

Reyner Banham reviews James Stirling's Cambridge History Faculty

14 NOVEMBER 1968 BY REYNER BANHAM BUILDINGS



Opposite: the vertical axis runs the apex of the reading room of the History Faculty bridge together the essential elements of the design, the ventilating fins of the roof are an environmental feature, and the access galleries to the two teaching rooms that form the two arms of the glass enclosing the library.

criticism

Reyner Banham

Architect: James Stirling
Associate: Michael Wilford

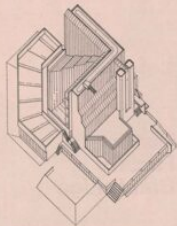
History
Faculty
Cambridge

It was James Gowen, not Jim Stirling, who explicitly voiced the axiom 'the style for the job' (with its corollary implied: 'a different style for every different job'). So Stirling-builders who have been poised to savage him for reusing the Stirling and Gosson style of the Leicester Engineering Laboratories on the new building for the History Faculty in Cambridge are out of luck. In any case, the History Faculty is a pretty damning demonstration of how little the details have to do with fixing a style. Compromisingly, the brick and tile surfaces with all those neat gutters and corners and industrial re-appearances at Cambridge, so does a large average of standardized industrial glazing, and so even do chance-course stack-towers, but the result is an entirely different style of building. Much of the rhetorical effort ('expressivism', according to Professor Penrose) of the Engineering Laboratories was due to a very demonstrative separation of the different functional volumes—towers, auditoria, workshops, etc.—and their further differentiation by a repertoire of widely contrasting surface treatments—blank brick, smooth glazing, angled glazing, north-light glazing, free-form glazing—each of which tended to be used on only one type of functional volume. The whole complex seemed to be springing apart, with each volume asserting its independence. The History Faculty building, by contrast, is folded back on itself, into a snug and relatively unassertive formal, without any very strong projections or major breaks of its silhouette (the stack-towers have a completely different effect from those at Leicester). Also there are, effectively, only two visible surface treatments: the hard red brick or tile, which is largely restricted to the plinth in which the upper part sits, and the standard industrial glazing which surfaces almost 75 per cent of the upper structure above the plinth.

There is, as at Leicester, an alternative kind of glazed surface, where Leicester has the specially designed diagonal north-lighting, Cambridge has a specially-designed glass skylight over the reading room of the Seeley library. But whereas Leicester's north-lights except spectacularly all round the perimeter of the workshop area and are a compelling

part of the total visual image, Cambridge's skylight is quite difficult to see from outside the building and contributes nothing to its silhouette. It is a crucial part—perhaps the most crucial—of the whole design, it registers strongly in Stirling's widely published isometric drawing of the scheme, yet to see it properly in real life the visitor must retreat almost among the pilots of the adjoining building by Casco and Oosler on Silgewick Avenue. Only from there can you appreciate its stepped-pyramid form, monomorphically like a slice out of the greenhouse of some monumental Victorian botanic garden. This glazed pyramid has been the other great hope of the Stirling-builders, and again they appear to be out of luck. For months now, stories of the monstrous solar heat gain through all that glass have been anxiously circulated by that persistent group who, still smarting from their defeat when Leicester was shown to be as functional as it was spectacular, were assured that this time they really had Big Jim looked on a charge of indictable formalism. This time it would stick, because the stories of sweltering temperatures in the reading room that were going round the lunch-tables of the Architectural Association were all perfectly true and based on personal observation... except that the observers had apparently failed to note (or to mention) that the heating throughout the building was being run full blast at the time to help dry out the structure. Admittedly, the view of the thermal environment put forward by the architect and the servicing consultants in documents circulated to the press is not very inviting—peak temperatures reaching 80 deg F under the most extreme conditions, and the ventilating system only able to trim 10 deg F off that figure in the main reading space. But it is difficult to know when or how often such extreme conditions will ever be reached in the climate of Cambridge. My own personal observation is as follows: on an unseasoned visit in mid-August, on a day of continuous sunshine and very little breeze, at 2.15 p.m. and with outside shade temperatures of 74 deg-77 deg F and no mechanical ventilators working, I found the interior warm, but not so much so

that it was necessary to remove my jacket. If it had been any hotter I would not be writing this article. Since shade temperatures in Cambridge hardly ever hit even the seventies in term time, and the ventilating plant is there for use when they do, the glass pyramid must be accounted a reasonable, responsible environmental device, not a formalist extravagance. It is, of course, far from being the simple greenhouse basic that many people seem to imagine; instead, it is a properly sophisticated glazed roof, fulfilling—mechanically and visually—a set of simple rules laid down in 1914 and studiously ignored by the architectural profession ever since. Firstly, it is a widely separated double skin; the inner skin being of obscured glass (in fact, a built-up sandwich, as was the obscured glass at Leicester) to prevent glare and to give an even, shadowless general light throughout the reading area. The small part of the lower skin, which has been glazed clear to show the ventilating plant in the top of the pyramid, does admit a triangle of unretained sunlight, but only on a few days around mid-summer, and this does not fall into the main reading area. Secondly, the air space between the two skins is environmentally active because it is, in general terms, controllable; in winter with all the louvers in the vertical steps of the pyramid closed, the trapped air can be held fairly still as an insulating blanket to reduce heat-loss. In summer, with all the louvers open, external wind-pressure can combine with internal stack-effects to sweep out heated air from under the upper layer of glass. It should be noted here that, although the three ventilating fans are housed in the truss-space between the upper and lower skins of glass, they do not serve to move air through that space. Rather, they serve to augment stack-effects in the upper part of the main library space itself, extracting foul air from the apex of the pyramid and exhausting it direct to atmosphere through the louvers in the penultimate step of the pyramid. Thirdly, general artificial lighting comes from trussed strips of fluorescent tubes flanking the main truss members within the roof



cross-section of the History Faculty, from the south-east

space, but no attempt has been made to introduce radiant heating from between the two skins of glass. Instead, artificial heating is supplied by convectors all around the base of the ground, providing a blanket of warm air to travel up under the glazed glass, and thus prevent currents of chilled air descending in the necks of readers below.

Given the strip lighting, the main outlines of the structure within the glass roof-space will always be visible, some sun or some darkness, to any reader in the space below who cares to look up at it. Whether or not this may be an assemblage of psychological values is difficult to say (my own ideas seem to be at variance with those of the architect, as will appear later), but it makes this the least boring luminous ceiling in the whole of recent architecture. It is both explicit, and inherently interesting, and has needed no addition to style it up or compensate for visual deficiencies. Even a complete layman with little knowledge of other mechanisms of architecture (a professor of Modern History, say) would be able to see (and sometimes hear) the roof going above his business of reading between inner and outer environments, and understand what was going on.

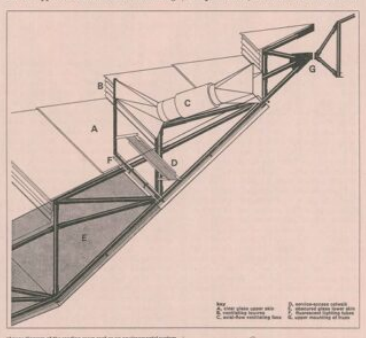
With the pattern of shadows from the structure above marching across the observed glass as the day proceeds (an active reader with Roy Scoon training would be able to tell the time by them presumably) and fading into the night pattern of parallel lines of fluorescent light, it will present a continuously interesting cerebral spectacle... only interesting in an inadequate word for this spectacular roof. It is absorbing, not only for its inherent visual quality, but also because those qualities derive from Stirling having followed the precept laid down by Paul Scherbert in *Glaschleibler* over half a century ago.

I am quite certain that Stirling did not follow them knowingly, because I know he has never read them. Scherbert derived them from common sense, observation and imagination;

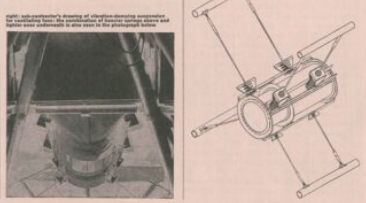
so did Stirling. Nevertheless, it is fascinating for an historian like myself to see that when Scherbert's precept about the use of an insulating blanket of air between the two skins, the placing of light sources between the skins (but not between) and all the rest of it, the result is quite as marvelous as he prophesied. It would be in 1914. I have not yet seen the History Faculty from outside after dark, so I don't know if it fills the Scherbertian role of *ein ganz selbständig illuminationslos* (Lambert fails it magnificently, for example, so one has hoped but in one way the interior goes right against Scherbert's ideas, and the approved orthodoxy of illuminating

practice as well. Wherever light is required under opaque, not glazed, ceilings, it comes from naked fluorescent tubes, without shades or diffusers, mounted on surface-painted hard glass white. As described, it sounds awful, as experienced it is never troublesome (light for reading will be supplied locally by fittings on the desks) and a certain sparkle to distant views through the book-stacks, etc.

At least, that is how it appears in the main reading room. In the smaller seminar rooms and offices the situation may prove different. There are bound to be complaints about the lighting because that is a fashionable thing to complain about, but even when allowance for



section diagram of the reading room roof as an environmental system

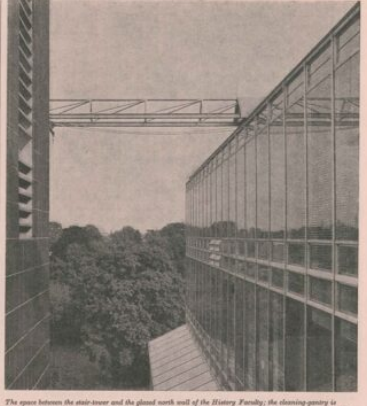


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human common sense and academic conservatism had been made, it seems possible that detail modifications will have to be made in some of the rooms because of localized patches of glare or shadow. Already, in some of the smaller rooms on the west face of the building and in corridors on the top floor, there have had to be remedial alterations to cope with thermal problems (extra ventilation, venetian blinds, etc.).

However, there are some persistent minor doubts about the environmental conditions in the major spaces which stem less from the basic design of the building (it should be remembered that its conditions had to be turned through ninety degrees after design was completed, through no fault of the architect) than from the detail provisions made for controlling heat and light, and the level of performance demanded of the occupants. The environmental controls provided are hot-water convectors in the upstand beam on the edge of the floor-slabs, ventilating louvers in the space between the glazing and the upstand, and their control handles are therefore a little difficult to reach. But they are also marked by the venetian blinds when these are in the down position (which they normally will be) but not convenient to reach (especially to the louvers) and it is quite easy to get the control handles fouled up in the slats of the blind.

Situations like this are governed by Murphy's Law (known as Finagle's Law) which predicts the probability of mechanical disaster by the formula: If anything can happen, it will. Such prohibitions are high anyway, but in this case they are likely to be raised by the fact that most of the occupants of the building will be humanistic-oriented, and therefore likely to fall below the national average in mechanical literacy and competence. Controls that get fouled up through mismanagement by the occupants will tend to be left in that condition while the occupants take verbal revenge on the architects. If enough is to be taken anywhere it should be on the University Grants Committee as the agent of a policy of allocating building budgets too stringently to prevent decent environmental installations, which in this case would be either full automation of the environment, or controls sophisticated enough to provide auto-proof fool manipulation. As it turns out, the excellent basic environment provided by Stirling and his consultants will require some skill and intelligence for its proper employment throughout the building. Not only in the smaller rooms, but in the large volume of the reading room as well. The environment requires conscious manipulation by a responsible human being, the design of the lighting, lighting and ventilating is incorporated in the blind deck which is also the structural part from which a sensitive librarian appraises the library and its contents, and that the whole life and human situation of the library falls under the hand of a single person—let us hope that the library gets the



The space between the main-structure and the glazed wall of the History Faculty; the glazing is long enough to reach the glass between the central pane of the inner-structure, venetian blinds can be seen behind the panel glazing, and the position of the ventilating louvers.

kind of captivity (or stage direction) it deserves. It may seem eccentric to have begun thus, with the environmental mechanics, in discussing a building in a context where problems of style and cultural values are usually taken to be pre-occupant; but the peculiar relationship of the History Faculty building to the Cambridge scene can only be explained in this way, in my opinion. Let me explain at once that my opinion is that of a persistent user of both libraries and seminar rooms, with fairly well-developed professional reflexes, especially where libraries are concerned. What makes a library a good place to work in, and thus an effective contributor to the cultural values of the university of which it is a member, is complex, and ultimately engages almost every known aspect of architecture. That engagement begins with the creation of a satisfactory life-support system of heat, light and ventilation, such as has been discussed above (this is obvious, yet there are too many libraries that fall even on this physiological level, and every scholar has his own private checklist). But even in terms of physical comfort the matter is a good deal more subtle, and extends well beyond what mechanical services can provide.

Thus, the business of working with books is a primarily optical affair, but the provision of adequate light is not itself a good service of this function. It is physically impossible to keep one's eyes on the print for more than a certain period of time (varying with one's own psychomotoric make-up and the nature of what is being read) and what is seen when the eyes are lifted is crucial. Not only must the length of focus change, but what is seen in long focus must possess certain qualities too. As far as it can make out from my own experience, what is seen must be totally different from what is on the desk in front of the reader. It might be the view out of a window into the campus or city beyond, or it might be an architectural interior striking enough to lead the interest of the viewer—not an outline perspective of bookshelves and right-foot high suspended ceiling, but something like the hand-drawn space-frame of Mackintosh's library at the Glasgow Art School, or the laughable domes of the Bibliothque Nationale. The History Faculty does not provide external views from its reading room that can be actively enjoyed—and this is not intended as a value judgement on other buildings in

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the Sidgwick Avenue development; simply that it is not possible to see much, even from the reading desk in the long window beyond the bookstacks. The interior view, on the other hand, has long enough to provide a real change of focus, have architectural interest in their own right, and also offer a change of subject matter, since anyone looking up from his books at the gallery cliff of acoustically slotted white wall will catch glimpses of non-readers proceeding to and from class-rooms and studies at the various levels.

Such reminders of alternative patterns of activity seem to be a more than visual relief, but in providing them, the building appears to be running counter to the architect's stated intention. In conversation, Stirling speaks of the business of reading as if it were an intensive process from which the reader ought not to be distracted, and therefore explains the tall upstand parapets of the screen galleries as being high enough to prevent the heads of persons in the corridor being seen from the reading room below, and those parts of the parapet that have been raised back to a narrow sill at the top as providing psychologically valuable views down into reading room (thus giving a sense of unity between library and class-room activities). But it seems to me that an even greater psychological value resides in the views out of the reading room into the life of the gallery, especially where the parapet is cut down to knee-height, as it is at two points at each of the lower levels. It is difficult not to feel that in matters like this Stirling is proceeding on sound human instincts that understand the functional rationalizations he likes to produce as *post facto* justifications of his designs. As usual, the disparity between architect's rationalizations and user's observations does nothing to invalidate the quality of Stirling's design—as any reader will agree as she straightens up from his books, stretches his shoulders and raises his eyes either to the spectacle of dozing heads bobbing along above the parapets, or to the three ventilating fans, painted in strong form-tractor primary colours, nestling like newly landed agricultural space-stations in the peak of the roof.

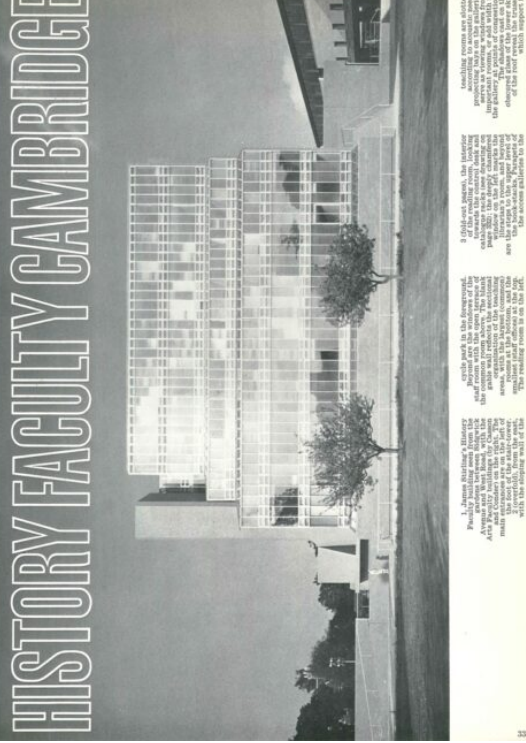
The exterior offers nothing so spectacular to

the view. The projecting stair-towers and the end walls are explicit about vertical circulation and sectional organization, but not obliquely become extreme in the patient detailing details of the exterior and remains, in light or shade, curiously and craftily obtuse. It presents a glass surface that avoids doing any of the things that glass is supposed to do in Modern Movement mythology—it is not glass-woven or fibrous, rejects nothing of interest and reveals remarkably little of the interior functioning of the building. It presents itself to the very sight as an impenetrable wall of keeping the weather out; one that might—but for the fact that there are advantages to be gained from admitting daylight to the interior—equally well have been corrugated asbestos. To get away with this architecture of dumb insolence in Cambridge requires more than just daring-do; it requires the self-confidence that comes from knowing that you are about, and it implies an attitude. Self-confidence first: that patent glazing is not neutral or dead. The temptation to make it so (as proof that you are a gentleman as well as an architect) would have overwhelmed some architects confronted with Cambridge, but Stirling has resisted roughness, irregularity, misalignments. This is in no way to disparage him or the glazing system, which is meant to be assembled that, and has the necessary degree of tolerance to even out local inaccuracies. To have assembled it more neatly and with greater nicety of alignment would have been, and would have looked, newly affected—like most other modern architecture in Cambridge.

The attitude which seems to be implied in this self-confidence is that Cambridge is a university, rather than the shrine of a cult. All the other modern buildings in Cambridge—even the very good ones, like Harvey Court—seem somewhat pre-occupied with trying to prove themselves scholarly adepts at the rituals of the cult, like collegiate planning, historical erudition, wharftiness, and so forth. They come on like provincial earnestly trying to pass as long-established dons, and betray themselves by accents and manner.

By proceeding as if the cult did not exist, and therefore not having to prove anything about it, the History Faculty building leaves itself with no problems of accent or manner. Style and intention are intrinsically from the building itself, not extrinsically from some more or less accurate apprehension of contingent cultural factors. The building is indifferent to the architecture that surrounds it, and therefore appears to mock it, it is not indifferent to Cambridge, nor does it mock it, as a university. The commission did not arise from some self-assertive endorsement nor an attempt to capitalize the name of an aging statesman, but from the manifest needs of history teaching. The design was chosen from a very limited competition whose entries were closely scrutinized by men deeply involved in running the university and teaching in it—the Sidgwick Avenue Committee and the two appointed members from the History Board, Geoffrey Elton and M. F. Fleury. These last two stood by the design, and the architect, through thick and thin and the barbed onslaughts of Hugh Flenner. They stood by it on functional grounds; more strikingly, they stood by it on aesthetic grounds as well (Fleury: 'I do not want to debate the aesthetics of the building either; I like it.'). Anybody who wishes to maintain that this is the wrong kind of building for Cambridge must face the fact that this is the kind of building the History Faculty wanted badly enough to defend in the Senate, and that they clearly were not in the market for either a pseudo-jewel-casket like the Beinecke Library at Yale, nor a job fortification like the new library at Trinity College, Dublin. Unlike those two august institutions they are not imbued with illuminated minds and humanistic manuscripts. The History Faculty just has a lot of undergraduates and a lot of current literature, and a fairly numerous teaching staff, and commissioned a building which could bring all these neatly and effectively together. Clients and architects knew what they were about, and therefore had the confidence to do what they had to do without bravado or false humility (both of which are endemic in buildings actually under construction in Cambridge at present). The result, respectful to Cambridge at the more fundamental level of what Cambridge actually does, presents a startling critique of buildings that have tried to be respectful to Cambridge at the superficial level of what it looks like—the more startling in that no critique appears to be intended. The mystique of the Cambridge tradition is neither sent up nor put down. It is not even treated with the contempt it probably deserves; it is almost as if architect and clients had failed to observe its existence because they were too involved with the living body of Cambridge to notice the coffin into which other architects have tried to cram it. The sad thing is that Cambridge opinion will eventually accept it as part of 'the Cambridge tradition' and then no one will have the guts to pull it down when the useful life for which it was designed has come to an end.

photograph by Richard Evinity



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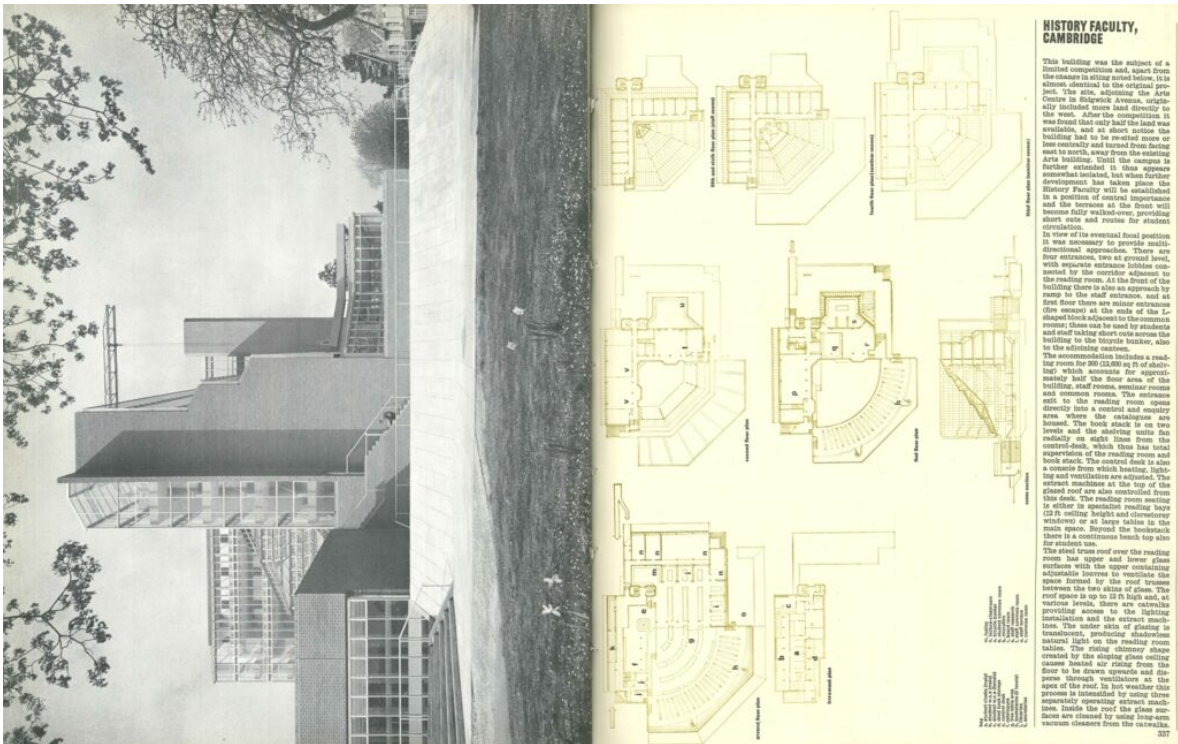
photograph by Richard Evinity

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HISTORY FACULTY, CAMBRIDGE

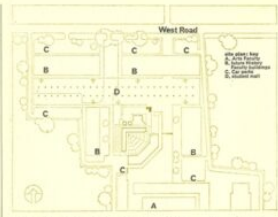
This building was the subject of a limited competition held by the owners in 1959. The winning design is the design submitted by the architect. The site, adjoining the Arts Centre in Kingsway, Cambridge, originally included more land directly to the west. After the competition it was found that only half the land was available, and at short notice the builder had to be re-sited more or less centrally and lifted from facing east to north, away from the existing Arts building. Until the concrete is further extended in this aspect conventional building techniques for the History Faculty will be maintained and the terrace at the front will become fully walk-over, providing short cuts and routes for student circulation.

In view of its eventual final position it was necessary to provide multi-directional approach. There are four entrances, two at ground level, with separate entrance lobbies connected by the overhanging approach to the reading room. At the front of the building there is also an approach by ramp to the staff entrance, and at first floor there are three entrances (one direct at the side of the L-shaped block adjacent to the common and staff taking short cuts across the building to the steps leading up to the adjoining lecture).

The second-storey lecture and reading room for 200 (12,600 sq ft of absorbing) which occupies for approximately half the floor area of the building, staff rooms, seminar rooms and common rooms. The entrance will be the reading room, opens directly into a control and enquiry area, where the bookcases are located. The book stack is on two levels and the enquiry area is mainly on the level from the control-deck, which has been supervised by the reading room and book stack. The control deck is also a cinema from which heating, lighting and ventilation are adjusted. The extract machines at the top of the reading room are also controlled from this deck. The reading room contains in either in special reading bays (12 ft ceiling height and elementary windows) or at large tables in the main space. Beyond the bookstack there is a continuous bench top also for reading.

The steel frame roof over the reading room has upper and lower glazing sections with the upper containing adjustable louvers to ventilate the space formed by the roof trusses between the two skins of glass. The roof spans up to 12 ft high and, at various levels, there are catwalks providing access to the lighting installation and the extract machines. The under skin of glazing is translucent, producing shadows on the reading room tables. The rising chimney shape created by the sloping and sloping down inside air rising from the door to be drawn through the glass panels, ventilates at the apex of the roof. In hot weather this process is intensified by solar rays separately operating extract machines. Inside the roof the glass sections are cleaned by using long-arm vacuum cleaners from the roof.

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The external roof glass is cleaned by way of the gutters, which act also as ladder and expansion joints. These gutters separate the lower facade of the L-shaped block from the glass roof, and a ladder running on fixed tracks provides access to all parts of the roof. The glass ceiling is cleaned from a mobile and demountable scaffold tower during the long vacations, as it is necessary to move the scaffold tower for this operation. The step back glass facade of the L-shaped block is cleaned from a boat which can move at right angles to the building as it is supported from a mobile roof gantry.

The arrangement of the corridors as galleries around the reading room is designed to provide close contact between the reading room and the other accommodation. Continuous horizontal windows set into the corridor walls appear under the roof and run around the upper floors above the reading room. The corridor windows and the lobby, which project into the air space of the reading room, allow students in the upper floors to maintain a visual, but semi-hermetic contact. They also provide standing space to allow students to experiment in silence without blocking the corridors. The structural spatial walls facing these corridors are high enough to prevent students overlooking the courtyard being seen from the reading room. The reading room side of these walls are veneered in fibrous plaster with a closer frequency of sound absorption slots at the lower levels where they are most required.

SOME NOTES ON THE STRUCTURE

By Peter Smith of F. J. Smalley & Partners

Three distinct yet interdependent structural elements, separated from each other by movement joints, are contained in this building. The largest element is the seven-storey L-block with a basement under one wing. It is of precast reinforced concrete. A double construction with reinforced concrete slabs. There are structural reactions from raking columns and wind loads are carried by lattice reinforced concrete slabs which, and by the steel and lift towers counteracting vertically from their foundations. The second element is the two-storey block which connects the two ends of the L-shaped block and is also precast in place to enclose the space forming the book-stacks. The

construction of this block is also lattice concrete, the first floor is a flat slab and the roof is carried by continuous beams which are positioned to control deflection on the exterior glass facade. The building is constructed horizontally, through a sliding connection allowing vertical movement on its column and beams which are bolted to the 6th floor and roof slab. The thrust is then transmitted, through the slab acting as horizontal beams, to the end slabs which are pinned joints. The thrusts are being transmitted to the back walls of the temporary block in a similar manner. The horizontal beams between the main raking girders are fixed to both secondary and tertiary trusses which support closely spaced raking walls and are also designed to act as plan bracing to stiffen the structure.



vector beams contained in a structural space frame in the secondary and study rooms in the L-shaped block and to the reading room floor. A precast concrete structure for this building is the lighting structure. The lighting structure has been used almost exclusively and a theme of the lighting has been to provide access to the building from the top to the architect's belief that illumination standards are very low, the 100 lux illumination levels have been exceeded, except in the accident rooms where local flood lighting will be used. The general lighting in the reading room consists of fluorescent tubes clipped to the wing trusses under the main trusses and within the roof space.

SOME NOTES ON THE SERVICES

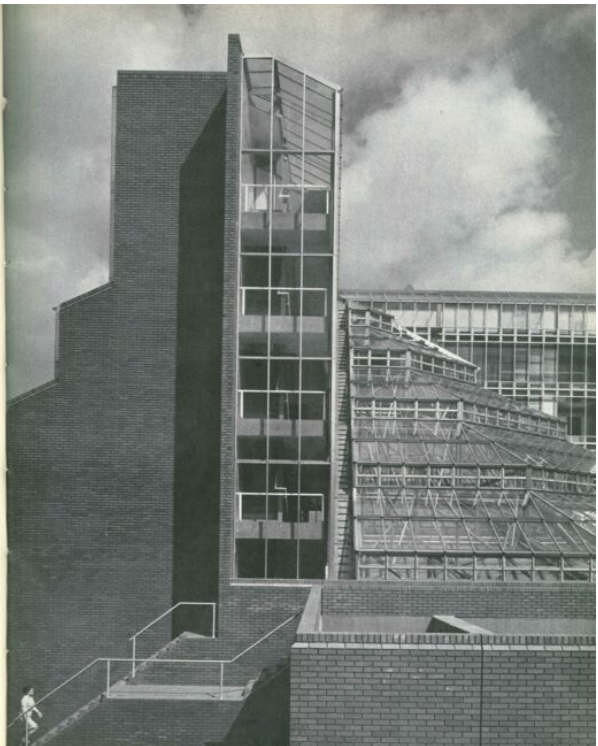
By J. & H. Woodhead of R. W. Gregory & Partners

In the reading room embedded floor heating coils are used as well as a special air handling plant system located at the junction of the large glass roof with the ceiling of the bookstack, thus placing the necessary heating equipment at the most advantageous positions while at the same time not taking up valuable floor space. The steel truss roof over the reading room has a double-deck

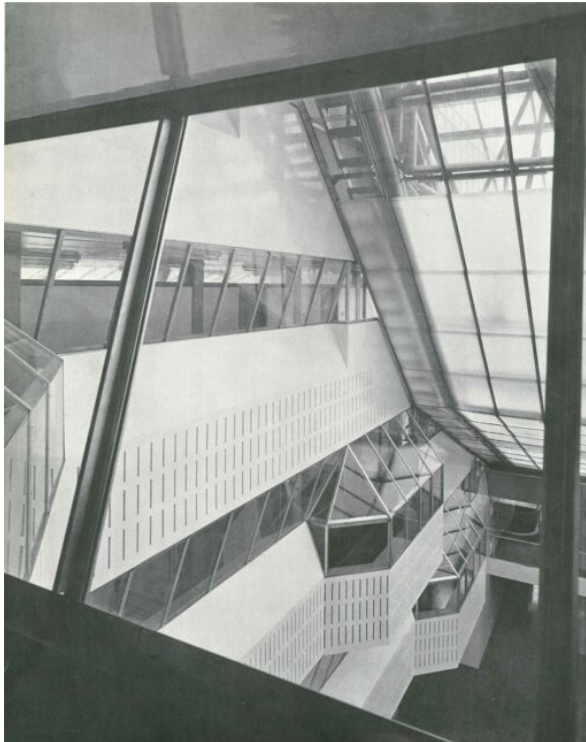


HISTORY FACULTY, CAMBRIDGE

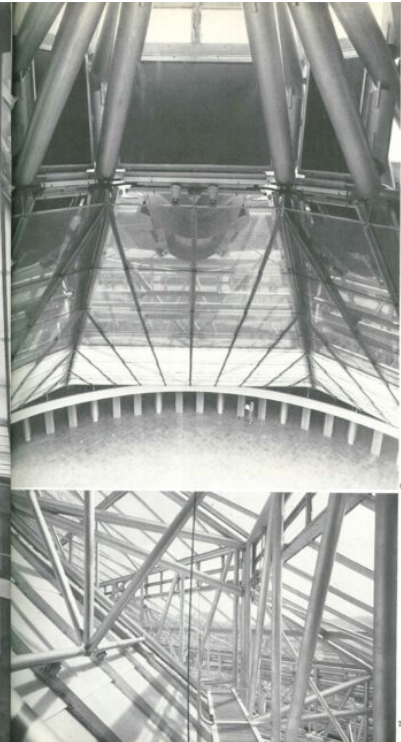
at the southern end of the west wing. The reading room is on the right.



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HISTORY FACULTY, CAMBRIDGE



8 (Clutter seen, looking out from the lift gallery level) showing the structure of the glass and concrete above the main truss structure. The main truss structure is shown in the vertical strip of the glass. A lattice of the lower truss structure is shown above the main truss structure. The main truss structure is shown in the vertical strip of the glass. A lattice of the lower truss structure is shown above the main truss structure. The main truss structure is shown in the vertical strip of the glass. A lattice of the lower truss structure is shown above the main truss structure.

The faculty appears to spring apart from its surroundings, implying the self-confidence of knowing what you are about

Originally published in AR November 1968, this piece was republished online in August 2010

It was James Gowan, not Jim Stirling, who explicitly voiced the axiom 'the style for the job' (with its corollary implied: 'a different style for every different job'). So Stirling baiters who have been poised to savage him for re-using the Stirling and Gowan style of the Leicester Engineering Laboratories on the new building for the History Faculty in Cambridge are out of luck. In any case, the History Faculty is a pretty daunting demonstration of how little the details have to do with fixing a style. Conspicuously, the brick and tile surfaces with all those neat gutters and corners and balustrades re-appear at Cambridge, so does a large acreage of standardized industrial glazing, and so even do chamfer-corner stair-towers, but the result is an entirely different style of building.

Much of the rhetorical effect ('expressionism' according to Professor Pevsner) of the Engineering Laboratories was due to a very demonstrative separation of the different functional volumes-towers, auditoria, workshops, etc - and their further differentiation by a repertoire of widely contrasting surface treatments - blank brick, smooth glazing, angled glazing, north-light glazing, free-form glazing - each of which tended to be used on only one type of functional volume. The whole complex seemed to be springing apart, with each volume asserting its independence. The History Faculty building, by contrast, is folded back on itself, into a snug and relatively unassertive format, without any very strong projections or major breaks of its silhouette (the stair-towers have a completely different effect from those at Leicester). Also there are, effectively, only two visible surface treatments: the hard red brick or tile, which is largely restricted to the plinth in which the upper part sits, and the standard

industrial glazing which surfaces almost 75 per cent of the upper structure above the plinth.

There is, as at Leicester, an alternative kind of glazed surface; where Leicester has the specially designed diagonal north-lighting, Cambridge has a specially-designed giant skylight over the reading room of the Seeley library. But whereas Leicester's north-lights erupt spectacularly all round the perimeter of the workshop area and are a compelling part of the total visual image, Cambridge's skylight is quite difficult to see from outside the building and contributes nothing to its silhouette. It is a crucial part-perhaps the most crucial-of the whole design, it registers strongly in Stirling's widely published isometric drawing of the scheme, yet to see it properly in real life the visitor must retreat almost among the pilotis of the adjoining building by Casson and Conder on Sidgwick Avenue. Only from there can you appreciate its stepped-pyramid form, uncommonly like a slice out of the greenhouse of some monumental Victorian botanic garden.

This glazed pyramid has been the other great hope of the Stirling-baiters, and again they appear to be out of luck. For months now, stories of the monstrous solar heat gain through all that glass have been assiduously circulated by that persistent group who, still smarting from their defeat when Leicester was shown to be as functional as it was spectacular, were assured that this time they really had Big Jim hooked on a charge of indictable formalism. This time it would stick, because the stories of sweltering temperatures in the reading room that were going round the lunch-tables of the Architectural Association were all perfectly true and based on personal observation ... except that the observers had apparently failed to note (or to mention) that the heating throughout the building was being run full blast at the time to help dry out the structure.



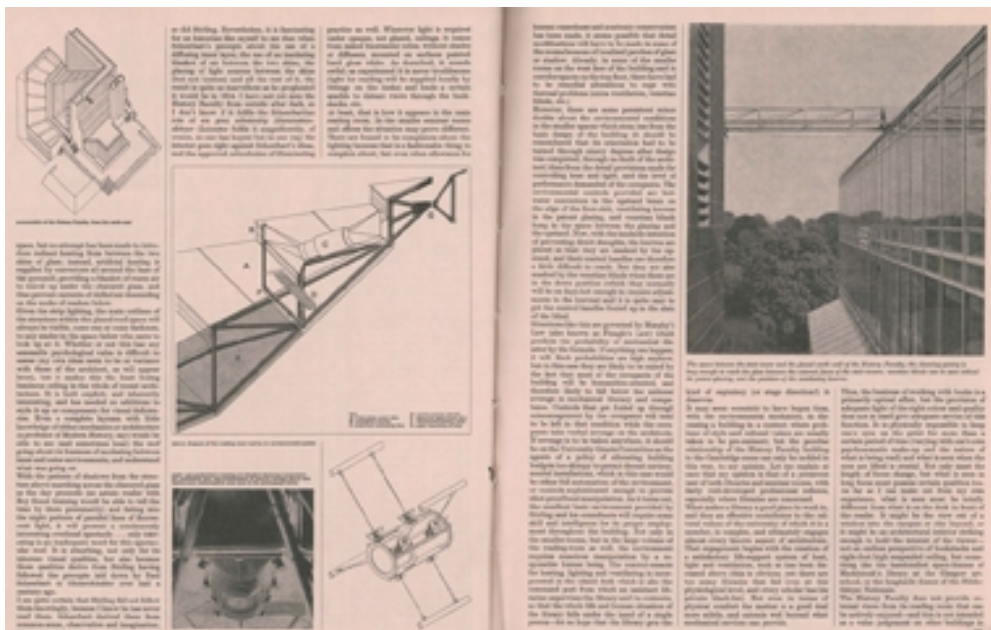
Secondly, the air-space between the two skins is environmentally active because it is, in general terms, controllable; in winter with all the louvres in the vertical steps of the pyramid closed, the trapped air can be held fairly still as an insulating blanket to reduce heat-loss. In summer, with all the louvres open, external wind-pressure can combine with internal stack-effects to sweep out heated air from under the upper layer of glass. It should be noted here that, although the three ventilating fans are housed in the truss-space between the upper and lower skins of glass, they do not serve to move air through that space. Rather, they serve to augment stack-effects in the upper part of the main library space itself, extracting foul air from the apex of the pyramid and exhausting it direct to atmosphere through the louvres in the penultimate step of the pyramid.

Thirdly, general artificial lighting comes from twinned strips of fluorescent tubes flanking the main truss members within the roof-space, but no attempt has been made to introduce radiant heating from between the two skins of glass; instead, artificial heating is supplied by convectors all around the base of the pyramid, providing a blanket of warm air to travel up under the obscured glass, and thus prevent currents of chilled air descending on the necks of readers below.

Given the strip lighting, the main outlines of the structure within the glazed roof-space will always be visible, come sun or come darkness,

to any reader in the space below who cares to look up at it. Whether or not this has any assessable psychological value is difficult to assess (my own ideas seem to be at variance with those of the architect, as will appear later), but it makes this the least boring luminous ceiling in the whole of recent architecture. It is both explicit, and inherently interesting, and has needed no additions to style it up or compensate for visual deficiencies. Even a complete layman with little knowledge of either mechanics or architecture (a professor of Modern History, say) would be able to see (and sometimes hear). the roof going about its business of mediating between inner and outer environments, and understand what was going on.

With the pattern of shadows from the structure above marching across the obscured glass as the day proceeds (an astute reader with Boy Scout training would be able to tell the time by them presumably) and fading into the night pattern of parallel lines of fluorescent light, it will present ' a continuously interesting overhead spectacle ... only interesting is an inadequate word for this spectacular roof. It is absorbing, not only for its inherent visual qualities, but also because those qualities derive from Stirling having followed the precepts laid down by Paul Scheerbart in *Glasarchitektur* over half a century ago.



I am quite certain that Stirling did not follow them knowingly, because I know he has never read them. Scheerbart derived them from

common-sense, observation and imagination; so did Stirling. Nevertheless, it is fascinating for an historian like myself to see that when Scheerbart's precepts about the use of a diffusing inner layer, the use of an insulating blanket of air between the two skins, the placing of light sources between the skins (but not heaters) and all the rest of it, the result is quite as marvellous as he prophesied it would be in 1914.

I have not yet seen the History Faculty from outside after dark, so I don't know if it fulfils the Scheerbartian role of *ein ganz selbständig Illuminationskörper* (Leicester fulfils it magnificently, of course, so one has hopes) but in one way the interior goes right against Scheerbart's ideas, and the approved orthodoxies of illuminating practice as well. Wherever light is required under opaque, not glazed, ceilings, it comes from naked fluorescent tubes, without shades or diffusers, mounted on surfaces painted hard gloss white. As described, it sounds awful; as experienced it is never troublesome (light for reading will be supplied locally by fittings on the desks) and lends a certain sparkle to distant views through the bookstacks, etc.

At least, that is how it appears in the main reading room. In the smaller seminar rooms and offices the situation may prove different. There are bound to be complaints about the lighting because that is a fashionable thing to complain about, but even when allowance for human cussedness and academic conservatism has been made, it seems possible that detail modifications will have to be made in some of the rooms because of localized patches of glare or shadow. Already, in some of the smaller rooms on the west face of the building and in corridor spaces on the top floor, there have had to be remedial alterations to cope with thermal problems (extra ventilation, venetian blinds, etc.)

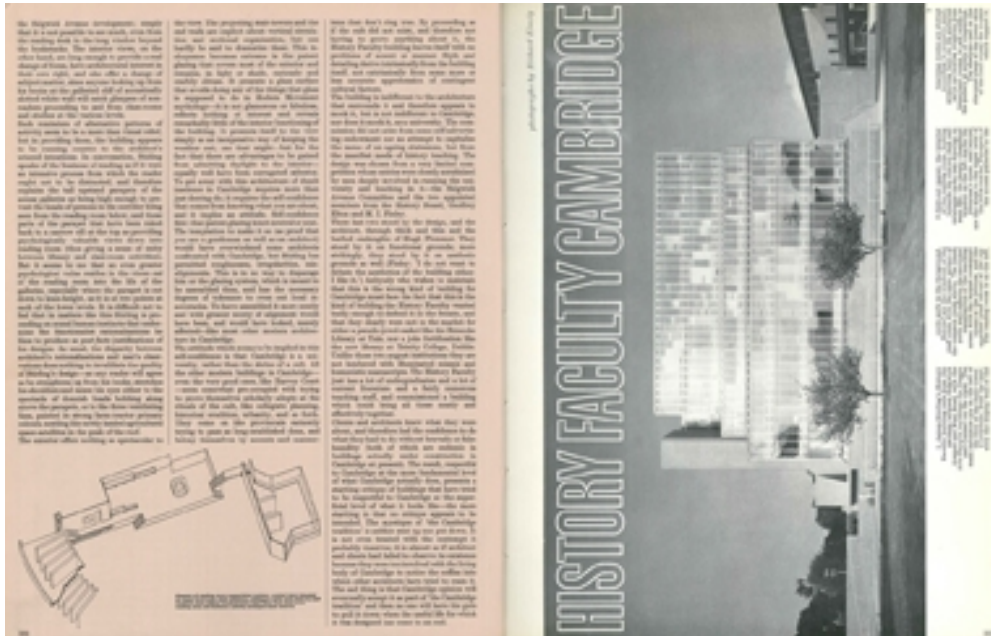
However, there are some persistent minor doubts about the environmental conditions in the smaller spaces which stem less from the basic design of the building (it should be remembered that its orientation had to be turned through ninety degrees after design was

completed, through no fault of the architect) than from the detail provisions made for controlling heat and light, and the level of performance demanded of the occupants. The environmental controls provided are hot water convectors in the upstand beam on the edge of the floor-slab, ventilating louvres in the patent glazing, and venetian blinds hung in the space between the glazing and the upstand. Now, with the laudable intention of preventing direct draughts, the louvres are placed so that they are masked by the upstand, and their control handles are therefore a little difficult to reach. But they are also masked by the venetian blinds when these are in the down position (which they normally will be on days hot enough to require adjustments to the louvres) and it is quite easy to get the control handles fouled up in the slats of the blind.

Situations like this are governed by Murphy's Law (also known as Finagle's Law) which predicts the probability of mechanical disaster by the formula: If anything can happen, it will. Such probabilities are high anyhow, but in this case they are likely to be raised by the fact that most of the occupants of the building will be humanities-oriented, and therefore likely to fall below the national average in mechanical literacy and competence. Controls that get fouled up through mismanagement by the occupants will tend to be left in that condition while the occupants take verbal revenge on the architects. If revenge is to be taken anywhere, it should be on the University Grants Committee as the agents of a policy of allocating building budgets too skimpy to permit decent environmental installations, which in this case would be either full automation of the environment, or controls sophisticated enough to provide idiot-proof local manipulation.

As it turns out, the excellent basic environment provided by Stirling and his consultants will require some skill and intelligence for its proper employment throughout the building. Not only in the smaller rooms, but in the large volume of the reading-room as well, the environment requires conscious manipulation by a responsible human being. The control-console for heating, lighting and ventilating is incorporated in the island desk which is also the command post from

which an assistant librarian supervises the library and its contents, so that the whole life and human situation of the library falls under the hand of a single person - let us hope that the library gets the kind of captaincy (or stage direction?) it deserves.



It may seem eccentric to have begun thus, with the environmental mechanics, in discussing a building in a context where problems of style and cultural values are usually taken to be pre-eminent; but the peculiar relationship of the History Faculty building to the Cambridge scene can only be tackled in this way, to my opinion. Let me explain at once that my opinion is that of a persistent user of both libraries and seminar rooms, with fairly well-developed professional reflexes, especially where libraries are concerned. What makes a library a good place to work in, and thus an effective contributor to the cultural values of the university of which it is a member, is complex, and ultimately engages almost every known aspect of architecture. That engage merit begins with the creation of a satisfactory life-support system of heat, light and ventilation, such as has been discussed above (this is obvious, yet there are too many libraries that fail even at this physiological level, and every scholar has his private black-list). But even in terms of physical comfort the matter is a good deal more subtle, and extends well beyond what mechanical services can

provide.

Thus, the business of working with books is a primarily optical affair, but the provision of adequate light of the right colour and quality does not in itself give adequate service of this function. It is physically impossible to keep one's eyes on the print for more than a certain period of time (varying with one's own psychosomatic make-up and the nature of what is being read) and what is seen when the eyes are lifted is crucial. Not only must the length of focus change, but what is seen in long focus must possess certain qualities too. As far as I can make out from my own experience, what is seen must be totally different from what is on the desk in front of the reader. It might be the view out of a window into the campus or city beyond, or it might be an architectural interior striking enough to hold the interest of the viewer not an endless perspective of bookstacks and eight-foot high suspended ceiling, but something like the handcrafted space-frames of Mackintosh's library at the Glasgow artschool, or the laughable domes of the Bibliothèque Nationale.

The History Faculty does not provide external views from its reading room that can be actively enjoyed - and this is not intended as a value judgement on other buildings in the Sidgwick Avenue development; simply that it is not possible to see much, even from the reading desk in the long window beyond the bookstacks. The interior views, on the other hand, are long enough to provide a real change of focus, have architectural interest in their own right, and also offer a change of subject matter, since anyone looking up from his books at the galleried cliff of acoustically slotted white wall will catch glimpses of nonreaders proceeding to and from class-rooms and studies at the various levels.

Such reminders of alternative patterns of activity seem to be a more than visual relief, but in providing them, the building appears to be running counter to the architect's uttered intentions. In conversation, Stirling speaks of the business of reading as if it were an intensive process from which the reader ought not to be distracted, and

therefore explains the tall upstand parapets of the access galleries as being high enough to prevent the heads of persons in the corridor being seen from the reading room below, and those parts of the parapet that have been raked back to a narrow cill at the top as providing psychologically valuable views down into reading room (thus giving a sense of unity between library and class-room activities). But it seems to me that an even greater psychological value resides in the views out of the reading room into the life of the galleries, especially where the parapet is cut down to knee-height, as it is at two points at each of the lower levels. It is difficult not to feel that in matters like this Stirling is proceeding on sound human instincts that undermine the functionalist rationalizations he likes to produce as post facto justifications of his designs.

As usual, the disparity between architect's rationalizations and user's observations does nothing to invalidate the quality of Stirling's design - as any reader will agree as he straightens up from his books, stretches his shoulders and raises his eyes either to the spectacle of donnish heads bobbing along above the parapets, or to the three ventilating fans, painted in strong farm-tractor primary colours, nestling like newly landed agricultural space-satellites in the peak of the roof.



The exterior offers nothing so spectacular to the view. The projecting stair-towers and the end walls are explicit about vertical circulation and sectional organization, but can hardly be said to dramatize these. This in-eloquence becomes extreme in the patent glazing that covers most of the exterior and remains, in light or shade, curiously and craftily obtuse. It presents a glass surface that avoids doing any of the things that glass is supposed to do in Modern Movement mythology - it is not glamorous or fabulous, reflects nothing of interest and reveals remarkably little of the interior functioning of the building. It presents itself to the view simply as an inexpensive way of keeping the weather out; one that might - but for the fact that there are advantages to be gained from admitting daylight to the interior equally well have been corrugated asbestos.

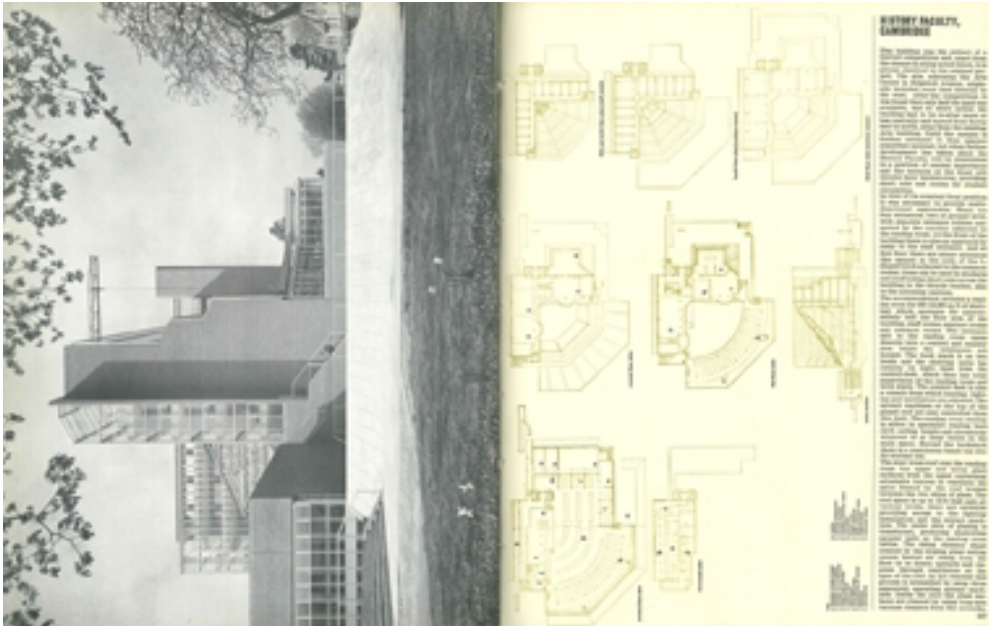
To get away with this architecture of dumb insolence in Cambridge requires more than just derring-do; it requires the self-confidence that comes from knowing what you are about, and it implies an attitude. Self-confidence first: that patent glazing is not neutral or neat. The temptation to make it so (as proof that you are a gentleman as well as an architect) would have overwhelmed some architects confronted with Cambridge, but Stirling has permitted roughnesses, irregularities, misalignments. This is in no way to disparage him or the glazing system, which is meant to be assembled thus, and has the necessary degrees of tolerance to even out local inaccuracies. To have assembled it more neatly and with greater nicety of alignment would have been, and would have looked, merely affected - like most other modern architecture in Cambridge.

The attitude which seems to be implied in this self-confidence is that Cambridge is a university, rather than the shrine of a cult. All the other modern buildings in Cambridge even the very good ones, like Harvey Court - seem somewhat pre-occupied with trying to prove themselves scholarly adepts at the rituals of the cult, like collegiate planning, historical erudition, urbanity, and so forth. They come on like provincials earnestly trying to pass as long-established dons, and betray themselves by accents and mannerisms that don't ring true. By

proceeding as if the cult did not exist, and therefore not having to prove anything about it, the History Faculty building leaves itself with no problems of accent or manner. Style and detailing derive intrinsically from the building itself, not extrinsically from some more or less accurate apprehension of contingent cultural factors.

The building is indifferent to the architecture that surrounds it and therefore appears to mock it, but is not indifferent to Cambridge nor does it mock it, as a university. The commission did not arise from some self-advertising endowment nor an attempt to capitalize the name of an ageing statesman, but from the manifest needs of history teaching. The design was chosen from a very limited competition whose entries were closely scrutinized by men deeply involved in running the university and teaching in it - the Sidgwick Avenue Committee and the two appointed members from the History Board, Geoffrey Elton and M. I. Finley.

These last two stood by the design, and the architect, through thick and thin and the barbed onslaughts of Hugh Plommer. They stood by it on functional grounds; more strikingly, they stood by it on aesthetic grounds as well (Finley: 'I do not want to debate the aesthetics of the building either; I like it.') Anybody who wishes to maintain that this is the wrong kind of building for Cambridge must face the fact that this is the kind of building the History Faculty wanted badly enough to defend it in the Senate, and that they clearly were not in the market for either a pseudo-jewel-casket like the Beinecke Library at Yale, nor a joke fortification like the new library at Trinity College, Dublin. Unlike those two august institutions they are not lumbered with illuminated missals and humanistic manuscripts. The History Faculty just has a lot of undergraduates and a lot of current literature and a fairly numerous teaching staff, and commissioned a building which could bring all these neatly and effectively together.



Clients and architects knew what they were about, and therefore had the confidence to do what they had to do without bravado or false humility (both of which are endemic in buildings actually under construction in Cambridge at present). The result, respectful to Cambridge at the more fundamental level of what Cambridge actually does, presents a startling critique of buildings that have tried to be respectful to Cambridge at the superficial level of what it looks like - the more startling in that no critique appears to be intended. The mystique of 'the Cambridge tradition' is neither sent up nor put down. It is not even treated with the contempt it probably deserves; it is almost as if architect and clients had failed to observe its existence because they were too involved with the living body of Cambridge to notice the coffins into which other architects have tried to cram it. The sad thing is that Cambridge opinion will eventually accept it as part of 'the Cambridge tradition' and then no one will have the guts to pull it down when the useful life for which it was designed has come to an end.

HISTORY FACULTY, CAMBRIDGE

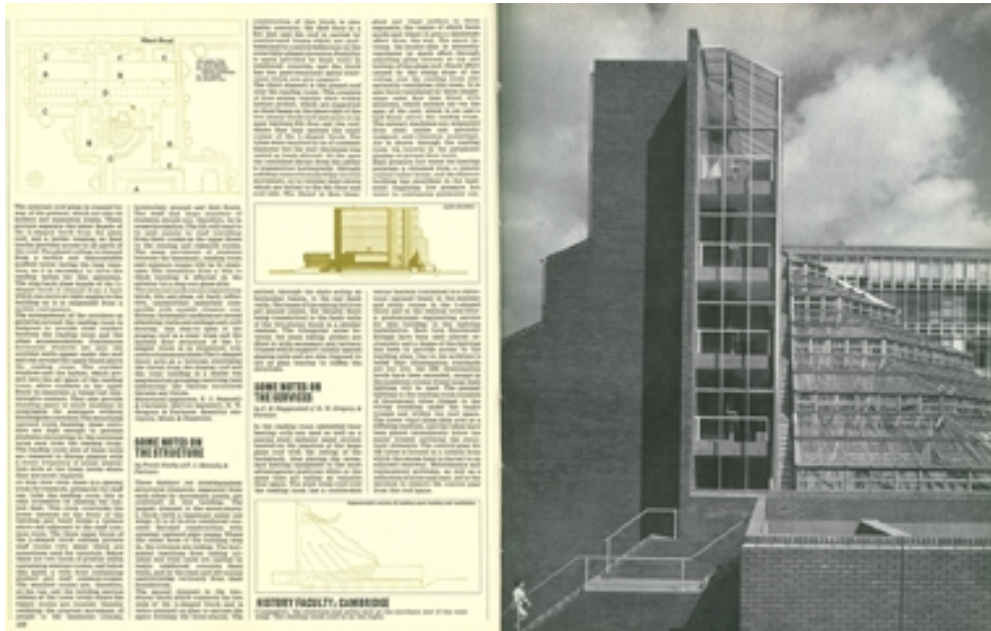
This building was the subject of a limited competition and, apart from

the change in siting noted below, it is almost identical to the original project. The site, adjoining the Arts Centre in Sidgwick Avenue, originally included more land directly to the west. After the competition it was found that only half the land was available, and at short notice the building had to be re-sited more or less centrally and turned from facing east to north, away from the existing Arts building. Until the campus is further extended it thus appears somewhat isolated, but when further development has taken place the History Faculty will be established in a position of central importance and the terraces at the front will become fully walked-over, providing short cuts and routes for student circulation.

In view of its eventual focal position it was necessary to provide multidirectional approaches. There are four entrances, two at ground level, with separate entrance lobbies connected by the corridor adjacent to the reading room. At the front of the building there is also an approach by ramp to the staff entrance, and at first floor there are minor entrances (fire escape) at the ends of the L-shaped block adjacent to the common rooms; these can be used by students and staff taking short cuts across the building to the bicycle bunker, also to the adjoining canteen.

The accommodation includes a reading room for 300 (12,600 sq ft of shelving) which accounts for approximately half the floor area of the building, staff rooms, seminar rooms and common rooms. The entrance exit to the reading room opens directly into a control and enquiry area where the catalogues are housed. The book stack is on two levels and the shelving units fan radially on sight lines from the control-desk, which thus has total supervision of the reading room and book stack. The control desk is also a console from which heating, lighting and ventilation are adjusted. The extract machines at the top of the glazed roof are also controlled from this desk. The reading room seating is either in specialist reading bays (12 ft ceiling height and clerestorey windows) or at large tables in the main space. Beyond the bookstack there is a continuous bench top also for student

use.

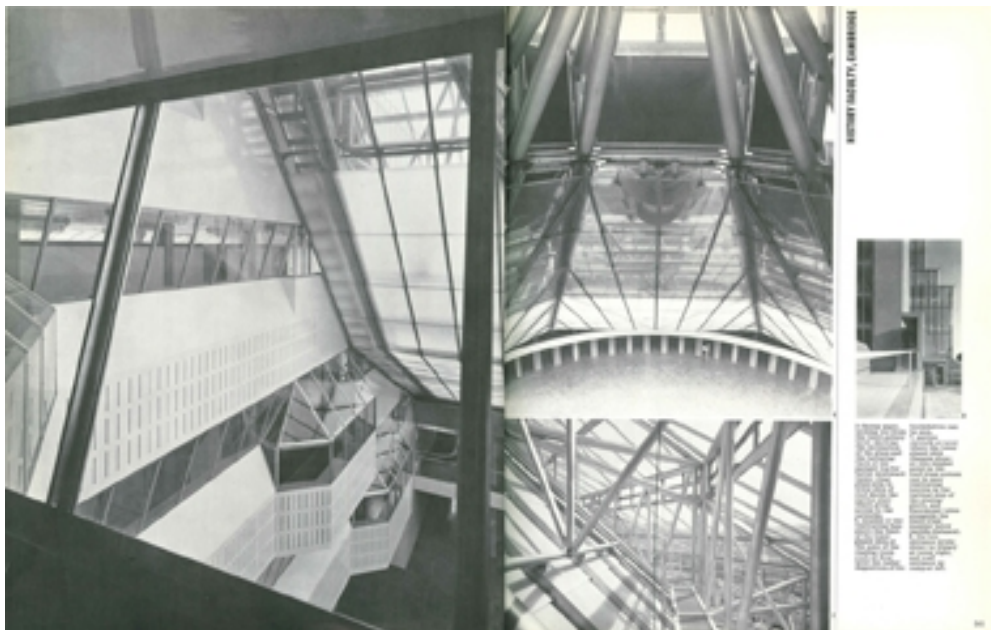


The steel truss roof over the reading room has upper and lower glass surfaces with the upper containing adjustable louvres to ventilate the space formed by the roof trusses between the two skins of glass. The roof space is up to 12 ft high and, at various levels, there are catwalks providing access to the lighting installation and the extract machines. The under skin of glazing is translucent, producing shadowless natural light on the reading room tables. The rising chimney shape created by the sloping glass ceiling causes heated air rising from the floor to be drawn upwards and disperse through ventilators at the apex of the roof. In hot weather this process is intensified by using three separately operating extract machines. Inside the roof the glass surfaces are cleaned by using long-arm vacuum cleaners from the catwalks.

The external roof glass is cleaned by way of the gutters, which act also as ladders and expansion joints. These gutters separate the inner façade of the L-shaped block from the glass roof, and a ladder running on fixed tracks provides access to all parts of the roof. The glazed ceiling is cleaned from a mobile and demountable scaffold tower during the long vacation, as it is necessary to move the reading tables for this operation. The step back glass façade of the L-shaped block is cleaned from a boat which can move at right angles to the building as

it is suspended from a mobile roof gantry.

The arrangement of the corridors as galleries around the reading room is designed to provide close contact between the reading room and the other accommodation. Continuous horizontal windows set into the corridor walls appear under the roof and run around the upper floors above the reading room. The corridor windows and the laybys, which project into the air space of the reading room, allow students in the upper floors to maintain a visual but nonintrusive contact. They also provide standing space to allow students to congregate for seminars without blocking the corridors. The structural upstand walls flanking these corridors are high enough to prevent students circulating in the corridors being seen from the reading room. The reading room side of these walls are veneered in fibrous plaster with a closer frequency of sound absorption slots at the lower levels where they are most required.



At first floor level there is a special room for research, primarily for staff use. Like the reading room this is only accessible by passing the control desk. This room overlooks the lower terraces at the front of the building and itself forms a terrace above and adjacent to the staff common room. The three upper floors of the L-shaped block contain private staff rooms (two sizes) which are sometimes used for tutorials. Below there are two floors of greater width containing seminar rooms,

and below this again a wide floor containing student and staff common-rooms. The smallest rooms are, therefore, at the top, and the building section widens at the lower levels where the bigger rooms are located, thereby confining the greatest movement of people to the basement (cloaks, lavatories), ground and first floors. The staff and large numbers of students should not, therefore, be in cross circulation. The lift will tend to be used mainly by staff traveling from their rooms on the upper floors to the reading and research rooms. The mass movement of students between the basement, reading room and common rooms will be by staircase. The transition from a thin to thick building is effected on the exterior by a step-out glass skin.

The external surfaces are engineering brick, tile and glass, all hard, reflective, unabsorbent materials compatible with outside climatic conditions. Internally surfaces are sound absorbing walls and ceilings and cork flooring. The lean-to span of the sloping roof is a steel truss and the layered floor structure of the L-shaped block is in reinforced concrete columns and slabs. The L-shaped block acts as a buttress stabilizing the thrust from the sloping roof and the total building is a stable but assymetrical grouping resolving (and indicating) the various structural thrusts and forces.

Structural engineers, F. J. Samuely & Partners. Service engineers, R. W. Gregory & Partners. Quantity surveyors, Monk & Dunstone.

SOME NOTES ON THE STRUCTURE

Three distinct yet interdependent structural elements, separated from each other by movement joints, are combined in this building. The largest element is the seven-storey L block (with a basement under one wing). It is of in-situ reinforced concrete flat-slab construction with external upstand edge beams. Where the outer faces of the building step in, the columns are raking. The horizontal reactions from raking columns and wind loads are carried by insitu reinforced concrete flank walls, and by the stair and lift towers cantilevering vertically from their foundations.

The second element is the two-storey block which connects the two ends of the L-shaped block and is twice cranked on plan to enclose

the space forming the book-stacks. The construction of this block is also insitu concrete; the first floor is a flat slab and the roof is carried by cantilevered beams which are post-tensioned to control deflection on the outer fully-glazed elevation. Stability is again provided by flank walls in reinforced concrete, and the block has two post-tensioned spiral staircases which also give support.

The third element is the glazed roof over the reading room. This consists of four raking tubular steel welded lattice girders, which are supported at their bases on the inner edge of the two-storey block roof and meet at an apex between 6th floor and the roof, where they lean against the inner corner of the L-shaped block. The tubes were required to be of constant diameter but the wall thickness was varied as loads allowed. At the apex the combined thrust from the girder is transmitted horizontally, through a sliding connection allowing vertical movement, on to tubular steel struts which are bolted to the 6th floor and roof slab. The thrust is then transmitted, through the slabs acting as horizontal beams, to the end flank walls. The bases of the raking lattices are pinned joints, the thrusts there being transmitted to the flank walls of the two-storey block in a similar manner. The triangular areas between the main raking girders are filled in with secondary and tertiary trusses which support closely spaced glazing rails and are also disposed to act as plan bracing to stiffen the structure.

Frank Newby of F. J. Samuely & Partners

SOME NOTES ON THE SERVICES

In the reading room embedded floor heating coils are used as well as a special steel radiator panel system located at the junction of the large glass roof with the ceiling of the bookstack, thus placing the necessary heating equipment in the most advantageous positions while at the same time not taking up valuable floor space. The steel truss roof over the reading room has a double-skin glass and vinyl surface in three segments, the centre of which faces south-east where it gets a maximum effect from the sun. The space between the double skin is naturally ventilated by stack effect through adjusting glass louvres at top and bottom of the glass roof. Stack effect caused by the rising slope of the ceiling over the reading room also naturally ventilates this room. It is also force ventilated by three single stage

axial flow fans fitted with silencers, which extract air via the apex of the roof, which is six and a half floors above the reading room. The extract machines are suspended from steel cables and specially designed anti-vibration mountings. Air is drawn through the reading room via louvres in the peripheral glazing at ground floor level. High pressure hot water for heating purposes is obtained from a remote central boiler house, and the History building has calorifiers in the basement supplying low pressure hot water to continuous perimeter convector heaters (contained in a structural upstand beam) in the seminar and study rooms in the L-shaped block and to the reading room floor.

A predominant engineering service for this building is the lighting installation. Bare tube fluorescent fittings have been used almost exclusively and a theme of the lighting has been to provide accent to the building plan. Due to the architect's belief that illumination standards are too low, the IES illumination levels have been exceeded, except in the academic rooms where local desk lighting will be used. The general lighting in the reading room consists of fluorescent tubes clipped to the wiring trunking under the major trusses and within the roof space.

The lower vinyl glass skin acts as a diffusing medium, and the tubes have been placed immediately below the major trusses outlining the structural elements. The control gear for 142 tubes is housed in a cubicle from which the excess heat is ducted to an adjacent stairway. Maintenance and replacement problems, as well as a reduction of noise and heat, led to the decision to remove the control gear from the roof space.

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