In March 1975, the recommendations were approved by the Ministry; planning and building could begin.

2 The Witte Singel – Doelen project

The site consisted of two parts: a site of the Witte Singel, and a site across, on the other side of the Witte Singel canal, formerly used by the Doelen barracks. After these two sites, the project was called the Witte Singel – Doelen project.

Closer study of the two sites and the facilities to be housed on them led to a recommendation to build five units, two on the Witte Singel and three on the Doelen area. The facilities were to be divided as follows: unit I: western languages; unit II: Library; unit III: non-western languages/archeology; unit IV: History/History of Art; unit V: general facilities, such as lecture rooms, language laboratory, audio-visual department, restaurant, theatre. It was decided that these five units should be built by five different architects, who should however, work together within one general plan. For the overall plan, a number of criteria were formulated:

- there should be no clear cut division between university and town buildings; the two should blend together;
- the site as a whole should be accessible from all sides and open to the public to walk through;
- the buildings and the streets and squares in between them should have a town aspect: same size, height, variety etc. as usually found in an (old) Dutch town.

As the site is so close to the old town, typified by small houses on canals, this meant that the buildings should be no more than some 15 meters high.

The library was given a central place, in the middle of the Witte Singel site, flanked on both sides by faculty buildings. For the Library the architect Bart van Kasteel was chosen.

3 The Library before the move

The library used to be housed in a building which was largely from the nineteen-twenties. A new building was desperately needed, mainly for two reasons:

- The library books were stored in closed stack storerooms all over town. In all, the library had four such book stores, some at walking distance, but two quite far away. In a closed access library, the user always has to ask for a book and wait for it to be handed out to him. In the case of Leiden university library, because of these storerooms at a distance from the library, this sometimes meant a waiting time of half a day; quite often, the user would have to come back the next day: not really what one would call good service!
- The old building did not have enough room for study places. It contained a number of special study-rooms per subject, and one general study-room. In busy periods, such as examination times, the subject rooms had to be reserved for students studying that subject; and even then there was not always enough room. All the other students, for whose subject the library did not have a studyroom, (in particular law and medicine) were packed together in the general study area, which would thus become too crowded for studying.

So, as a service institution the library really needed a new building. For the library staff the need was less urgent, since in the sixties a stack area, which started to fall down under the weight of the books, had been converted into fairly spacious offices. Nonetheless, the building was less suited to modern technics (computer cabling hanging from the ceiling) and gave little opportunity for changes in procedures. A more flexible building was wanted.

4 The new building

For the new building, the library staff formulated an architect's brief, which asked for 17 353 m^2 netto, of which 12 327 was meant for the storage of books. The architect was also given a scheme of the relationships between the various library departments, a scheme of the lines of transport within the library and a survey of the interrelationship of study areas. To calculate the number of square meters needed, the library had to use a number of standards, such as: 1 member of staff, graduate: 12 m^2; non-graduate: 6 m^2; 1 bookcase open access: 1 m^2; 1 bookcase = 200 volumes.

In the course of 1976 and 1977 the brief was subjected to close scrutiny; also, other requirements such as technical facilities for the whole site had to be housed, nibbling off square meters. As a result the final brief mentions 16 884 m^2, of which 9998 was for storage of books. This resulted in a building with the following measures:

total height	17,50 m
height of spout	11,50 m
size of ground floor	68,40 × 93,60 m
size of 1st and 2nd floor	71,60 × 96,80 m
contents	88 513 m^3
construction	concrete mushroom-shaped pillars
modular measure	7,20 x 7,20 m
outside	pre-fabricated concrete elements with French stone
dome construction	two steel constructed domes covered with a transparent roof; one wooden doom, covered with copper plating

The library was built by the German contractor Strabag Bau AG. (Fig. 1)

5 The building in detail

The building exists of five layers: two stories underground, used as closed books stacks – these are usually called −1 and −2 – and three stories above ground: a ground floor, a first and a second floor (ground floor, +1 and +2). The closed stacks underground are only accessible for the staff working there, and occasionally for other library staff with special permission.

Above ground, a division has been created in three "noise and traffic" areas:

a. the ground floor where all those activities have been concentrated that involve a lot of people and/or noise: such as the circulation desk, the catalogues and the reference collection, and the busy library processing departments, expedition etc.;
b. the first floor with the subject reading rooms: an area with often a lot of people but little or no noise;
c. the second floor, reserved for departments that attract few people and involve little noise: the special departments for manuscripts, maps and rare books, the photographic department, and the librarian's office.

5.1 The stacks

The height of the building was limited to some 15 meters, to blend with the surrounding town houses. This meant that the library could not store its books in a so-called book-tower. The architect solved this problem by storing the books underground, on two levels. This solution has two major drawbacks: the staff may feel "stacked away", "buried" underground; and

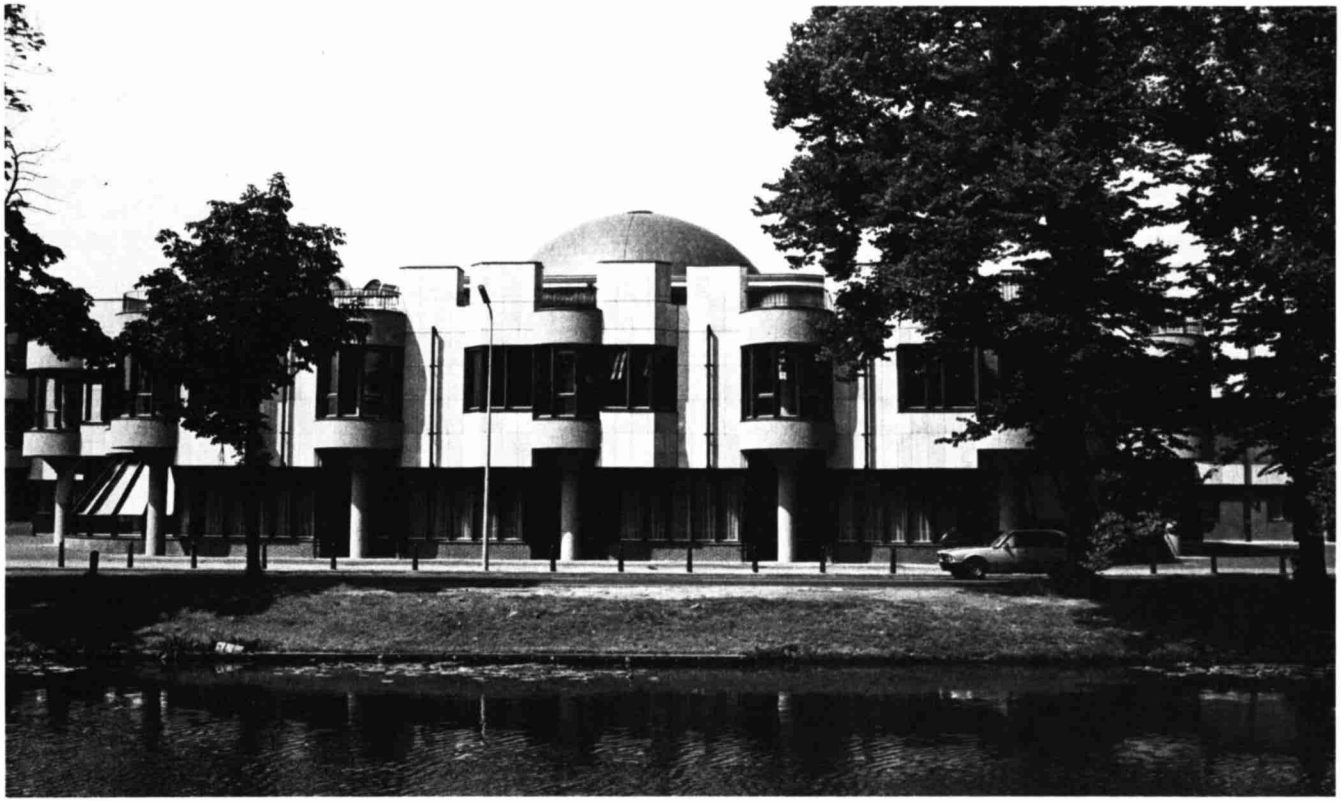

Fig. 1 University Library Leiden

there might be a danger of books getting wet when stored below sea-level. The architect tried to counteract the first problem, by creating open spaces, covered by glass, thus allowing some day-light to enter. Although these light-wells are only visible when you are quite near, they do help to make the stacks less oppressive. The problem of humidity or even actual wetness in the stacks, is judged by the experts to be effectively solved by special treatment of floor and walls. Whether there will indeed never be any water problems, only time can tell.

The bottom layer was made strong enough to hold books stored in compact shelving. At the moment only the middle part of this floor is filled with compact, movable shelving. It has been calculated that the shelving capacity on its floor will last us about ten years. When the present compact shelving is full, one of the other two parts of this floor will be filled with compact shelving. In twenty years time such shelving also needs to be installed in the last part. Altogether, there should be sufficient room for the whole library collection for the next thirty years!

The second level of the stack area can only contain ordinary shelving. Part of this floor has been made open access. This is a completely new phenomenon in Leiden. Leiden University Library has always been a closed stack library. Books were only available on request. In the old building, which housed the library since the beginning of this century, the library did have some of its collection on open shelving in the reading rooms, but here it always concerned study collections, not for loan.

When the new building was planned, the university planning officers visited many libraries, at home and abroad. They were particularly taken by the Anglo-Saxon tradition of open-access

libraries. So the question arose whether such a provision would not be possible for Leiden. However, a complete change to open access was obviously impossible. The library had a collection of nearly two million books, stored by size, all subjects mixed, every book possessing only a shelf-mark; no subject classification marked in the books whatsoever. To change to open access, placed by subject, would be a massive operation, which would take many years to realize. The question of space needed for open access did not even arise, although this too would have been prohibitive.

However, a compromise was achieved. About 900 m^2 of the -1 floor was made into an open access stack area, fitted out like a study area, with wide aisles, study places, carpeting etc.

Here the library has placed a selection of much asked periodicals and series, arranged by subject, and within each subject alphabetically. Altogether some 50 000 volumes. Here the users can browse, read articles at leisure, skim through runs of periodicals, copy articles, or, if this does not provide sufficient possibility for studying the text, borrow the volumes. The entrance and exit to the area is passed the circulation desk, enabling library staff to keep an eye on the users of this facility (Fig. 2).

5.2 Ground floor

On this level, the users enter the building. To get to the actual library services, you have to pass a janitor who will tell you to leave coats and bags in the cloakroom (lockers available). There is only one entrance to the building for library users. There is a staff entrance, which is however closed during working hours. There is also an entrance for deliveries, but

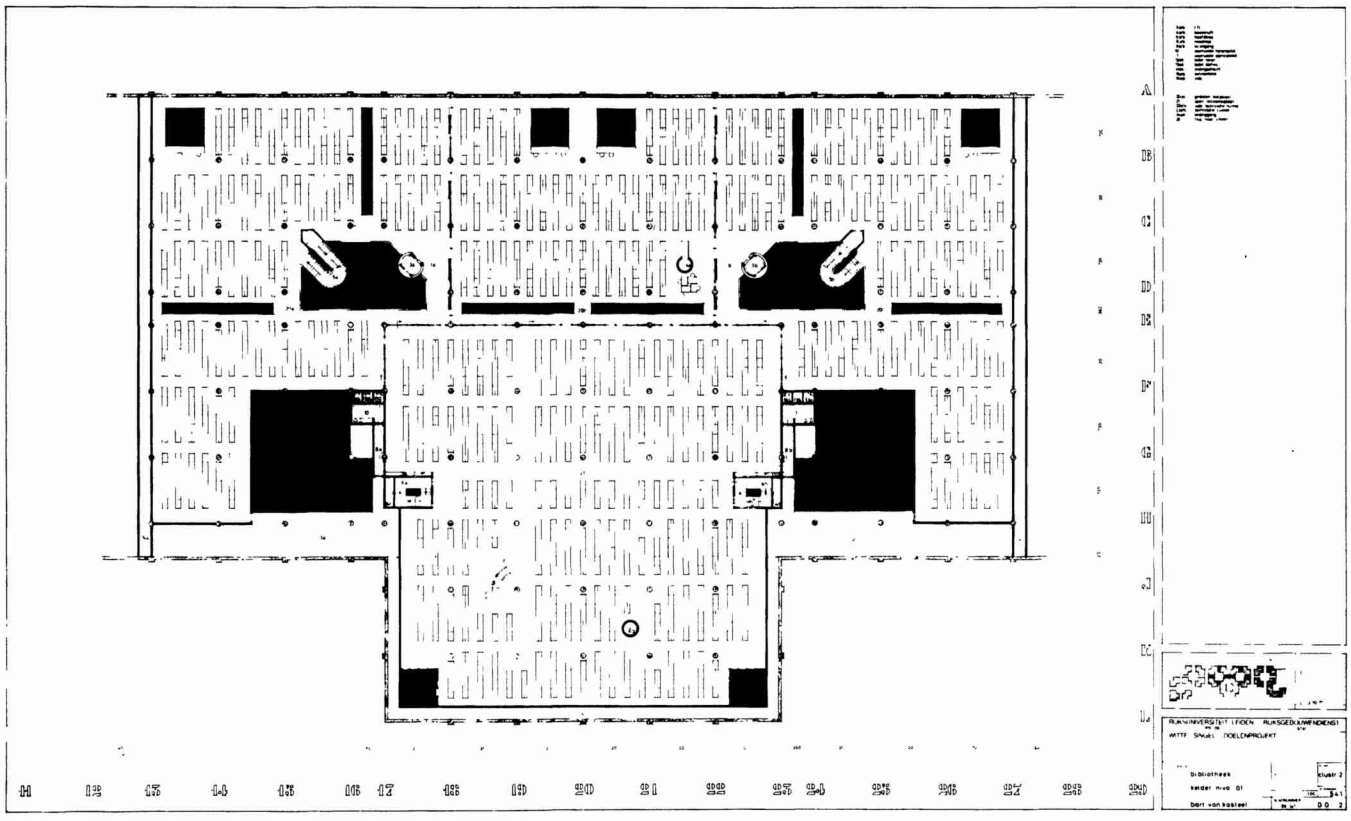

Fig. 2: Floor −1 closed stack area and open access stack area.

this too is locked most of the time. The architect would have liked to create three or four entry points, allowing staff and students of the university – and anybody else for that matter – to enter the building on one side, and leave again on the other side, e. g. passing through on their way to lectures. To us this "market-place" idea was not acceptable. It fitted well in the concept of the Witte Singel – Doelen project, which aimed to be open and inviting. However, for a university library this created far too many security problems. I am glad to say that this battle was won by the library.

The building is built around three open spaces: "courtyards" where you can look from the ground floor straight up to the roof at the top, there being no first or second floor in these places. One of these "courtyards" is covered with a wooden dome, on the outside clad in copper plating. The other two vides have a glass-like covering over a steel frame. The three courtyards are interconnected by "streets" in the form of corridors. The two faculty buildings on either side of the library have the same pattern of streets and courtyards. Only there the courtyards really are open air squares.

The two glass covered "vides" are the traffic areas, containing lifts and staircases. Around the courtyard with the wooden roof we find the information heart of the library: catalogues, reference collection, information desk and circulation desk. This forms the centre of the library, in the middle of the ground floor.

The ground floor also contains the offices of the library processing staff: acquisitions, periodicals, cataloguing and classification, binding etc. These are placed along the back side of the library, in a logical sequence. The catalogues and bibliographies being in the middle of the ground floor, makes these tools easily accesible for staff and users alike, without the traffic flows of both groups actually crossing each other. For the movement of people there are two staircases and two escalators. The books are transported in a separate book-transport system, which consists of two escalator shafts, linked on the -2 level by a transport-belt.

The system has 8 points of exit: in the shaft in the front half of the building on the two stack levels and in the circulation desk; in the shaft in the back half of the building also on the two stack levels, and furthermore on the ground floor, on the first floor in the information desk, and on the second floor in the administrative point of the special collection rooms. Books placed in special containers can be sent from any of these eight transport-exits to any other exit, as specified on the container. If the place specified is in the other shaft, the container goes down to the bottom level, travels along the conveyer belt and then goes up in the other shaft to the point required. (Fig. 3)

5.3 First floor

The first floor contains study areas for all the various subjects. There are no divisions between the subjects: walking along the bookcases, which are all placed on the inside of the building, you will of course notice the changes in subject, but the division in separate rooms we had in the old building, has disappeared. This has the advantage that subjects can grow or diminish without creating insolvable problems of space. On the other hand some – both users and subject specialists – regret the loss of their "own" room.

The centre of this floor is formed by part of the "strong room" stacks. All around is a ring of study areas, similar all the way, with book cases on the inside and study places (700) on the outside, giving a choice of 2-, 4-, 6- and 8 place tables. There are also single carrels. Finally there are 12 sound-proof, lockable study carrels, which can be reserved by students working on special projects.

The floor has one information post, serving all subjects. The subject specialists have large desks, near the books of their subject. We asked the architect to design special cubicles for the subject specialists, which would allow them to keep an eye on the students, to be approachable and to type or hold a (telephone) conversation. The architect promised to find a solution to this combination of demands. However, in the end he could not keep his word. The present desks are large enough to create good working places; the staff can keep an eye on the students and they are available for questions. But there is no sound-absorbing facility which allows them to do anything which causes noise of any kind . . . No building is perfect! (Fig. 4)

5.4 Second floor

The second floor contains the offices of the librarian and his staff, the photographic department and two special collection departments: one for Eastern manuscripts and rare books and one for Western manuscripts, maps and rare books. Both departments have the same design. They both have an area for the consultation of manuscripts and books, right under the eyes of a member of staff at an information desk. The room behind this desk connects on to the "strong room" stacks, where all the really valuable items of the library collection are kept. Next to the consultation room, is a library area, where the relevant books are available for study. These library-study areas are open all day and also in the special opening hours

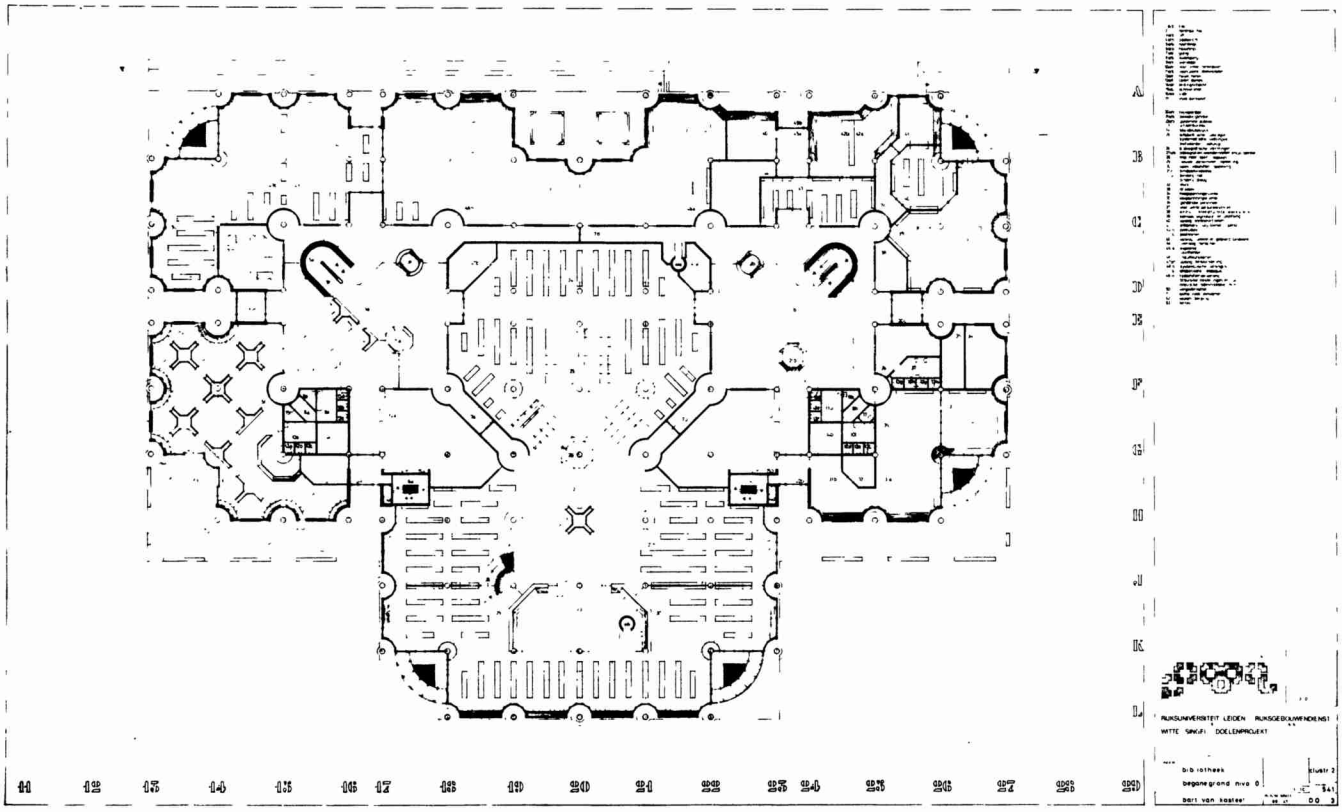

Fig. 3: Floor 0 ground floor catalogues, reference collections, circulation desk, offices of processing staff etc.

(evenings/weekend) whilst the consultation areas are only open on weekdays, when there is staff available to man the desk.

6 Technical facilities

All the books on open access, such as those in the open access store area, the reference collection and the books on the first floor, have been given security strips. The security screens are placed at the entrance/exit desk, which is always manned, whenever the library is open. There is no gate which closes when the security systems goes off. We rely on users being called back by the officer at the desk. Up to now this has functioned well. The stacks are climatised quite strictly, only a fluctuation of plus or minus 5% humidity being allowed and aiming at a temperature of 18°. The rest of the building has a climatization which is much less strict, allowing library staff to open windows if they wish. The whole building has been fitted with smoke detectors. There is a direct link with the fire-brigade; experience (false alarms) has shown that in case of alarm the firebrigade is present within a few minutes! There is also an extensive burglar alarm system in the building, a. o. protecting the processing departments during the evening and weekend opening hours. The floor of the bottom stack layer has been fitted with water detectors.

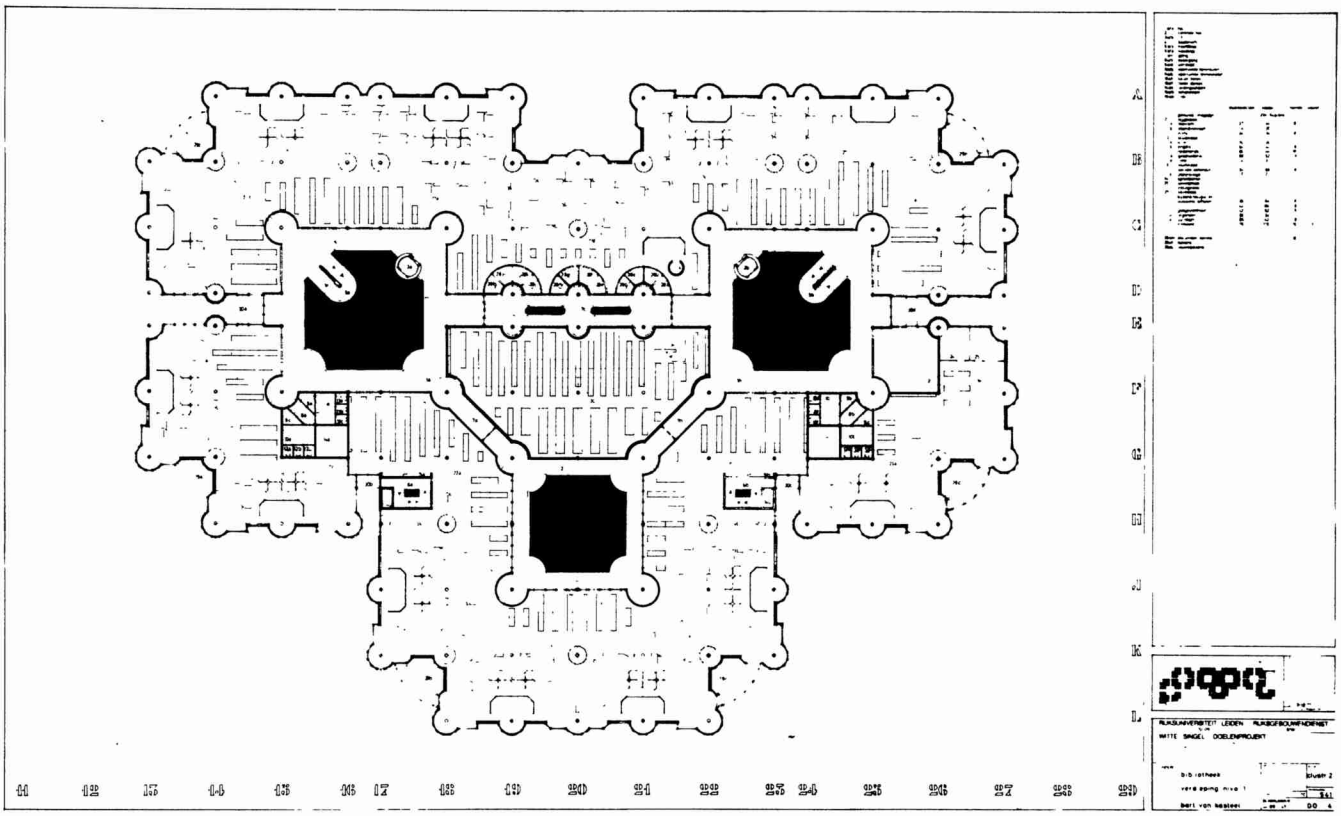

Fig. 4: Floor +1 Study area.

7 Conclusion

Although the building has some drawbacks – particularly the processing departments could have done with a little more room – the move to this new building has meant a considerable improvement for the library users. It has also given Leiden an interesting new piece of architecture, which most people find very pleasing to the eye.

The influence of EDP on library building and management

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An introduction to EDP and its application to library functions seems not necessary, because almost every librarian has been confronted already with this question. Since the pioneertimes of EDP application to libraries the number of librarians who are against automation is decreasing steadily.

At least a new library – small or large – should consider seriously the introduction of EDP. With the advent of mini-, micro- and personal computers the hardware is rather cheap and prices are still falling, the software can be bought, self-programming, with all its problems around, is no more necessary, the connection with a computing centre for libraries or a library network is possible, independent of the library place.

The question whether to choose an online or an offline catalogue – usually with Computer Output in Microfiches (COM) – may be difficult to decide. Both however mean that a large catalogue room in a new building is no more necessary, in an old building respectively can be used for other purposes. The old card catalogue should be filmed and presented in microfiche form, possibly with the same reduction rate as the COM catalogue. To give an example: The University Library of Regensburg has 1,8 Million entries, a card catalogue occupies 700 cards per drawer, 36 drawers per cabinet, that means 72 cabinets, occupying about 140 m^2 for one catalogue copy only.

Instead the library for 12 200 students plus teaching staff needs 50 Microfiche-readers in 10 departmental libraries with one million volumes in open access; including the reading rooms of the central library there are 3285 reading places. Besides the 50 MF-readers for patrons the library meanwhile adopts 70 MF-readers for its own staff. In the cataloguing department every fulltime cataloguer has his (her) own reader. In the beginning we had only one reader for two cataloguers, but the discussions and laments did not finish until everybody had almost free access to a reader.

The number of MF-readers probably will correspond to the number of terminals necessary for an online catalogue. During peak hours, especially in the first weeks of the winter semester, when many new students are beginning their studies, patrons have to wait some time before they get a free place in front of a reader, but they patiently wait or evade to quieter hours.

So as a first conclusion we can say that the influence of the COM-catalogue on the building is minimal, what you need is sufficient plugs for electric current and a good screening off from too much light in order to avoid eye disturbances. If the position of the MF-reader was not a good one we changed it or at least protected the screen through caps of cardboard, produced by the own bindery.

The Online Catalogue

We are now stepping into the era of online catalogues and library networks. The past year 1983 had been declared Worldcommunication year by the UNO. There are many online library networks already existing or in the test phase, to mention just a few:

- PICA (Project for Integrated Catalogue Automation) in the Netherlands, with presently 30 institutions
- BLAISE (British Library Automated Information Service)
- OCLC (Online Computer Library Center, Inc. Dublin, Oh.) formerly: Ohio College Library Center, with more than 2700 institutions
- WLN (Washington Library Network) with 106 libraries
- RLIN (Research Libraries Information Network, Stanford, Ca.) with 30 institutions

In the Federal Republic of Germany three systems are in the test phase: Informationssystem beliebiger Anwendungs-Strukturen (IBAS), Hessiches Bibliotheks-System (HEBIS) and Bibliotheks-Verbund-System (BVS). Online access is usually reserved for librarians only, which means that a second (off-line) system, mostly COM, has to be maintained.

The prerequisites for a full online system are:

1 Online access to a computing centre with mass storage capacity for the bibliographic files;

2 Cable connection to almost every room of the library, including the departmental libraries. In the university campus of Regensburg it means an area of 400 × 900 m plus the connection to the 2 km distant faculty of medicine. Tubes for the cables usually are provided already because of existing computer connection, but their capacity could be insufficient. For catalogue data transmission you need synchronous transmission facilities, that means a Local Area Network (LAN) with broadband capacity, not only baseband, like e. g. Ethernet.

3 Integration of data processing, word processing (Textverarbeitung) and the various telecommunication facilities, like Telex, Teletex, Telefax, Electronic mail, Videotex (BTX) and Information Retrieval not only in the local database but also in foreign information centres, e. g. DIMDI (for Life Sciences in Cologne), INKA (Physics, Mathematics and Energy in Karlsruhe), DIALOG, SDC, and BRS in the United States.

The advantages of such a full integration (1) are:

1 Repeated input and storage can be avoided, e. g. ordering can be used for cataloguing, catalogue data for the local and the interlibrary loan system, recall of adresses out of the electronic file, writing a text or letter once as outline draft, corrections, with final automatic output.

2 Searching is substantially faster, almost no manual search in card files or catalogues is needed, no waiting, no walking and searching for persons or things.

3 Greater multiplicity of communication methods; storage of messages is possible, therefore no waiting when the telephone number is occupied or the person absent, greater freedom in organizing the own work.

4 Information is faster accessible and easier usable through effective automated selection methods.

5 Conference can be better prepared or become superfluous; problems of time and place, emotional influences like talking ability or disability are reduced.

6 Decision processes can be better founded on facts.

7 Release of repetitive tasks gives time for more creative work.

8 Lower qualified personnel can be employed for more difficult tasks because of help functions through the computer.

9 Reduction of mail transport.

10 Expenses of administration are therefore reduced.

But here are also problems:

1 Danger of increasing paper production which can make office work unproductive, can jam information channels.

2 Danger of too much delegation of decisions to consultative bodies and/or experts. Instead of deciding a matter, a committee is convocated to prepare a decision.

3 Employees are afraid that screenwork has a negative influence on their health. Trade unions and workers' councils are quoting eye disturbances and radiation damages and demand restrictions for working time. Recently the administrative court of Frankfurt has decided the pregnant women need not work with terminals because of possible health damages according to a Canadian expert opinion (2).

4 The fully integrated system is not yet economically feasible. To give an example: Hewlett-Packard has constructed an electronic office in Hamburg (FRG). In February 1982 a staff of 100 employees had 1600 m^2 at their disposition, with 50 video display units connected with a HP 3000 computer. The firm spent DM 5000–6000 per working place with a yearly depreciation of DM 550 per place and DM 4000 per employee for the electronic devices and the network, with almost 1000 DM depreciation per year and per person (3). "When the installation costs of the cable and the support hardware and software, and the cost of the interface devices are all taken into account, it is estimated to cost around £ 400–£ 500 to connect a terminal to a LAN. To make LANs really attractive, this figure must be reduced to £ 100–£ 200. This can be expected within the next year or two." (4)

A VDU for library purposes probably will cost more than one for business applications because of the need for greater character capacity, graphic display, or the facility of the "mouse" to simplify the dialogue with the database, and perhaps also a light pen for loan requests and for data security measures.

The building prerequisites therefore would be the following:

1 An integrated working place for voice-, text- and image-communication in a room with more than one employee presupposes an environment with almost no acoustic disturbance. This is only possible with (costlier) non-impact printers, e. g. ink-jet printer.

2 The working post probably needs more place because of VDU, keyboard, printer, acoustic in- and output; on the other side card files, which librarians are very fond of, become superfluous.

3 There is a greater necessity for air conditioning, because the devices, through their ventilators, produce more heat. Without air conditioning the devices, especially on the south side of the building, can raise temperature to unsupportable degrees (5).

4 The paper output in the near future will not be reduced significantly; the slogan of the paperless office contradicts the intensity with which new printers are developed and offered on the market (6).

5 The technology of pneumatic dispatch in view of telefax and electronic mail becomes more and more obsolete.

At present it is impossible to foresee the consequences of videotex on library equipment. Perhaps the number of terminals for patron use can be reduced when the library catalogue is accessible through the television screen or personal computer at home. The German PTT forecast 1 million Videotex participants in the Federal Republic for 1986 (7), even if this figure may be too optimistic the impact of videotex on libraries has to be taken into account.

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