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MARGINALIA

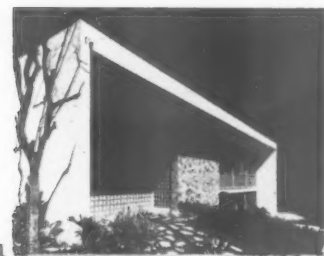
HOUSE AND GARDEN-HOUSE. Architects today are rarely faced with the problem of relating a garden structure to a large house, and making certain fine social distinctions in doing so—as far as Europe is concerned that probably went out with Repton's picturesque gamekeeper's cottage at Holkham with its air of 'industry with an affectation, rather the reality of penury.' But, like most exotic things, it can happen in Brazil, and a new week-end house near Rio shows Alfonso Reidy executing this delicate

The site is not deep, 2, but the land behind the house rises steeply, and the caretaker's cottage, at the back of the main house, is likely to be seen over it, from the front. To use the solution evolved by Le Corbusier at Poissy, and make the cottage a miniature of the house, might therefore lead to some confusion as to who lived in what, and Reidy's answer has been to treat the cottage in a manner which is clearly related



to the house, but much less formal, 3. There is no strong frame, the roof is pent, there are no decorated surfaces, and yet the family relationship of the two houses is immediately manifest.

EXHIBITION BUILDINGS FOR PARIS. Two projected buildings that stand well within the great Paris tradition of exhibition halls and museums have recently been announced. The *Musée des Arts et Traditions Populaires*, which might, but for the open-mindedness of Georges-Henri Rivière, have been all too easily a mélange of regional styles, will be instead a grouping of Miesian framed glass boxes with faintly Corbusian ancillary structures, 4. No doubt the relatively isolated site in the Bois de Boulogne, as well as the sympathetic interest of the Director, enabled the architects, Dubuisson and Jausserand, to offer so uncompromising a design. For a site even further from the centre of Paris, the *Place de la Défense*, an impressive team of designers including Zehruss, Nervi and Jean Prouvé,

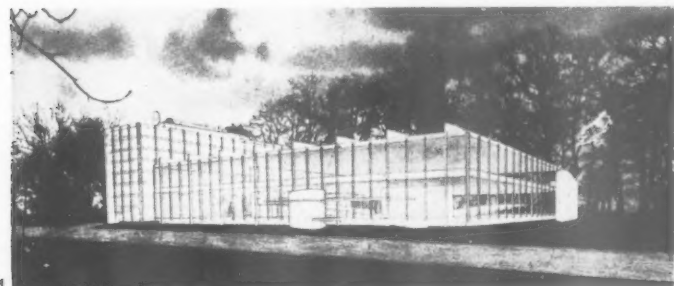


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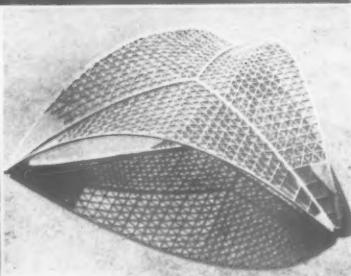
feat with his customary sensitivity. The main house, 1, which is fairly large, is asymmetrical yet formal, the imbalance of its façade—glazed and open one side, solidly murrilled in by Burle-Marx on the other, single storey one side, double on the other—being contained within a strong and tidy rectangular frame.



4



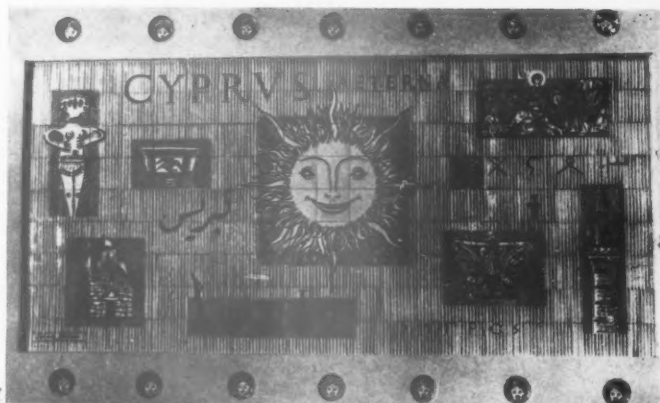
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6

Techniques et Architecture

1



7



8

have projected a new hall for the *Centre Nationale des Industries et des Techniques*, 5. Although ancillary buildings will be spread over quite a large area to the west of the *Place*, interest will be concentrated on the great triangular hall on its north side, for which Nervi has devised a characteristic and exciting structure, 6.

TILT-UP SCHOOL. Interesting variations on the common usages of site-cast concrete slabs tilted up into the vertical for walling purposes are seen in the Douglas High School, Oregon, USA, 9, designed by

statements. Both the style and the iconography need to be carefully considered—the first, it seems, can now be a kind of modified-representational without confusing the spectator, while the latter, though inseparable from style, remains largely for the artist to create for himself. In his wall of painted ceramics in the Information Office at Nicosia, 7, Sigmund Pollitzer has evolved a style and iconography which admirably fill the gap between material—painted tiles—and message—Cyprus, though he is undoubtedly aided in this by the way in which Cypriot artefacts, whether Archaic, or Byzantine, lend them-



9

Dougan and Heims. The fill panels for under-window spaces of the simple frame structure are of concrete cast flat, over a bed of local river-run pebbles which, after sand-blasting, form a permanent surface, 10, free from the usual maintenance and aesthetic difficulties encountered with concrete walling.

MURALS: now widely accepted as a proper decorative foil to modern architecture, large scale mural compositions still present aesthetic problems when considered as public

selves both to his technique and his theme.

For his mural in the bar of the new Union Building, London University on the other hand, Clive Gardiner was faced by a more subtle problem in terms of both theme and audience. His solution, 8, a *capriccio* of University life and the *Commedia dell'Arte*, seems both appropriately donnish and donnishly appropriate, while the use of an ambiguous stage-set convention effects a suitably intellectualized compromise between reality and illusion, between iconography and style.

Corsham Court

As every great house should, that houses a great collection, Corsham Court offers a two-layer service of cataloguing and documentation on its treasures. For the student and historian there is still the definitive catalogue of the collection, issued a few years ago, but for the visitor who needs primarily to know merely who did what, there is now a supplementary brochure, less opulent in format than the usual charabanc trade keepsake, but still giving a short history of the house and family, and what it terms a 'topographical index' of the collection. This lists, on a room-by-room basis, not only the strangely mixed and highly characteristic assemblage of paintings that the Methuens have brought together, but also the more important furnishings, such as the Adam pier-glass, and the Cobb commode and torchères, below, that were seen in last winter's Royal Academy exhibition.



Peter Watson

The death at forty-eight of Peter Watson (properly Victor William, but always known as Peter) robs us of a personality who did much to shape our concept of the contemporary in art. He was one of the founders of *Horizon* just before the war, and of the Institute of Contemporary Arts after it, so that he was intimately concerned with two of the most influential organs in the creation of current attitudes to literature and the plastic arts. At the ICA he served on the Managing and Exhibition committees, his service on the latter being a kind of large scale projection of his private activities as a collector, and he was instrumental in bringing to the notice of the British public, artists as diverse as Matta, Wifredo Lam and Gerald Wilde.

A Common Language

Diana Rowntree, who has been visiting the Hammersmith School of Building and Arts and Crafts, writes:

The retiring and businesslike manner in which the LCC goes to work tends to conceal the fact that it is increasingly the promoter of daring creative feats. The Hammersmith School of Building and Arts and Crafts aims at establishing a common language between the members of Trades, Professions, and Arts who train there. These include all the building trades, architects and structural engineers, furniture

and textile designers, interior designers, potters and sculptors.

What this means can be understood by all tradesmen who have ever worked for architects, and by all architects who have striven to control operatives or artists all firmly bent on going their separate ways. They will recognize from the depths of the profound irritation they suffered what a necessary and what a revolutionary idea this is. The infinite misunderstanding that can build up between a designer's sweeping ideas and a craftsman's conservatism comes from their entirely separate education.

Art schools and colleges have worked on the lines of integrating the fine arts and industrial design, by encouraging the different departments to co-operate. Hammersmith has taken this idea a stage further, aiming to integrate their trade students with artists, designers and the professional students, by means of a common language and their student life in common. Periodically the work of all departments is on view at a single exhibition. At the last one, the level reached was



remarkably high for a local school. This success vindicates the principle, and to anyone who has grasped the implications of the general intention is only to be expected. This is only one stage short of the total education projected at Ulm.

If these trades, professions, and artists all understood a common language, imagine the ease and speed with which buildings and projects could be constructed. Imagine how immeasurably more interesting life would be for everyone concerned on such projects. But the supreme importance of this innovation is that it is the only way in which we can ever hope to build a coherent environment. It is probably the only answer to subtopia.

Illustrated is an exhibit at last year's exhibition of work, which includes the work of sculptors, bricklayers, mural designers and monumental masons.

CORRESPONDENCE

Motels

To the Editors,

DEAR SIRS.—After perusing Diana Rowntree's article on motels*, I wish to congratulate her heartily on the suggestion to set up a panel dealing with motel buildings and preferably also with buildings, structures, signs, etc., scattered around our highways. I am fully aware, from my personal experience, of the need for such a body.

To pick out only a few points mentioned in the article—my Kent

*AR, February 1956

motel was rather better received (apart from the use of the wancye-edged boarding, and on this point I must also agree with Diana Rowntree) than the others. The reason is quite plain: we have had practically no interference from the Kent Planning Authority, whilst in the New Forest we had to redesign the original scheme (which was a simple timber structure, expressed as such, with semi-flat roofs, etc.) three times, and control was exercised to such a degree that we were not even allowed to colour-wash our brickwork or use any but the locally prevalent red brick. Window sizes were drastically reduced, bars introduced, pitched roofs insisted upon. Similar, though not quite so stringent control was exercised in Exeter as well, and oddly enough the false stonework buttresses were required by the planning authority and were built at considerable cost to my client.

Again, in the New Forest, simplicity of design—most desirable from the operator's point of view for ease of control and servicing, had to be sacrificed because of the local authority's contention that a long building block would not fit into the surrounding locality.

Road signs are treated even more suspiciously by the authorities. The ones published are only temporary, since so far we have had no success in having any of our proposals accepted.

Planning permission in both the New Forest and the Devon Motel took approximately twelve and six months respectively as opposed to Kent, where it required only two months. Leaving aside all other benefits accrued by a Central Authority, the time saving alone would warrant any operator to gladly pay a fee, if necessary, to this authority, which thus could be made self-supporting. Particularly so if this authority could have a voice in drink and licensing matters too.

Two more points in conclusion—the morality aspect: of course there is no difference on this score between Hotel and Motel, control, registering, etc., being the same in both by law, and the running therefore depending on the management. Shabby finishes: They are due entirely to taxation policy, whereby it is cheaper in the long run to re-decorate frequently out of profits, on the untaxed maintenance account, than to increase the capital cost, which must perforce come from a taxed profit account. These conditions do not apply in the USA, where taxation is on a different basis; hence the avoidance of maintenance costs is the sounder financial policy over there.

Yours, etc.,

LOUIS ERDL.

Arthur Ling, responsible as City Architect for the District Centre at Coventry, was trained at the Bartlett School of Architecture and studied Town Planning at University College, London.

In 1936 joined the town planning staff of the London County Council, but left the following year to work in the office of Maxwell Fry and Walter Gropius, continuing his theoretical studies of Metropolitan planning as secretary of the MARS Group town planning committee.

In 1941 he joined J. H. Forshaw and Sir Patrick Abercrombie's team to prepare a plan for London, eventually taking charge of the group preparing and editing the published County of London plan. At the end



of the war appointed planning officer in charge of all the LCC's planning work.

In 1946 took charge of the town planning course at University College and continued as senior lecturer until his appointment in 1955 as city architect and planning officer in Coventry.

Design in Cambridge

The Cambridge Design Society was formed in December, 1955, by undergraduates, 'to propagate interest in design of all kinds, particularly of objects mass produced and widely used . . .'. The first chairman and secretary are respectively Michael Dower, of St. John's College, and Jeremy Taylor, of

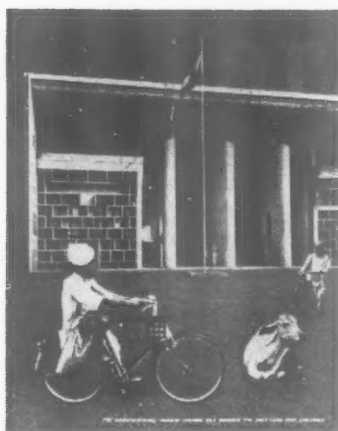


Trinity. The Society has been working on a survey of Cambridge street furniture; the photograph shows the kind of problem it is up against.

ACKNOWLEDGMENTS

COVER: Denis Brihat. MARGINALIA, pages 1-2: House in Brazil, A. Michel; London mural, J. R. Pantlin. WIRES OVERHEAD, pages 7 and 8: BTC. POWER STATION AT KUWAIT, pages 9-11: Jack Hill. BUCKMINSTER FULLER, pages 12-20: 10, 15, US Defense Dept. (Marine Corps); 16, 18, R. Buckminster Fuller. DISTRICT CENTRE AT COVENTRY, pages 24-32: Galwey, Arphot. FACTORY AT STAFFORD, pages 33-35: Galwey. OXFORD COLLEGE BARGES, pages 36-42: photographs of paintings, Galwey; 6, Gillman & Soume; 9-13, Diana Rowntree; 14, Wallace Heaton. CURRENT ARCHITECTURE, pages 43-6: Highbury school, Mann Bros.; Binley pithead baths, P. W. & L. Thompson; Wallingford hospital, Toomey, Arphot. MISCELLANY, pages 47-54: Exhibitions, 1, Kleinhempel; 3, R. B. Fleming; 4, coll. Marquise de Pote-stad; 5, coll. J. Power. Steristerio, M. Johnson. Faversham, Nairn, Arphot. Chandigarh, Denis Brihat. SKILL: Design Centre, pages 55-9: 1, 3, 9, 14, COID; 2, 4-8, 10-13, 15, Galwey, Arphot. Design Review, pages 60-1: Swedish hollow-ware, 1, Wahlberg; plywood chairs, Erik Hansen; exhibition stand, Cowderoy & Moss.

THE ARCHITECTURAL REVIEW



The Cover joins what man at Chandigarh has put asunder. The rich plastic forms of Le Corbusier's Law Courts, the sacred cattle, the Sikhs with their uninhibited attitude to Western technology, are all elements of the townscape, but elements that the programmatic division of the circulation, and the regular gridiron of the plan, aim at keeping apart. On p. 53 Gordon Cullen questions whether the rigidity of the plan does not destroy many of the inherent townscape possibilities.

1 Marginalia

2 Correspondence

4 Frontispiece

5 Wires Overhead by the Editors The Transport Commission's announcement of its intention to electrify over twelve hundred route-miles of railway on the overhead system, though it contains many self-congratulatory statistics about economies of installation and support for the export industries, makes not a single reference to the visual consequences of this far-reaching programme. Some of the consequences may be beneficial to the eye—fewer lineside buildings will be required than with the direct-current third-rail system—but the wires themselves will alter, permanently, the aspect of large stretches of countryside, and routine excuses about the existing lineside telegraph wires, and other elements of rural wirescape, cannot diminish the visual responsibilities that the Commission is assuming. In some landscapes—the vastnesses of the prairies, or rugged mountains—overhead wires might have some value as symbols of human endeavour, but in the small-scale man-made landscape of England the existence of overhead wires and their supports may throw out of tune a hard-won harmony that now exists between the permanent way and the rest of the scene. The situation of the smaller, scenic, branch lines is particularly perilous, and for these the Commission should be prepared to take advice from experts in visual as well as electrical matters—if only because the economics of the Tourist trade may be

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affected. But beyond this, the electrification programme as a whole should be made a field of activity in which the present guerilla warfare between industrial and aesthetic interests might be replaced by an attitude of co-operation that could set an example for other situations of the same kind.

9 Power Station at Kuwait: Architects, Farmer and Dark

12 Buckminster Fuller by John McHale

Though widely, and superficially, known for his domes, Buckminster Fuller is more than a man with an obsession for one kind of structure at the expense of all others. He is, in his own terminology, a Comprehensive Designer, and his task, as he sees it, is Total Design. These all-embracing concepts are themselves embraced within an attitude of mind that takes design problems back to their roots in technology, economics, social needs—even to a radical view of the world's physical form: an earth-island at the bottom of an air ocean. Mr. McHale traces the development of these Fullerian concepts through their biographical sequence, showing how specific themes have grown, waited on necessary technological developments, and then come to fruition after a lapse of years that Fuller, with his accurate sense of technical progress, has been able to estimate almost to the day. Seen against this background, the characteristic geodesic dome structures that have won him international fame in recent years appear as the logical outcome of almost forty years of thinking and research in fields as diverse as transportation and spherical geometry, light alloy fabrication and plastics chemistry, and the decision of the U.S. Marine Corps to replace its tents and quonset-huts with air-liftable domes comes as a demonstrable justification of a lifetime of radical thought that had hitherto only earned him the reputation of a visionary and eccentric.

21 Dursley by Gordon Cullen To open its second series of Townscape studies undertaken in collaboration with a University—in this case the Department of Adult Education at Bristol—THE ARCHITECTURAL REVIEW has selected Dursley as the first of a group of West Country towns for study. Dursley's basic problem is that its town-centre—a composition of great character—is inadequately equipped for the press of traffic that now passes through it, and buildings are already being demolished to make more traffic space. In addition it is one of three towns that provide social and administrative facilities for its area, and it is now proposed to extract these facilities from the towns and move them to new sites in open country. This also, like the Dursley traffic jam, is a product of the new mobility and fluidity of a motorized society, and Gordon Cullen attempts to show just what is at stake before barbarous authority tries to convince the citizens of Dursley that the gutting and disintegration of the town will constitute an improvement—most notably, a gratifying and usable pedestrian precinct that will be irretrievably ruined if the town centre is made over for an arterial highway.

24 District Centre at Coventry: Coventry City Architect, Arthur Ling

33 Factory at Stafford: Architects, Edward Mills and Partners

36 Oxford College Barges by Diana Rowntree The tradition of the College barge at Oxford is just over a century old, and now appears to be coming to an end. The barges were part of the nineteenth-century style of oarsmanship, a feature of the social life of the university, some were the work of distinguished architects, and they constituted a curious and satisfying feature of the riverside scene. In the changed life of the twentieth-century oarsman, and his college's rowing activities, they have lost their essential place, and are being replaced by permanent boat-houses on a site made available by Christ Church. But it is to be feared that the new structures will not contribute as much to the landscape as did the barges—Mrs. Rowntree suggests that those already built have contributed only an air of tidy-minded desolation. What is needed is a type of building that will continue the elements of nautical tradition that were visible even in some of the least distinguished barges, will respect the old trees on the site, and resume the tradition of bringing Eights Week visitors well forward over the water. This last is difficult, because the stowage of long boats on a narrow site tends to force the upper storeys of the boathouses back from the bank, and some deliberately contrived feature will be required to bring the structure, and the viewer, to the front again.

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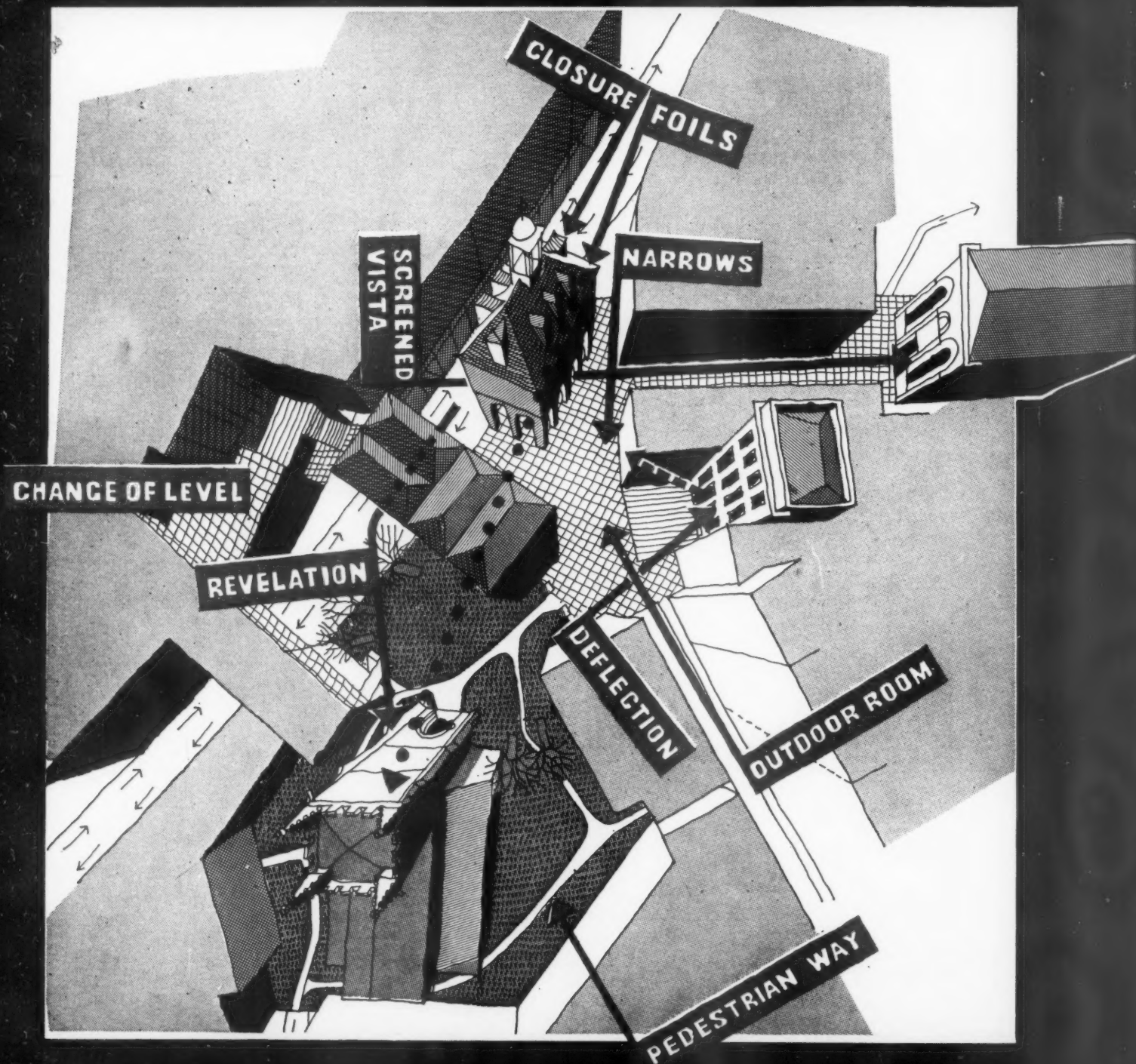
THE ARCHITECTURAL REVIEW

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FIVE SHILLINGS

SERIAL VISION, the unfolding of urban drama in the dimension of time, is particularly apt at the centre of a small town where intricacy is a continuing source of pleasure as opposed to the boredom created by opening up. Such a town is Dursley in Gloucestershire, and it forms the first subject of a new series of townscape studies in the west of England, undertaken by the REVIEW and Bristol University, who will use them as the basis of extra mural courses in the towns concerned. In a world in which the old town patterns are cracking open like chestnuts before a hot fire it is felt that only a broad, popular appreciation of townscape can ensure that the integrity of generations is not thrown away in an afternoon's search for a car park site.

Below, the centre of Dursley showing some of its townscape effects which are more fully described in the article on page 21.



WIRES OVERHEAD

'The Commission's decision to adopt the new system has the full concurrence of the Central Electricity Authority and is supported by the electrical manufacturing industry.'

So ends the British Transport Commission's general statement to the Press of its revised system for the electrification of British Railways. The report describes the process by which, at a cost of £185 millions, 1,210 route miles of BR—820 of main trunk routes and 390 of suburban lines—which had already been scheduled for electrification under the £1,200 million Modernization Plan will be saved from the method hereby rendered obsolete of direct current with third rail conduction, prevailing on all lines so far electrified, by the installation of alternating current, with overhead wire conduction. All subsequent electrification schemes, except on the eastern and central sections of Southern Region and on London Transport, will be carried out in this way. The advantages of AC over DC are apparently numerous¹. And the case against steam seems strong enough to convince anyone accessible to reason. There is a chronic coal shortage; steam pollutes the air, and steam locos have bad acceleration, need excessive cleaning and maintenance, and need firing before use. But the advantages of electricity over diesel, considered even apart from aesthetics, seem moot. During the replacement of steam by electricity which will take about 25 years to complete (the last steam loco will be built next year) diesel locos will anyway be used on lines in the actual throes of change-over. About 2,500 will be ordered and will be moved about to fit temporary requirements and then used permanently on lines with light traffic, or in shunting, for which purposes they are apparently economical. What is remarkable is that the BTC thinks them uneconomical for the main lines. It is understandable that electric locos are more economical in running costs on lines with heavy traffic than on less frequented lines²:

¹ First, the cost of power supply equipment, sub-stations and feeder equipment, also of power consumed and maintenance, will all be less, it is said, by £1,000,000 annually on all the lines which it is proposed to electrify; secondly, with overhead equipment, both the wiring and the overhead structures are light and require less copper and steel respectively than do existing DC equipment—the expense of alterations to tunnels and bridges to give the necessary extra clearance being more than counterbalanced in the over-all saving; thirdly, this system gives better adhesion to the rails, thus making possible lighter locomotives, and easier control.

² In fact the difference is proved to be very great, the cost of running electric locos on main lines being assessed at 5s. per train-mile (as against something like £3 on lines used comparatively little). This compares with about 10s. per train-mile for steam, diesel coming 'somewhere in between'; research has apparently not yet arrived at a more accurate assessment.

(so, admits the BTC, would diesel locos be; a nice contradiction in their attitude there). But diesel can be put immediately into use; of course it has no need of the wiring, transforming and new signalling equipment necessary for electrification and which is going to cost the country such a packet. The time in which it is estimated that the capital cost of electrification will be recouped (if ever) has not been disclosed. It is merely stated that the electrification plan will be long-term . . . and 'under certain conditions, the most economical'. Sir Brian Robertson, chairman of BTC, states, that, by adopting the latest system of electrification, British Railways would enable our electrical engineering firms to build large quantities of equipment which would eventually have a great sale in overseas markets. Interested in the new system, he said, are the USA, Argentine, Brazil, East Africa, New Zealand and South Africa. At the prospect of all this milk and honey, the *Manchester Guardian* issued a very happy first leader on March 7. And no wonder the Central Electricity Authority and the electrical manufacturing industry concur; the quotation at the beginning of this article is a masterpiece of understatement.

However, these are technical arguments which are difficult to answer without more evidence but, whatever their merits, the thing that is most striking about the Commission's statement is that it does not contain even a routine mention of the visual aspects of overhead wiring. One might have expected the defensive formula about there being enough mess in the country already for a little more, or a lot more to make practically no difference; but nothing, either defiant or excusatory, is to be found.

Perhaps we are fortunate in that the AC system (which involves overhead wires) requires many fewer sub-stations along the routes than does the DC. The voltage of the AC is 15,000; that of the DC at present in use in the Southern Region 660 volts. Hence the voltage 'drop' in transmission of current from the central station is less in the AC and many less sub-stations are needed, the ratio being approximately 7 to 1.

But overhead wiring makes the prospect immensely different. And before going into this point in detail, let us examine one facet of the question of association. A protagonist of the electrification of railways on the AC system, or the PRO of any of the interested bodies, if faced with the objection that overhead wiring would be detrimental to the beauty of the landscape, would certainly reply: 'But you have got pylons stretching for miles across down-land, not to mention the telegraph poles and wires which already run along-side railway lines and along a good many country roads and lanes. What difference will one more thing make? Pylons are much bigger than the gear necessary for AC electrification.' And a doubt will creep over the questioner. Has he not on many occasions half lulled himself to sleep by watching, from a comfortable corner-seat in a train, the apparent rise and fall, and crossing and uncrossing of the telegraph wires? Is the pleasure of watching stretches of country roll by anything comparable with it? Yet the most cunning PRO would find it hard to persuade anyone that the static wirescape along a railway track, seen from a nearby field, is more beautiful than the country surrounding it. The

trouble is that whereas, to a child, landscape, considered pictorially as against something to be in, means next to nothing, wires probably mean much; and childhood's fascinations die hard. If you have grown up with telegraph poles along every country lane, and as a child put your ear to the pole to hear the wires 'singing' or watched the migrating swallows perched on the wires, it is difficult later to recommend that they all be torn up because they are detrimental to the landscape (which they undoubtedly are.) And pylons . . . many children must have been surprised at hearing their right-minded parents condemn a thrilling perspective of these giant conductors of imagination; and, in later life, when their own aesthetic sensibilities are developed, it may be impossible for them not to experience occasionally a return of the old elation and wonder if inveterate pylon-hatred is not simply a matter of prejudice.

What about overhead wires on railways? Except as travellers abroad, we have had little experience of them—only on the prototype stretches of line from London to Shenfield in Essex, and from Manchester to Sheffield. The trolley-bus wires in towns scarcely count, but it is difficult to see how their monstrous

eating-up of the sky and the façades of buildings could make even a child happy. In open country, the effect is less claustrophobic. This is particularly so in large-scale landscape, such as the lower Alpine valleys: there even a dam, or a power-station, if well designed, should not look amiss. Any claims either of those might make to dominance would be severely

checked by the 10,000-ft. peaks above. In a great tree-less prairie, stretching for hundreds of miles in every direction, a grain elevator will appear to the native, or to anyone, as piazzas and parks do to a city-dweller, or to anyone—viz., as a beloved oasis. However gigantic and assertive, it cannot spoil the landscape. Similarly, wires in a rocky landscape of



DAWLISH. The heroic age of steam—the permanent structure is in scale and in sympathy with the view, and stands only as high as the roadbed, whereas . . .



. . . in the fiddling age of electricity, the permanent structure stands twice the height of a train above the roadbed, niggling in scale and out of sympathy even with this view near MANCHESTER

vast scale, or even across hundreds of miles of empty prairie, might be seen as showing off man's achievement in a heroic light, the victory of minuscule man over great and hostile elements.

But in England, the battle is over before it has begun. The soft and gently undulating landscape has no defence against any punishment man may wish to inflict upon it. One slap, and the red mark stays for ever. Once again, it may be objected that scars and weals are so numerous that no more can make any difference; but the equipment necessary to carry the overhead wires on the railways, even if of unexceptionable design, will eat fifteen feet or more into every skyline. In many cases, where at present railway lines harmonise with the landscape and are only in evidence when a train passes by, a wirescape will appear, visible perhaps from far away, and obliterate the quiet and unassuming individual quality of the neighbourhood. This does not apply only to branch lines

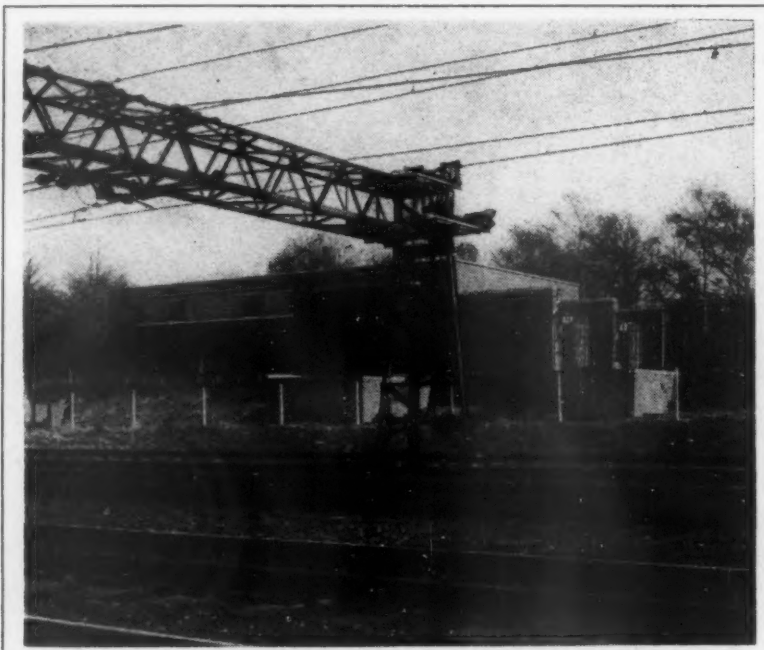
stretching into remote regions. Travelling on any of the great trunk lines, one will pass through many miles of deep countryside; and from the countryside itself, the new wirescape will be the visual equivalent of an unending express train, passing at 60 miles an hour with the whistle blowing. For the branch lines and less important national routes, the British Transport Commission should invite a committee, well qualified to advise on visual matters, to prepare a list of areas which it thinks specially important. This would be the minimum concession to opinion which

dreads further spoliation of landscape and the spread of subtopia. It will then have the choice whether to act on such advice or not. If it does not, then protests can be made and put before the public, either by means of questions in Parliament or through articles and letters in the Press. The BTC would thus be brought down from its pedestal of cool disdain towards matters not obviously connected with

economic expediency and good relations with the electrical manufacturing industry.

There are several reasons why BTC should have intentionally omitted to mention, in visual terms, how their re-wiring scheme would affect the landscape. Perhaps they foresaw long sessions during which they would have to be polite to members of the Royal Fine Art Commission—while the real point, namely an equivocal material advantage, was being missed. Perhaps their honesty forbade them to leave an apparent loop-hole open to visual objections, which they had no intention of gratifying. But on this score they can probably be given the benefit of the doubt: for it seems almost certain that visual considerations never even entered their heads. What is really surprising, however, is that it should never have dawned on them that to inflict further damage on the countryside, whose beauties they continually extol in their home and foreign publicity, might turn out to be bad business.

Like every nationalized industry and every big business worth speaking of, they prove themselves honest barbarians. Honest in that they never waver for one moment from the belief that only the material consideration counts; if they were to let aesthetics befoul their profitable schemes, they would be opening the floodgates to a national decadence. Or would they? Already, by the ignorance of local authorities and the indifference of private commercial interests big and small, local character is being erased throughout the British Isles. A brave

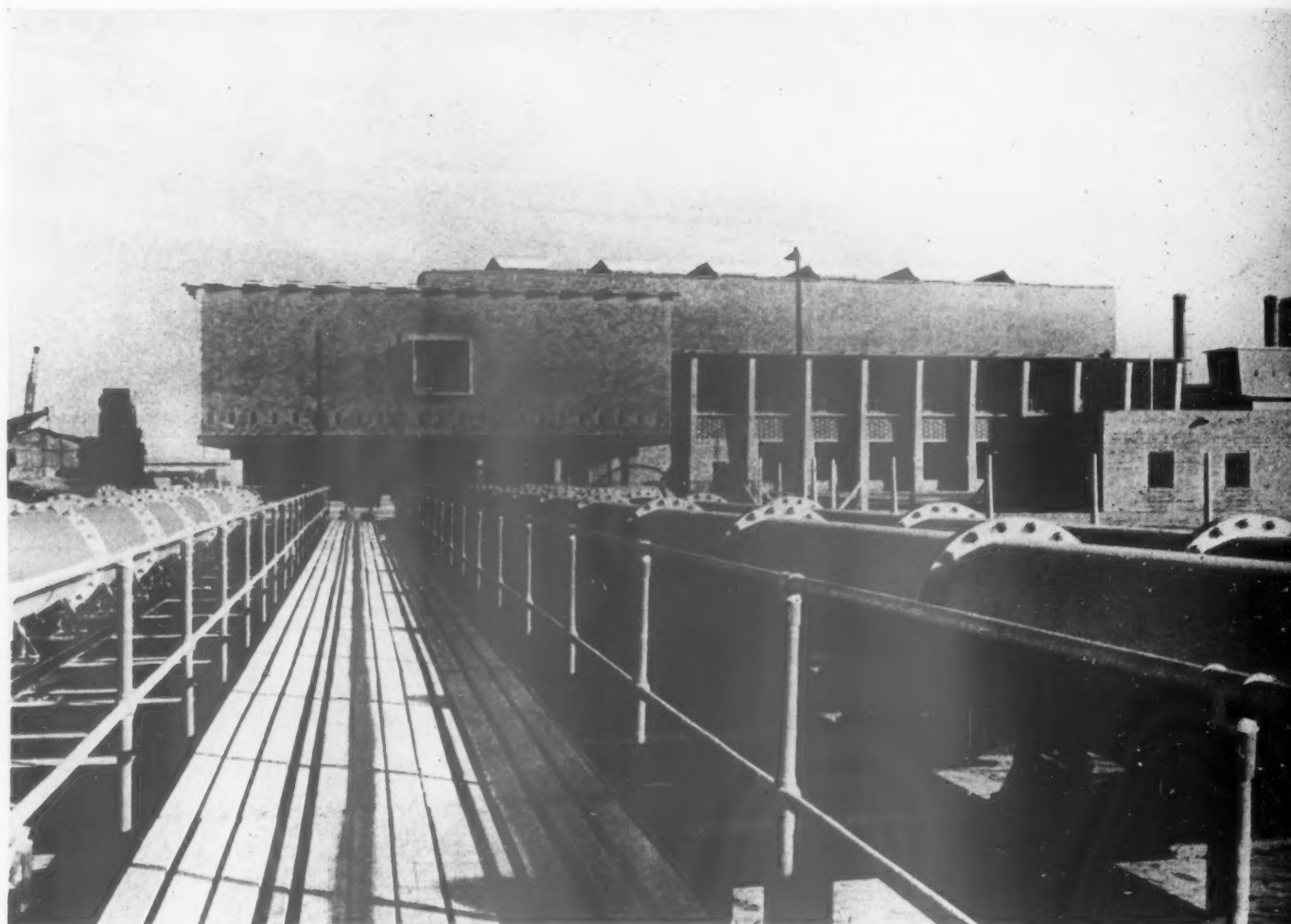


On a British railway line that already has overhead wiring, the Liverpool Street-Shenfield line: a sub-station building.

new world of a sort can be developed by scouring human barrels free of any inhibiting accretions in the way of romantic associations with place. If everywhere is the same, there can be no harm in mass deportations à la Serov, etc., etc. And where will the patriotic impulse go, which has won our wars in the past, and which is largely based on place? Instead of it, no doubt, we shall have megaphone propaganda.

POWER STATION AT KUWAIT

ARCHITECTS | FARMER AND DARK



1. the power station from the 600-ft. long intake jetty. The control room faces the landward end of the jetty.

Kuwait is an independent state in the north-east of Arabia, at the head of the Persian Gulf, with a territory of 6,500 square miles and a population that has increased from 100,000 in 1951 to over 200,000 at the present time. The climate is hot and dry with a daily maximum shade

temperature of over 100° F., with a sun temperature of up to 180°. Humidity is very low, rainfall being seldom more than 6 in. a year, and direct sun and reflected light is intense.

The station is the first part of a scheme commissioned

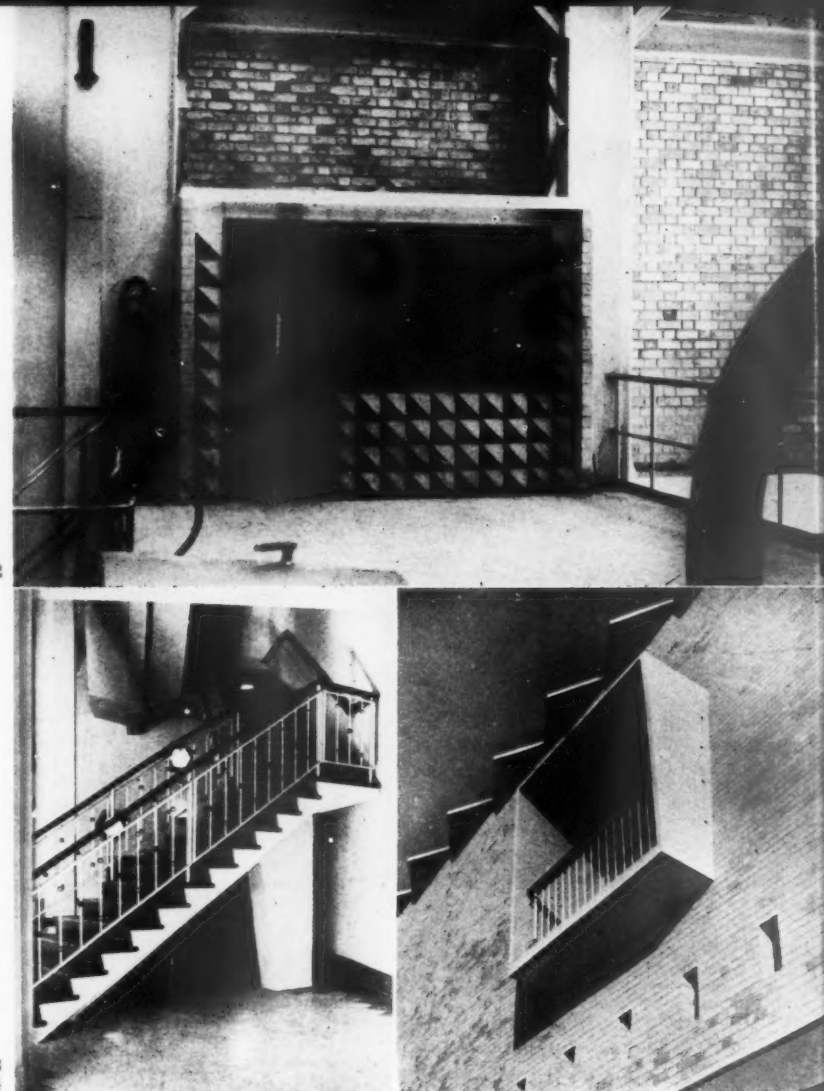
by the Ruler of Kuwait in 1954, before which time electricity supply to the town was very limited. It is in the industrial area $1\frac{1}{2}$ miles south-west of the old town, directly overlooking the bay. The turbine house, which contains the four turbo-generators, has a roof height of 55 ft. 6 in. A tiled operating floor at 18 ft. 6 in. level has three large light wells north of the turbines, the rest of the floor in this area consisting of two bridges, leading through soundproof airlocks to the office corridor. From these bridges and from two points in the south aisle, steel staircases descend to ground level. The tubular balustrading is removable to allow easy handling of plant served by the overhead travelling crane.

In a lower block to the north, at the 18 ft. 6 in. level, are the administration offices, of which the north external wall has French windows opening on to a balcony. Under the balcony and offices are the transformer cubicles separated by $13\frac{1}{2}$ in. brickwork, and the switchgear and battery rooms, for which fire protection is by a CO_2 installation.

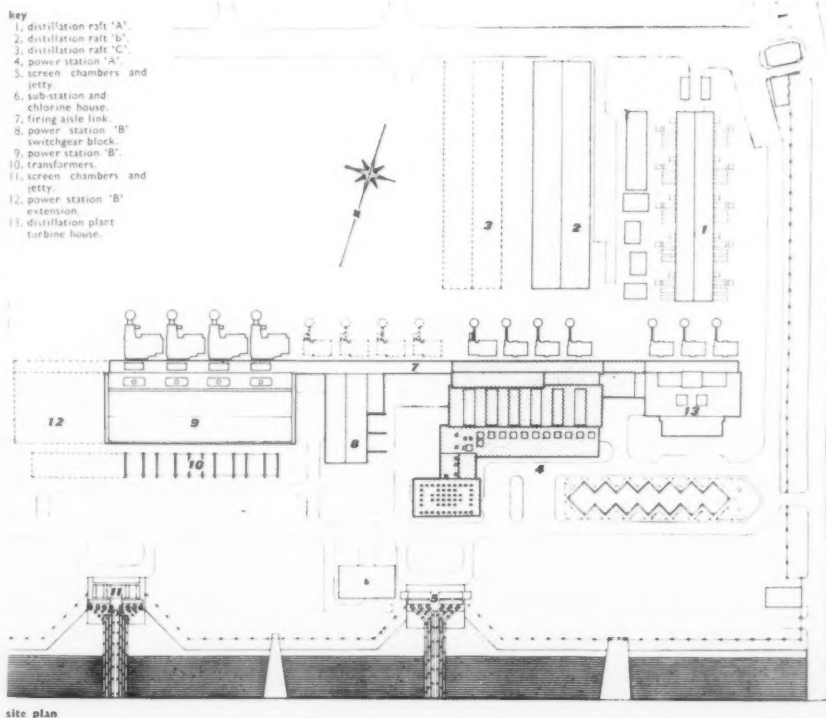
The whole site was excavated to the full foundation depth. $4\frac{1}{2}$ in. brickwork was built as permanent shuttering for the mass concrete stanchion foundations, which in general are 4 ft. thick. Steel channels were cast into the bases, and pockets left to receive the holding-down bolts for the stanchion base-plates. The ground-level concrete slab is 10 in. thick, reinforced by two layers of mesh, and has a granolithic floor screeded to fall slightly towards internal washdown drainage channels. Plinths for machinery and plant are mass concrete cast with the floor slab. The structural steel frame has three sets of double stanchions in the length of the station, isolated from each other to provide for expansion; it is rigid laterally. Additional crane stanchions are braced to the main steel. The steel box frames forming the turbine-house rooflights make a self-contained rigid frame with sliding joints supported on concrete upstand curbs from the main roof. External walls to the turbine-house are 1 ft. 6 in. thick brickwork; where bays between stanchions are uninterrupted by doors or windows, a core of 9 in. thick hollow concrete block is faced by $4\frac{1}{2}$ in. brickwork on each face. Elsewhere external walls are mostly $13\frac{1}{2}$ in. brickwork; internal walls the same or 9 in. No brickwork is load-bearing. All roofs are reinforced concrete; that above the raw water tanks has paint applied direct to the finished concrete. All others have a 2 in. vermiculite screed, bituminous asbestos fibre sheeting, and asbestos tiles in mastic; flashings are zinc.

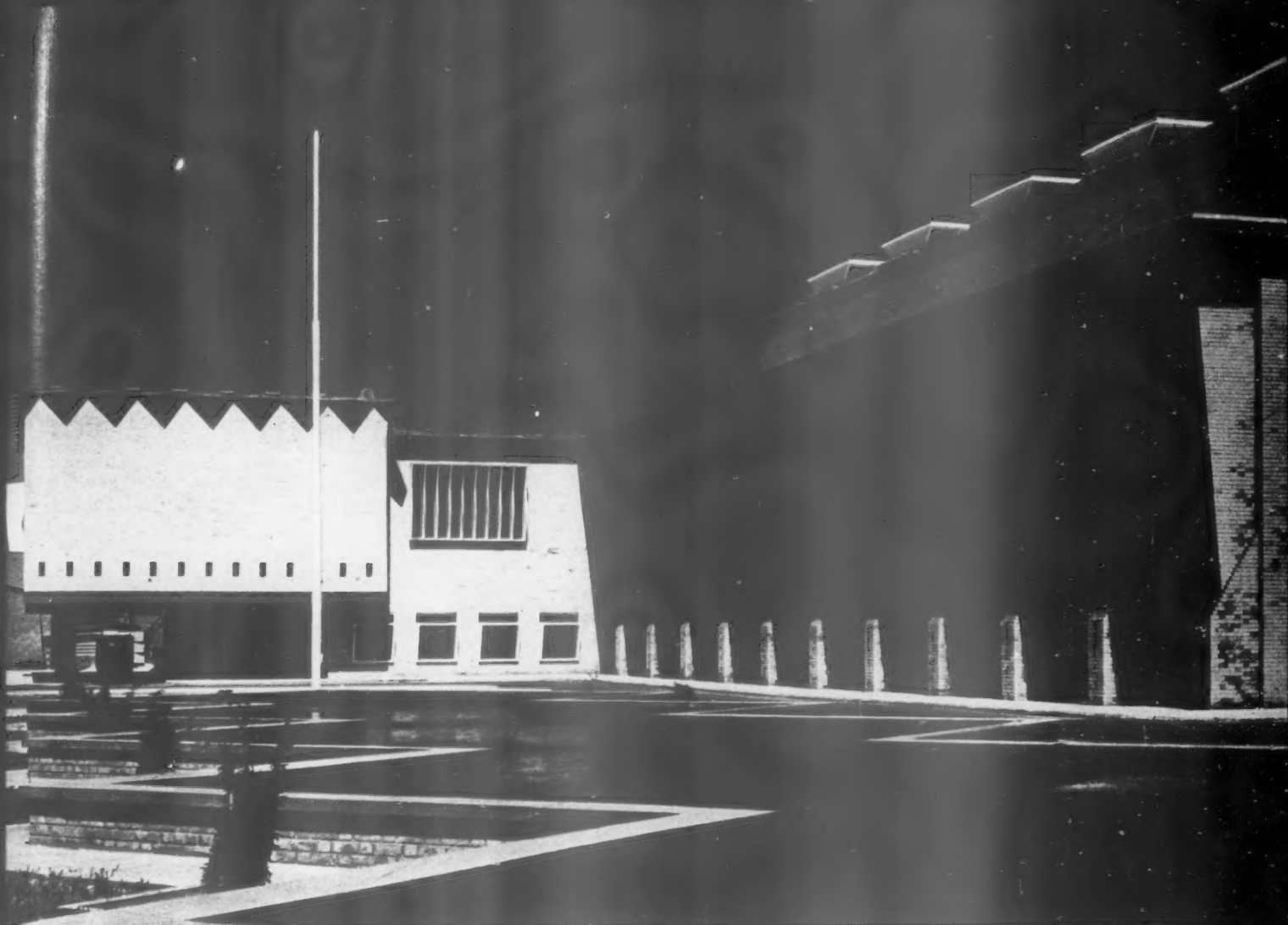
Doors in the office block are flush with semi-solid core and teak plywood veneers. Those in the conference room are solid teak. All other doors are flush steel. There are roller shutters in the unloading bay west of the switchgear rooms and at either end of the turbine-house. The window frames, purpose made of universal aluminium sections, are built directly into the reveals. All external walls are left fairfaced. The turbine-house walls are fairfaced brick, and the floor is granolithic on the lower level; the 18 ft. 6 in. floor is of hard vitreous tiles, and the walls have a terrazzo tiled dado. Floors elsewhere are mostly terrazzo tiled, and the false ceilings plaster on clay lathing. The false ceiling in the control room is of perforated metal trays with fibre glass insulation, clipped to hangers from the roof steelwork.

All the work was carried out in collaboration with Messrs. Ewbank and Partners, consulting engineers to the Government of Kuwait.

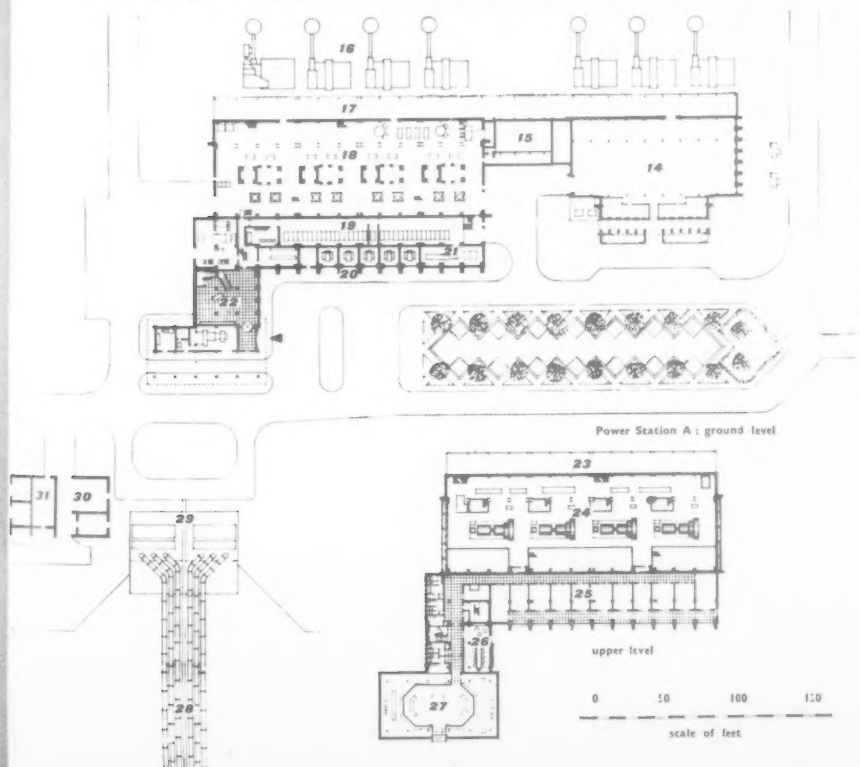


2 one of two links between 18 ft. 6 in. level of turbine-house and upper floor of office block, with sound-proofed air lock leading to office corridor. 3, concrete stairway in entrance hall. 4, control room balcony.





5. general view from west with, left, control room and *porte cochère* under; centre, with louvred window, is the conference room, and right, behind brick piers, the administrative offices on the first floor and transformer cubicles under. The pool is the first to be made in Kuwait; the eucalyptus trees lining it grow 6 feet every year.



POWER STATION AT KUWAIT

- key
- 14, distillation plant
 - 15, turbine house
 - 16, plenum link
 - 17, boilers
 - 18, boiler firing aisle
 - 19, power station 'A'
 - 20, turbine house
 - 21, switchgear
 - 22, transformers
 - 23, neutral earthing
 - 24, switchgear
 - 25, entrance hall
 - 26, tank and duct galleries
 - 27, turbine operating floor
 - 28, offices
 - 29, conference room
 - 30, control room
 - 31, intake pipe jetty
 - 32, intake water screening chambers
 - 33, water chlorination plant
 - 34, electrical substation



Though often dismissed as an eccentric with an obsession about technology, Richard Buckminster Fuller is one of the most radical thinkers on architectural problems that this century has produced. On the opposite page he is seen under his dome at Woods Hole, Massachusetts, while a helicopter lifts the prototype Marine Corps dome beyond. The latter is of magnesium, but the Woods Hole dome is made of one of the oldest building materials known—wood—and, as Mr. McHale makes clear in his article, Fuller's philosophy is too broad and all-embracing to be tied to a particular material or method.

BIOGRAPHY

John McHale

BUCKMINSTER FULLER

To many Richard Buckminster Fuller is still 'the man with the dome-house bug', and official historians and critics have done little to dispel this atmosphere of limited assessment. To the tidier mind, perhaps, he is a phenomenon which lies outside the customary canons of architectural judgment, a man whose varied career, development and ideas defy the usual categories. Yet, here, at the mid-century, he assumes a stature which renders pertinent some attempt at a balanced presentation.

His rise to prominence, and consequent influence, though confined mainly to America, coincides with a change in the climate of ideas, not only in design. This change employs, on the one hand, the Occam's razor of concept-economy, and, on the other, the idea that any formulation is acceptable which serves this economy, or identifies a situation in which action is possible. Tangential to this, Fuller's axiom, 'A problem adequately stated is a problem solved', expresses succinctly a basic premise of this new methodology.

The self-coined appellation 'Comprehensive Designer' is typically compressed in comparison with Fuller's recent citation by the University of North Carolina, 'As a distinguished engineer, mathematician, inventor, designer, mechanic, writer and philosopher, he has become one of the most influential and controversial personalities of the machine age.' Such a listing indicates the scope of his achievements but tends to distort them, by fragmenting what has been an impressively single-minded development towards his over-all manipulative position. Christopher Morley dedicated his 1936 book *Streamlines*

as follows: 'For Buckminster Fuller, scientific idealist, whose innovations proceed not just from technical dexterity but from an organic vision of life.' Each field in which he has engaged has been systematically ransacked for any knowledge or technique which would, in any way, add to his capacity to dominate the task he set himself—Total Design—with Fuller-indicated priorities.

It is important to place Fuller against his New England origins, and to define him as an indigenous American figure. 'Transcendental' is a favourite word with Buckminster. His aunt, Margaret Fuller, with Emerson, founded and edited *Dial*, the organ of Transcendentalism, which first published Emerson and Thoreau. She also brought Goethe and Schiller to the mid-nineteenth century audience through her translations. Though any adherence to -isms and movements was earnestly eschewed by Margaret Fuller, and the family in general, the atmosphere of ideas around *Dial* can be suggested as an important influence on Fuller's thought. New England Transcendentalism was a late love child of revolutionary humanism cross-bred with Puritan theocracy. 'A cosmic idealism coupled with Yankee practicality, Puritan pugnacity and grasp of fact.' Fuller has similarities with Thoreau, whose Walden experiment was an attempt to place life on a new basis, with its emphases on autonomy and strict accounting. Thoreau's basic shelter idea, costing one dollar, of a railroad worker's six-feet-by-three toolbox, antedates Fuller's grainbin-inspired Deployment Unit in use during World War II. On the side of design, the nineteenth-century balloon frame offers parallels with Fuller's later structural direction, with a similar lag in academic acceptance despite, in this case, widespread vernacular usage, and it 'marked the point at which industrialization began to penetrate housing.' The actual derivation, however, of Fuller's structure is not from architecture, but directly from ship rigging and aircraft framing, 2. Whilst disclaiming any such conscious æsthetic intent or association, Fuller's own assumption, of an economic and reliable structure being subconsciously employed æsthetically, allows one to place him on the side of functional æsthetics. Horatio Greenough with his 'beauty as the promise of function,' and Sullivan, 'form follows function,' are early American authors of this school.

Fuller was born in 1895 in Milton, Massachusetts. Of his early years he writes: 'My teleological stimulation first grew out of boyhood experience on a small island, eleven miles off the mainland, in Penobscot Bay of the State of Maine, U.S.A., where floatable at will in and out of nature's tidal dry-docks, with a 15 feet flood rise twice a day, boat building was the parent technology'. Formal schooling led in the family tradition to Harvard. The fifth generation Fuller at Harvard, Buckminster disgraced himself by two consecutive expulsions. These led to involvement in the live economic pattern; first, as an apprentice to a group of cotton mill machine fitters, and secondly, in the meat industry with Armour & Co. These episodes were enjoyed more than Harvard. Following these came Naval Academy, entry into the

U.S. Navy and marriage in 1917.

Fuller's wide naval experience gave him the kind of education he failed to find at Harvard. The atmosphere of precise mathematical reckoning, advanced communications and the technical know-how involved in the logistics of mass tonnage movements, ballistics and navigation is built into his later ideas as a fanatical belief in complete over-all pre-planning.

In 1919 he returned to Armour, and other work. 1922 was a fateful year for Fuller. His daughter died of an epidemic aggravated by four years of war. In the same year he had founded the Stockade Building System—a reinforced concrete scheme of his architect father-in-law. (James Monroe Hewlett, Vice-President and Fellow, American Institute of Architects; President, Society of Mural Painters and Director, American Academy in Rome—one of Fuller's most important inspiritors). Fuller recognized in the former event the human misery attending preventable breakdowns in society, and his experience in commercial building, with the latter venture, afforded him chapter and verse for later messianic condemnation of lack of foresight and ensuing chaos.

In 1927 the birth of a second daughter forced Fuller's 'blind date with principle.' Commercial considerations were set aside. His five-year labour on the Stockade system (during which he set up four plants and built 150 structures) was abandoned and he devoted himself to shaping his Dymaxion creed. Its title, compound of 'dynamic' and 'maximum,' refers to the 'maximum gain of advantage from minimal energy input.' This largest dividend of human advantage from the least investment of energy and materials is to be accomplished by an over-all consideration of technological means available, and their most integrated employment. The Dymaxion House model of 1927 was the end-product of this reasoning, applied to basic shelter. Hexagonal in shape, and tension-suspended from a central duraluminium mast, 3, it embodied total environmental control. Adjusted to minimal fuel and water requirements, it was envisaged as rentable on the same basis as the telephone and replaceable at intervals like a car.

Convinced of the inadequacy of the building industry, Fuller had looked for technical guidance to the growing car and aircraft industries. In their early stages these could, however, not provide the alloy chemistry which he saw as necessary. The Dymaxion idea made him see how slow was the resource development and predict an approximate twenty-year lag in the development of necessary materials, and for general acceptance of such total prefabrication. He settled down to explore further prototypes.

Research into mechanical cores for the American Radiator Co. produced in 1931 a full-sized bathroom

unit and schemes for other utilities. This was one of the first attempts to integrate such units, and he returned to it in 1938, in the Phelps Dodge laboratories. The later version was a simultaneous die-pressing of all components, as a compact unit, 4, with walls included, 5. Giedion, who never actually saw a Fuller bathroom, whilst applauding the expertise with which this was calculated, criticized it as being 'all right for a submarine,' and complains that 'the human problem was lost in the stamping.' Fuller states: 'Bathrooms specifically built for human dimensions, freedoms, and joy, not built for giants or gnomes, or superficial efficiency experts, and not built as yesterday's clothes closets filled with new fangled gadgets or any formally designed modifications of such fortuitous gadgeting.' Twelve of the early models were actually made and have since given, according to their varied owners, extremely satisfactory service.

Whilst in the Navy Fuller had paper-designed a hoverable-type jet stilt 'flying bedstead.' It was brought to model stage in 1927, and he returned to it in 1932. From the 'ground taxiing and crosswind travel problems' of this idea was born his automobile. Scooping Chrysler's Airflow by a year, the Dymaxion Transport Unit was a stream-lined three-wheel job, perhaps the most radical design till then to appear in the car field, 6. These cars, of which three were built (one, reputedly, is still on the road), were typical of all Dymaxion projects in being undertaken by Fuller as 'true' scientific research and not for personal gain. A later version, developed for Henry Kaiser in 1945, was an improved design, using 15-25 h.p. engines, mounted as detachable units with wheel and drive, which after starting used one engine only to cruise, giving a running average of 40-50 m.p.g.

Criticism of the Dymaxion house, bathroom and car, at this stage, can stem basically from the same premise: the operation in the consumer mart of what Fuller labels 'economically inessential æsthetics,' broadly inclusive of styling, packaging and design symbolism. In the case of the car all you got was transport! But current examination of this field shows how low technical adequacy comes in the list of consumer preferences—compared with chrome trim and paint. But Fuller was certainly not alone in this partial design myopia, which has only recently been critically noticed.

The first of Fuller's projects to reach any level of mass production was the Deployment Unit of 1940. Inspired by mid-Western cylindrical steel grain-bins this exploited the facts that for lightness, maximum space enclosure and most efficient heat distribution, a cylinder, whose walls needed no extra bracing, would be ideal and could be most speedily turned out.

Concurrently Fuller undertook marginal activities, which, as well as helping to finance his exploring ventures, enabled him to activate other sectors of his Dymaxion philosophy. With Phelps Dodge and later as technical consultant to *Fortune*, he prepared statistical charts of scientific and industrial trends linked with process and material discoveries which resulted in new formulations in this field; notably the replacement of the old evaluation in 'Tonnage' and 'Manhours' by that of 'Energy' as more ex-

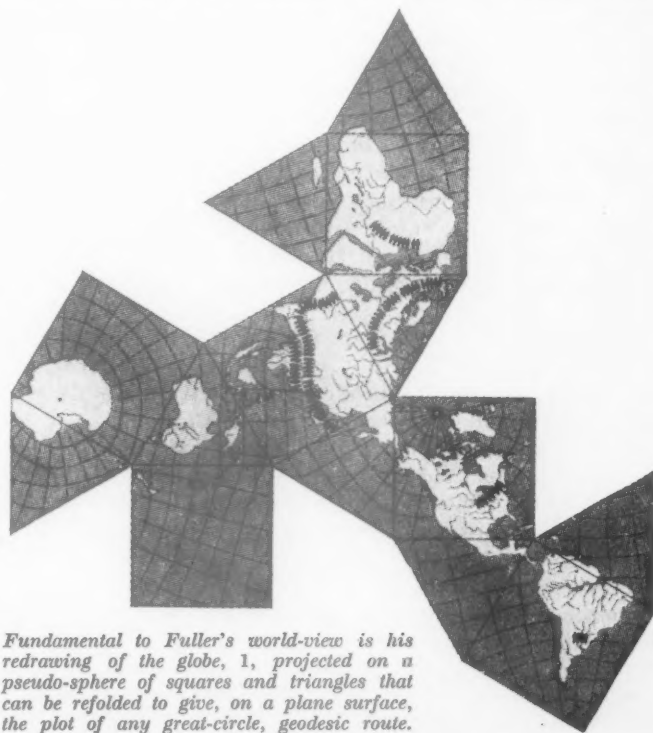
pressive of the industrial factor.

The Dymaxion World Map, also born of these researches and earlier naval and aeronautical studies, was published in *Life* in 1942. A new cartographic projection, this has since proved useful in global air routing. The map shows the world land masses as a 'one world island at the bottom of the air-ocean,' and is divided into squares and triangles to unwrap the world in any great circle direction, 1.

With the Board of Economic Warfare, from 1942-44, as Chief Mechanical Engineer, Fuller worked on motion economics and industrial development principles; from this came additions and expansion of his concept of 'Energetic Geometry,' first started in 1917, and to which we refer later. Aiding the State Department in the formulation of the world housing problem for UNRRA, Fuller also developed a programme to convert war production to a world-wide service industry, which would provide 'scientific living facilities.'

As a concrete implementation of this programme, long part of his ideas, Fuller returned to the Dymaxion house, having prophesied in 1927, from his analyses of industrial trends, that materials and technics, then missing, should be available around 1945. A new company was formed in conjunction with Beech Aircraft Inc., Wichita, and early in 1946 the first house came off the assembly line. Though a target of 500,000 a year was set, with a standard model priced around \$4,000, it never reached mass production. Despite 3,700 purchase applications, the war being over, funds for complete tooling-up could not be raised.

The over-all design of the Wichita house was roughly similar to the 1927 Dymaxion. The hexagonal form, forced by then-existent metal limitations, was replaced by a circular form, 7. Still suspended from the mast carrying the mechanical core, the new house



Fundamental to Fuller's world-view is his redrawing of the globe, 1, projected on a pseudo-sphere of squares and triangles that can be refolded to give, on a plane surface, the plot of any great-circle, geodesic route.

featured two Dymaxion bathrooms, indirect lighting of any colour, and air conditioning, with a patent ventilator capable of ten air changes an hour, operable by the slightest air current. Garage space could be given by raising the whole house one storey. To would-be purchasers of low-income, this was a dream house, notwithstanding its unconventional shape and generalized ship or aircraft atmosphere. Architectural criticism—that its shape would be a nightmare to city planners and its closed ground plan contrary to the development of the modern movement—probably did not reach them.

The Wichita House brings full circle a roughly twenty-year exploratory period. So far, though Fuller's various individual projects had been well planned and accounted for, the over-all advance of his career now required that they fit, in related organization, his concept of Comprehensive Designing. Three corporations are now maintained to correlate his manifold activities in such comprehensive fashion, the Fuller Research Foundation Inc., Geodesics Inc. and Syner-



2, a view between the twin skins of the 1946 Wichita house shows the tell-tale structural elements—ribs, wire bracing, tubes and sheet—that reveals its dependence on aircraft technology.

getics Inc. The first for pure and theoretically applied research and development: the other two for prototyping and pre-production development: Geodesics Inc. for military and Synergetics Inc. for civilian.

Around 1947 begins his first large scale development of geodesic structures. The eight years since then have been mainly concerned with the documenting and developing, through university seminars, lectures and writing, of the theory of Comprehensive Designing including Energetic and Synergetic Geometry.

Comprehensive (Total or Anticipatory) Design has been implicit as the pivot of Fuller's ideas since his earliest beginnings. The following paraphrase is drawn from various papers, written around 1946–50.

Man is unique only in his capacity to survive by transforming past accretions of experience into present and anticipatory strategy. Science is his attempt to set in order this past experience, and accomplishes survival by constantly modifying his environment—the universe. This is done by educing common principles from diverse phenomena and applying them to generalized cases through technical advantage, but *a priori* ignorance causes time lags in acceptance of unfamiliar principles—'man backs up into his future.'

The generalized case, basic shelter, has been the last of man's major items to come under any comprehensive discipline. It is a priority thanks to the data compiled by the United Nations and other bodies, e.g., 'one-third of the human family, roughly 800,000,000, are now doomed to premature death arising from inadequate solution of the housing problem . . . in addition to this, 14,000,000 homes were destroyed in the war for which families still exist. Against this position, in 1949, the largest production of single family or deployed dwellings ever produced in one year by the U.S. was 572,000 in 1925, and of these only half had interior sanitation. Large buildings, as processed by engineers, economists and social scientists, are now almost on a par with other industrial group products, like the ocean liner, automobile, steel mill or telephone system. In contrast, less than 4 per cent of U.S. single family dwellings are erected with union labour, less than 2 per cent architect-designed and approximately 0 per cent involved the engineer. During a period in which the price of the auto has steadily decreased, the cost of housing has shot upwards. The 1949 Bill for returned veterans' housing suggested for a standard 1,080 square feet dwelling a figure of \$17,745.

Fuller includes the 'International Style,' as operative in the U.S., in his criticism of current building, pointing out that its product, in the single dwelling range, is essentially the old house in a different garment, superficially simplified, and employing a hidden modern alloy structure under so-called 'tensed' or 'suspended' walls. He points out that the so-called modern house has, for example, in sanitation, modified the appearance of valve handles and improved bathroom tiling, but gone on using standard plumbing, without ever venturing to reassess the total sanitary function itself.

To deal with the housing problem in ways commensurate with developed technology, Fuller posits the comprehensive designer 'as an emerging synthesis of artist, inventor, mechanic, objective economist and evolutionary strategist.'

An example of what Fuller means by comprehensive strategy was his field trip through the paperboard industry in 1954, for the Triennale Dome, 16, which resulted in his correlating the industry's developments, in relation to his requirements, and taking current techniques, which used relatively expensive forming tools, a stage further, by suggesting a 'lost' mould which remained after forming plastic laminates, and constituted an interior packaging or scaffolding, 17.

Energetic and Synergetic Geometry were discovered by Fuller in 1917 and their subsequent development underlies his entire work. He defines them as 'an omni-directional, concentric wave topology—an isotropic vector matrix which discloses the means by which Nature accommodates all complimentary transformations in a finite rational manner while permitting an infinity of potential formulations. It is strictly a dynamic co-ordinate system, and accommodates all the field equations, Avogadro's law of gases, present-day solid-state mechanics, thermodynamics, Pauli's Exclusion Principle, Brouwer's Fixed Point Theorem, as well as all the classical mechanics and Relativity, Quanta and Wave mechanics. Syn-En.



3



4



5

dymaxion: The first clearly distinguished phase of Fuller's development took him into many fields in search of the fundamental Dymaxion quality, maximum performance with maximum economy. The house, 3, of 1927, was an almost-autonomous, expendable, rentable provision of total environmental control. It never went beyond the project stage, but the Phelps-Dodge bathroom, 4 and 5, and the Dymaxion car, 6, attempts in 1938 and 1933 respectively to rethink over-standardized concepts, did reach prototype work, as did the Wichita house, 7, of 1946, which embodied revised Phelps-Dodge units.

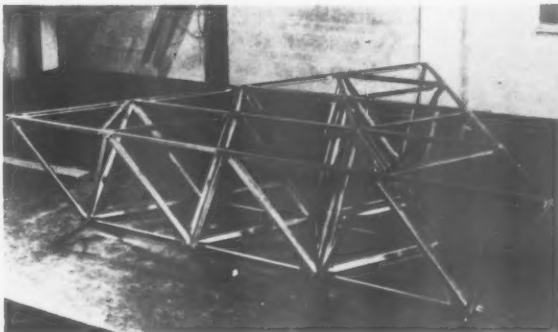


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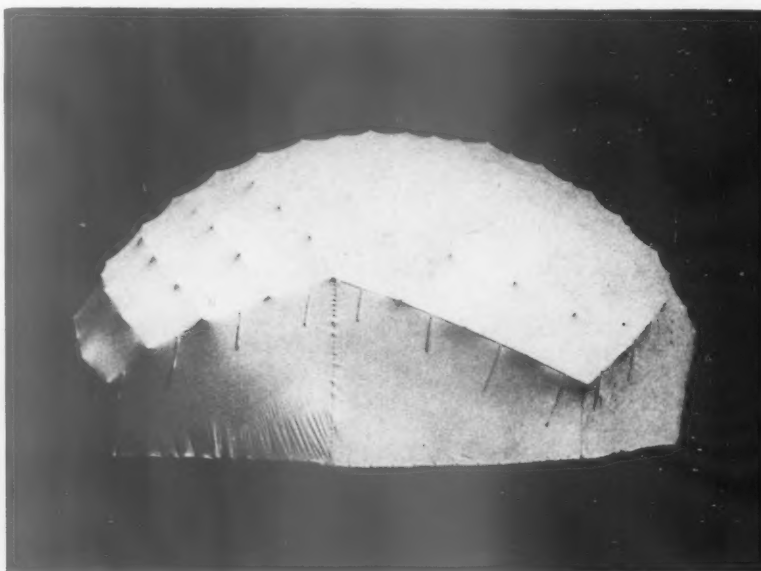


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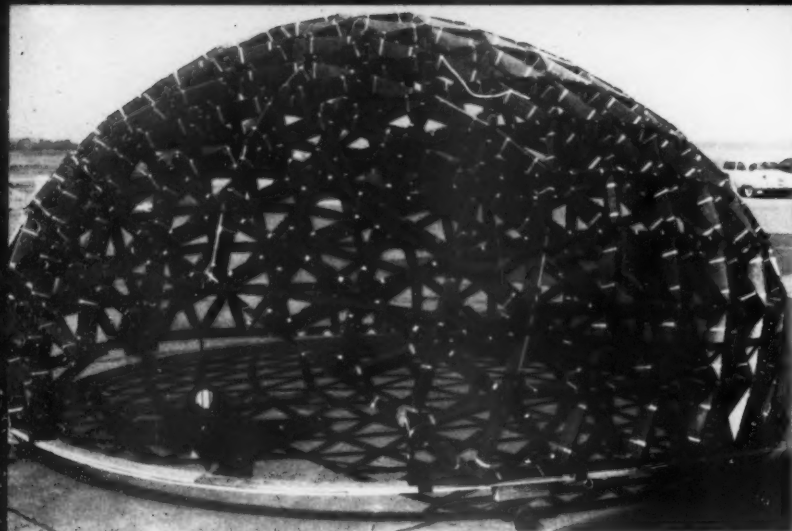
geodesics: The rapid development of Fuller's geodesic domes owes much to his clear separation of structure and cover. Structures based upon the octahedron-tetrahedron figure normally eventuate as space-frame approximations such as 8, a section of the Ford dome (see next page); covers depend much on current plastic technology to produce bathing-cap membranes pulled tight over the frame, 9, seen stripped in 11 (also next page).



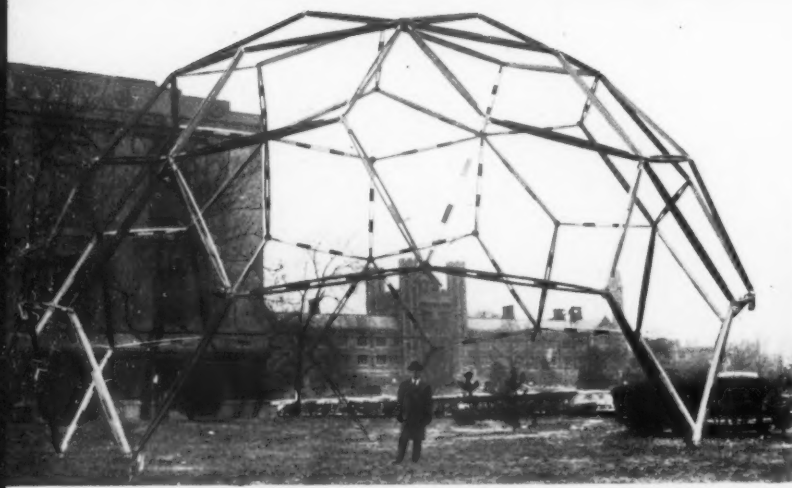
8



9

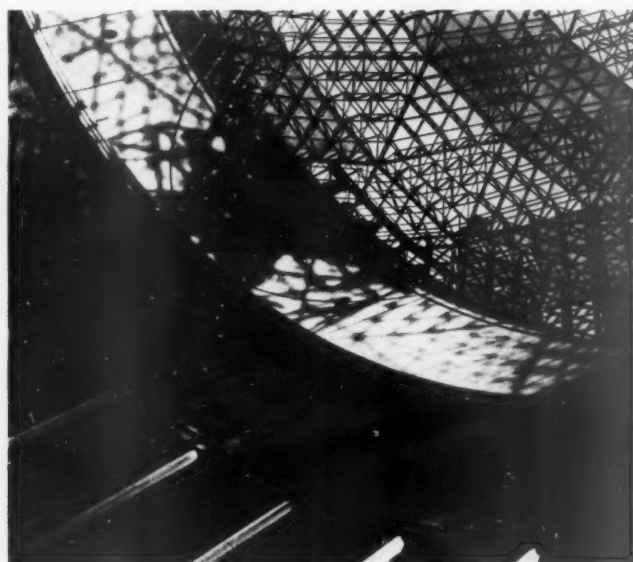


10, 11



12

seminar domes: Geodesic development has lain between pure academic research and industrial field-work, the project-organization being most frequently a research seminar. One at Tulane, 10, produced the paperboard structure subsequently passed to the Marine Corps; one at Minnesota the much-travelled 'Aspen' dome, 11, of 1953; and at St. Louis, 12, an interesting diamond-grid structure rigged over-all with external tension-wires.



13

light-weight shelter: The two most important large-scale realizations of Fuller's geodesic principles have been the Ford rotunda dome, sheltering an opening of 93 ft. diameter for a structural weight of only 8½ tons, 13, and the Marine Corps programme which aims to replace normal three-stage logistic shelter methods with a single phase under semi-expendable domes—the 'Kleenex' paper-board dome is seen airlifted in 14, MIT's fifty-foot dome for the Marine Corps in 15.

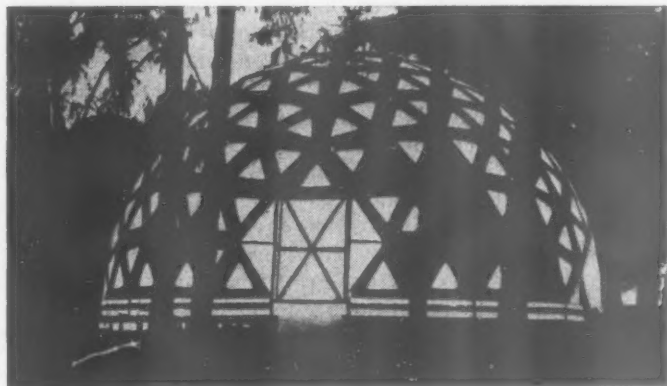


14, 15

18

geometry is a demonstrable mathematical phenomena proceeding logically from one proven stage to another proven stage. Unlike many of the limited mathematical theories, its dynamic behaviours are modelable, physically its vectorial equilibrium comprises the "Octet" truss.'

Though Fuller disagrees vigorously, this proposition, that all energy relationships occur, in dynamic



16, 17, typical of Fuller's adventures in materials, the Triennale dome of 1954, above, was built of units scored, folded and stapled up from sheets of standard packaging cardboard.

permutations of geometric constructs, derivable from the octahedron-tetrahedron truss with its assumption of a comprehensive mathematical patterning underlying the universe, does have metaphysical overtones which recall Emerson's: 'There is no chance and no anarchy in the world. All is system and gradation.' Transcendentalist philosophy, in general, also suggested that every part of the world is a microcosm comprehending within itself all the laws and meaning of the whole. Essentially a neo-Platonic conception, this makes the 'Octet' truss a twentieth century version of Plato's 'Spindle of Necessity,' with the magical properties of Solomon's Pentacle!

Synergy is defined, by Fuller, as: 'The unique behaviour of whole systems unpredicted by behaviour of their respective subsystems' events.' This is similar to the axiom of Gestalt psychology that, 'in the simplest sense-perception no analysis of the separate percepts can account for the total experience,' and to Korzybski's prime postulate of 'the organism as-a-whole-in-environment.'

Fuller comes out of this 'both/and' case with one foot in analytic and the other in holistic disciplines. His intuitive leaping about among the big abstractions is, when one shakes it down, usually

ambivalent, and based on well-documented and pragmatic programming.

The 'Octet' truss, whatever its connotations, has demonstrated, in his hands, great flexibility and a surprising economy in usage. In general practice now, in a somewhat perverted form, as the 'Space-frame truss,' it is the basic structural device from which all Fuller's geodesic structures are derived, 8.

The Geodesic dome combines the structural virtues of the tetrahedron and sphere. The sphere encloses most space with least surface and is strongest against internal pressure; the tetrahedron encloses least space with most surface and is stiffest against external pressure. Trusses derived from the compounding of tetrahedron and octahedron have the synergetic property of 'surprise,' as a structural system with strength unpredictable from linear components. Any vertexial loading causes members to act in pure tension or compression, and subsequent loading of any adjacent vertex induces reversal of all the system's pure tension into pure compression, and vice versa. The icosahedron exploded on to the surface of a sphere gives a three-way triangulated grid each line of which is a great circle arc. Trusses derived from this triangulation give a similar three-way grid, all of whose vertices lie on the surface of a sphere. Pressure on any vertex is load-shed throughout the whole compression tension pattern, thus giving extreme strength unprecipitated by the slenderness-to-weight ratio of individual truss members. Any modular frequency of symmetrical subdivision of spherical or linear tetrahedrons, octahedrons, or icosahedrons edges provides spring points for geodesic three-way grid interactions. This was unknown mathematically before Energetic-Synergetic Geometry.

All geodesic structure before that of Buckminster Fuller was applied only in approximately single curvature structures, as conic (masts), hyperbolic (battleship cage masts), cylindrical, and elliptical (air frame fuselage) spiralling and in lamellar roofs. Fuller's geodesics are inherently compound curvature, i.e., finite systems. Spirals are infinite.

This new derivation has been used throughout Fuller's recent work. In practice the type of truss member used in the domes varies, but all are drawn from this framework. Coverings of different kinds have been experimented with, 'bathing-cap,' 9, and internal stretched-membrane types and triangular panel filling with clear and translucent plastic, and combinations of these. Various domes under test at Air and Marine Corps laboratories, and at other organizations, show impressive snow and wind load figures. A 31-foot diameter three-quarter sphere has been installed since last year on the summit of Mount Washington, New Hampshire, where the world's highest land wind velocities occur, which no other structure has withstood. This year, Marine Corps final tests of a 35-foot diameter 700 lb. magnesium frame dome, have involved constant air lifts in assembled condition, giving their estimate of four years' usage, with no permanent effects. (This dome covers 1,000 square feet with 12,000 cubic feet clear span space, requires 135 man-minutes to erect with unskilled labour and packages in 2 feet by 2 feet by 8 feet—32 cubic feet dis-assembled.) Commercial

and private structures successfully weathered the U.S. hurricanes of 1954.

Usable in extreme climatic changes, the completed domes are energy valves, with natural internal air circulation, making them warm in winter and cool in summer. A 27-foot diameter structure in Canada, aluminium painted inside and out, with three inches of insulation, has passed three winters with 20° below exterior temperatures, whilst maintaining 70° above inside; each winter's electrical bill averaged \$60.

The way to solve the housing problem, as Fuller sees it now, lies through technology via such geodesic structures. The 'Autonomous living under a hurricane-proof hemispherical enclosure of 50-foot diameter (864 square feet of platform plus 986 square feet of interior garden), with all super luxury appurtenances and sanitary controls, is now feasible. Weighing, in toto, 14,000 lb., it may be mass produced at \$7,000. Push-button erected, it may be occupied at well below the present cost of bare miniature mansions sewerred and paved together in "Siamese-twinness".'

Fuller has integrated his personal efforts with the growing demands of educational service in typical fashion. Since 1949, invitations to lecture and conduct seminars in major U.S. universities and institutes have been increasingly numerous. The 'Autonomous Living Package,' quoted above, was partially assessed in this way. Student groups were given the problem of total evacuation of a city, and directed to design a unit which, loaded on a 24 foot trailer, would furnish, with no lowering of standards, living facilities, in the broadest sense, for a family of six. The result was no minimal aesthete's dream of 'the good life,' but contained elements ranging from high-grade kitchen, laundry and cleansing mechanics, complete furnishing and woodworking, photographic and sporting equipment to musical instruments. The whole assembled in a 25 foot by 8 foot by 8 foot container which provided, when hinged down, a floor space of 928 square feet. Calculations showed this luxury living package to cost, on present retail assemble, \$18,000 per family. Mass produced, like 'an automobile package' it could be done for \$4,500.

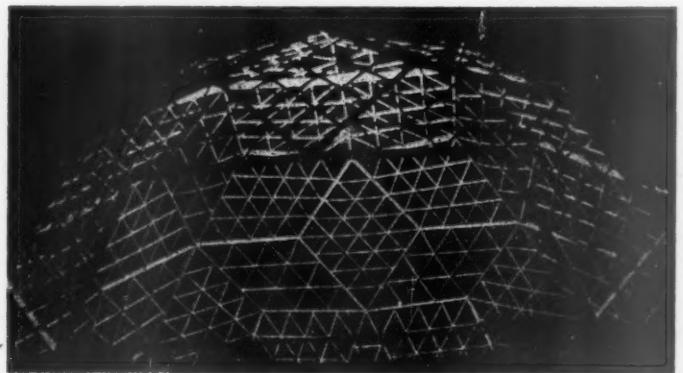
Usually, however, seminars involve the exposition of his principles, as so far noted, and the actual design and construction of a geodesic dome, 10. Invariably this is a new experimental type, and is worked stage by stage with a student group drawn from the final year, or a cross section of qualified grades. Students split up into groups to tackle different angles of structure, material supply and actual parts production. Fuller's contacts with industry enable him to obtain free new materials for testing. The average seminar length is one month.

An example of this scheme in practice was the *U.S. Marine Corps Shelter Study* of 1954, which is, in itself, one of Fuller's most interesting recent jobs. The Marine Corps called on him to investigate the contraction of their three-phase-forward-airfield-deployment, of tent, semi-permanent and permanent type structure, into a single-phase-multivalent structure. This had to be semi-permanent, weigh less than tents, cost less, be less bulk and take fewer man-hours to erect than tents. Within a short time

Geodesics Inc. in conjunction with seminar programming, provided five full-sized domes ranging from a 50-foot diameter hanger type of magnesium extrusions, from MIT, 15, to a 36-foot diameter expendable paperboard type. The Marines nicknamed the latter the 'Kleenex house,' 14, because it was essentially a throw-away structure. Official computation by Marine Aviation of advantages of these gave a weight-load reduction of 35,000,000 lb., a saving of \$15,000,000, and in a combat area of one million man-hours, over their original three-phase programme. Marine Aviation announced in July, 1955, that all tents in use will be replaced by domes, as they become unserviceable, describing the new shelters as the first basic improvement in mobile military shelters in the past 2,600 years.

The first excursion into large-scale permanent dome provision was for the Ford Rotunda in 1953 where a geodesic structure, 13, using only 8½ tons of aluminium and spanning 93 feet, was assembled in thirty working days. A conventional steel dome to do the same job, which the building could not have carried, was estimated at 160 tons.

Marginal attempts to fuse architecture and technology have been with us since the 1850's, but no single individual has made such a comprehensive move to confront the issue. Industrial change, in the same period, has had to wait many decades for incorporation and reflection in the progress of architecture. The GIs' remark anent the 'Kleenex' house gives indication of such a change now. As other environmental tools of man have moved over, in our time, from the permanent to the expendable category, the house, time-hallowed only, in our culture, as a permanent rectangular structure, may well follow. Emerging factors, like automation, and the increase of mobility and transient residence already render invalid much static urban planning. Anticipatory over-all design works now in aircraft construction, with its schedules of anticipated part failure, in preventive, as opposed to curative, medical science, and in many other fields. Its import is overdue in the laggard area of human dwelling provision, where most of us live in the 'hand-me-down' remnants of nineteenth-century boom building, and window-shop in the glossy pages of our architectural journals.

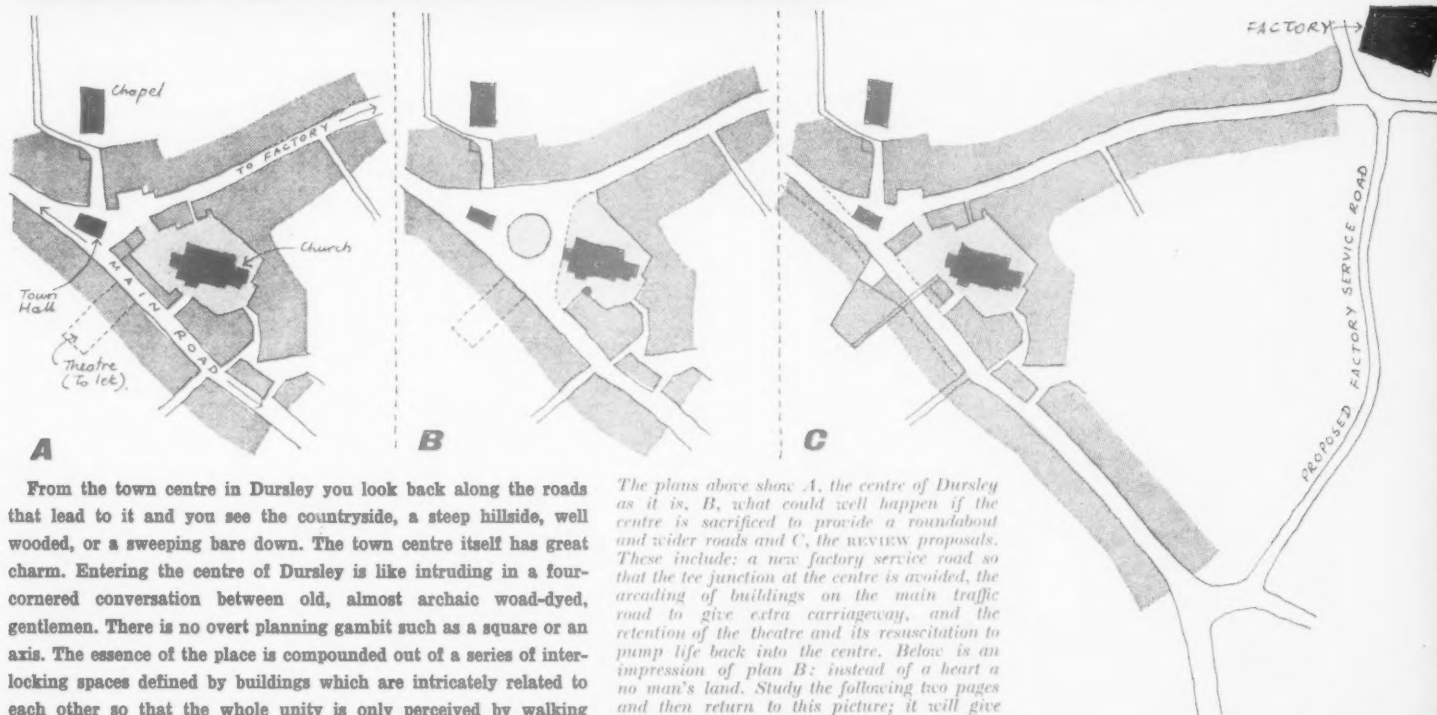


18, the typically Fullertian tracery of the Woods Hole dome, a permanent structure in Massachusetts, is a geometrically complex, technically simple erection in wood, and serves to remind us that Comprehensive Design is an attitude of mind more than the possession of revolutionary materials and techniques.

Three years ago the REVIEW, in collaboration with Birmingham University, carried the simple story of Townscape to Ludlow, Bewdley, Evesham and Shrewsbury, by means of articles, exhibitions, town meetings and study groups. This month we are happy to announce the start of a new series prepared in collaboration with the University of Bristol. The aim will be to present an assessment of certain towns as seen by the Townscaper: the drama, potential or real, arising from the relationship of buildings, spaces, levels and nature. To draw attention to probable threats to amenity and suggest a solution. This will be the basis for extramural studies so that the habit of thinking in these terms and using the eyes is fostered.

Gordon Cullen

DURSLEY

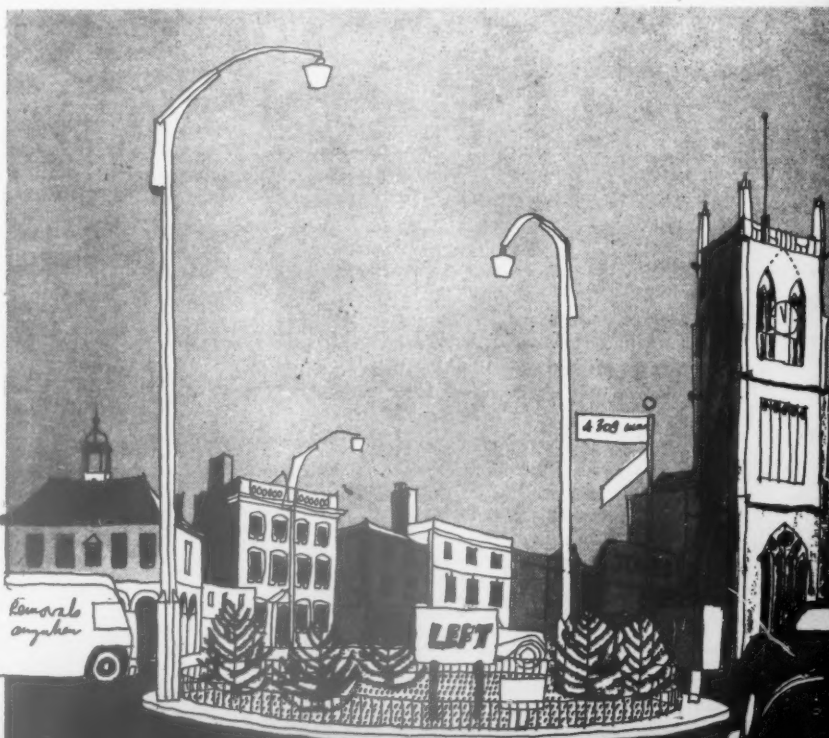


From the town centre in Dursley you look back along the roads that lead to it and you see the countryside, a steep hillside, well wooded, or a sweeping bare down. The town centre itself has great charm. Entering the centre of Dursley is like intruding in a four-cornered conversation between old, almost archaic woad-dyed, gentlemen. There is no overt planning gambit such as a square or an axis. The essence of the place is compounded out of a series of interlocking spaces defined by buildings which are intricately related to each other so that the whole unity is only perceived by walking through it or knowing it. It is a balance of forces at rest, a town centre of great charm and quality. This, you say to yourself, is a real town set in real country—the perfect contrast of Landscape and Townscape.

It doesn't take long for you to discover that you are living in a fool's paradise. You piece together several stray hints and discover that Dursley as you have seen it will last just about another 12 months before it is cracked open, gutted and scattered over the countryside. One of the buildings in front of the church is already demolished, a second is doomed: the theatre is up for sale. Cleverly concealed in a valley not half a mile from the town is one of the largest Diesel engine factories in England. Every day heavy lorries trundle past the Town Hall down to the factory, traffic piles up, the prosperous town needs bigger shops—multiple stores.

Added to this threat of disintegration comes another. Dursley and two nearby communities are to pool certain administrative and educational buildings such as police station, council offices and schools. These will be situated in the countryside at the geographical centre of the three communities. The economy and efficiency of the project are unquestionable; the telephone, the car and the bus have made it possible. We therefore have to place two weights in opposite sides of the balance. On the one side is Dursley as it is, as I have described it. Its great asset is that, in its own terms of reference, it has integrity. Not only is it the corporate out-door room, but its shape and arrangement are self-justifying just as is a painting by Klee,

The plans above show A, the centre of Dursley as it is, B, what could well happen if the centre is sacrificed to provide a roundabout and wider roads and C, the REVIEW proposals. These include: a new factory service road so that the tee junction at the centre is avoided, the arcading of buildings on the main traffic road to give extra carriageway, and the retention of the theatre and its resuscitation to pump life back into the centre. Below is an impression of plan B: instead of a heart a no man's land. Study the following two pages and then return to this picture; it will give you the measure of the threat.



i.e., if it were a machine you could patent it. No one can deny this. On the other side is the whole urge and inevitability of piston and valve. In comparison with this the rather gauche little Town Hall, the woad-dyed chairman, and the green hillside become ludicrous and laughable. Except for the one little niggling obstinate fact that in some strange way they have captured a pattern that ennobles, in however small a way, the life of the town.

Dursley is a microcosm of the national planning problem. The seed, the mediaeval town, is bursting open into a new and strange flower. It is a flower which will spread its scent over town and country or make both stink. The cause of the problem is the motor car . . . fluidity of communication. We can take the following steps, either:—

1. Dig in and cling to the status quo, disputing every inch and regarding the motor car as an evil which simply debases town and country;
- or 2. Redesign England as a land fit for cars to live in. This is the obvious, commonsense course and the really fatal one;
- or 3. Try to harness the potential of fluidity to redeem town and country;

it is this last course that we shall attempt to demonstrate in the particular case of Dursley.

The high street and town centre are no longer suitable for arterial traffic. The centre belongs to people on foot; the arterial roads belong to traffic. They are mutually exclusive and to operate successfully must be separated. To aid the flow of traffic whilst at the same time destroying the centre is no answer. In this article we are concerned to show just what is in danger of being lost and to suggest ways in which both functions can survive. But let there be no confused thinking—let not the barbarians who rule road transport beguile the residents of Dursley into believing that the removal of buildings to form a roundabout will actually improve the looks of Dursley by opening up a view of the church and allowing the two main monuments to face each other across no-man's land. The burden of this article is to explain the peculiar charm which Dursley possesses now. If when this is appreciated the barbarians are still determined to pull it down at least it will be done with the town's eyes open and not in the mistaken view that the town amenities are being improved.

In a future article we hope to show how fluidity of transport can help to redeem the twilight-tangle of town and country.

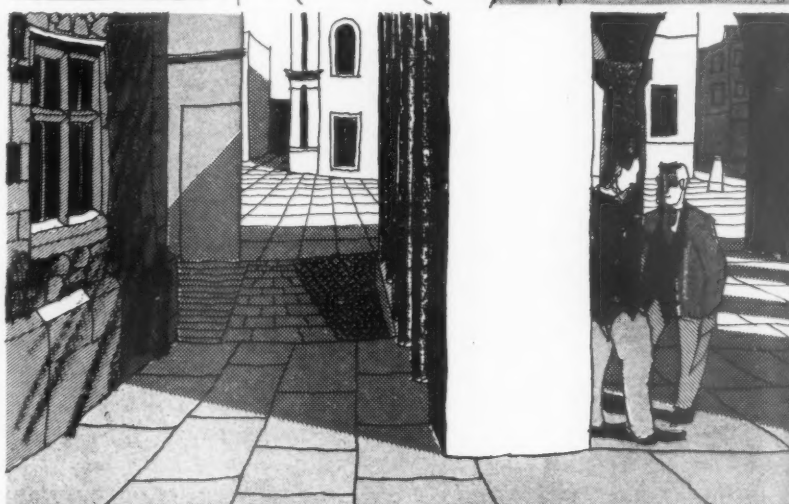
A TOUR THROUGH THE CENTRE

The description which follows presents Dursley as modified by our proposals which are aimed to increase or extend its present character (Plan C on preceding page). The key to understanding Dursley is the dimension of time. It cannot be seen in one glance; the nature of the place is built up out of a series of views which reveal a unified geometric pattern: a visual statement as plain as Nelson's column but only comprehended in experience, in time. To put it in another way, it is more akin to a four-cornered conversation than to an oration from the platform. And in a small county town, homely, unpretentious and lived in, this seems an admirable attitude to planning. Consequently, it can only be explained by walking through it.

1. Approaching the centre from the north the Town Hall is seen fair and square across our path, this diverts the traffic to one side and forms a visual stop (closure). In this way the arterial function of flow is modified—and quite rightly since this is the town centre, the outdoor room inhabited by people not cars. Directly behind the Town Hall is



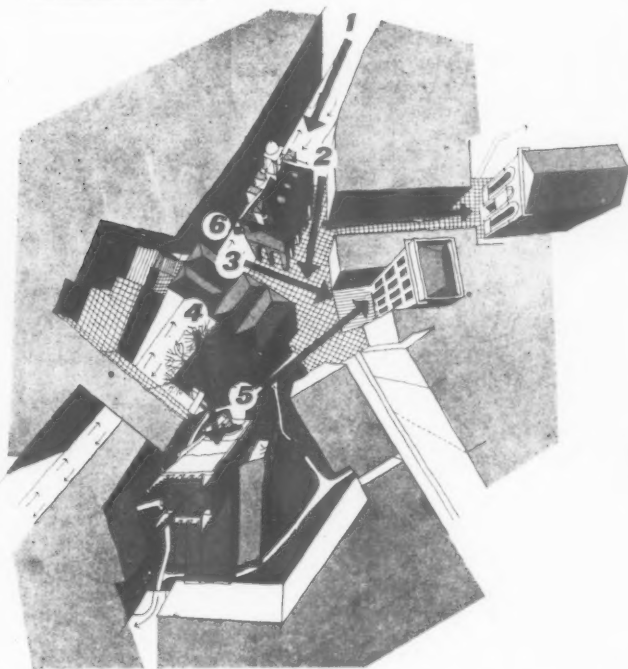
1



2

3





Bird's-eye view of centre with viewpoints marked in red. See also page 4.

seen the church tower; the two main monuments are seen in juxtaposition thus giving a concentration of urbanity and the intricacy arising from the relationship of different architectural styles.

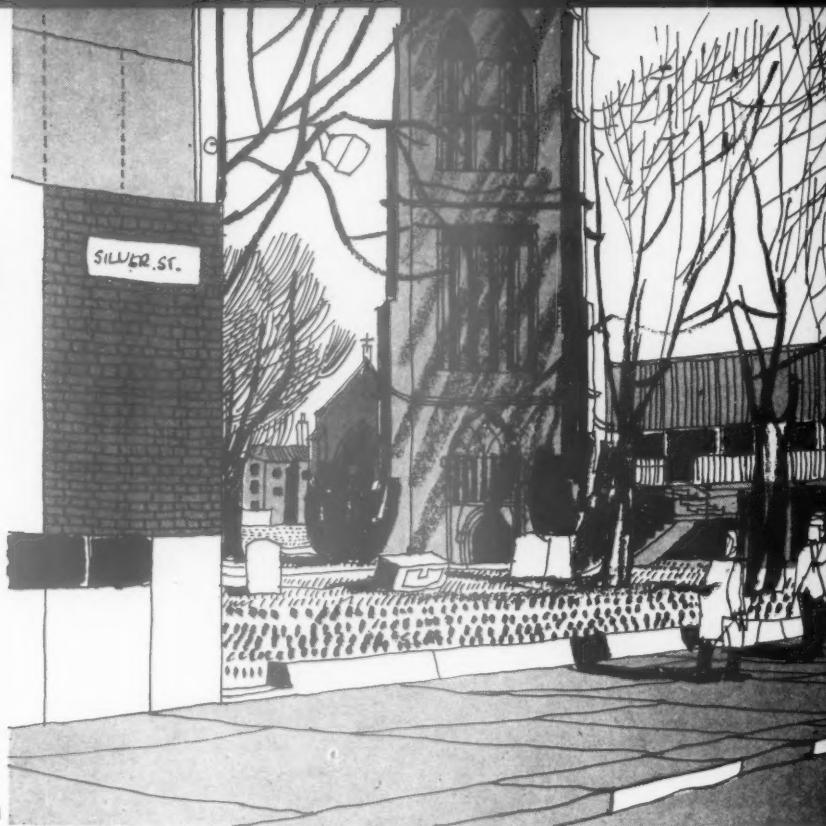
2. To our left is seen the beginning of the pedestrian way which weaves throughout the town centre. It is narrow and in this way preserves the integrity of the space beyond. The pedestrian areas are varied inside the space allotted. They are usable. It is little use drawing a rectangle on a piece of paper and labelling it *PRECINCT*. The space must be usable. In Dursley there is first the undercroft of the Town Hall which is sheltered from weather and traffic, there is the forecourt of the bank which is raised and quite separated from traffic and the whole is pedestrian priority.

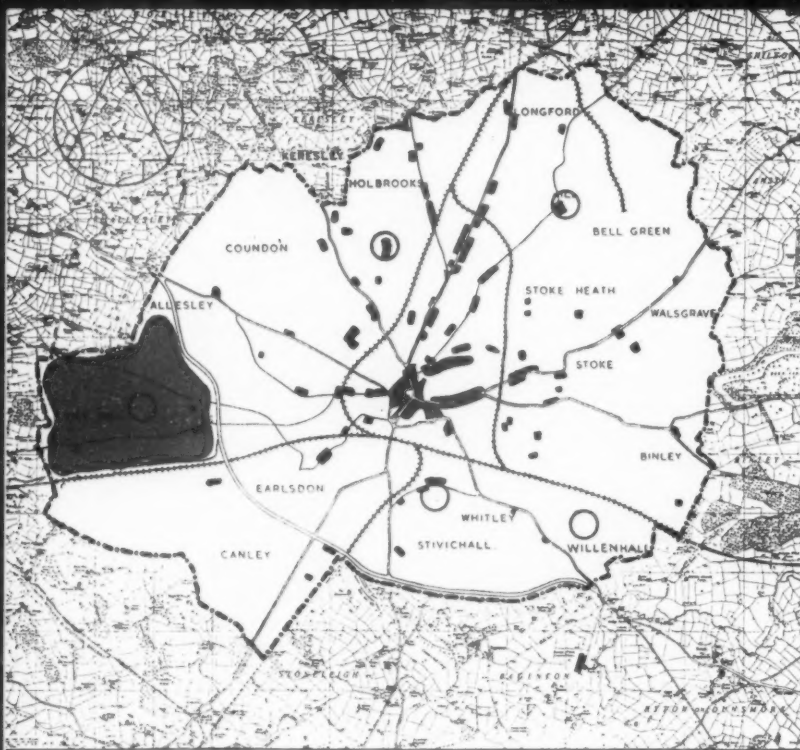
3. Proceeding south we look past the Town Hall and the first space is revealed. Closure and narrows have done their job in ensuring that the heart of the town is clearly and unmistakably defined. By paving we are able to emphasize the unity of the space, since then the facades of buildings and the floor surface form a single hollowed-out place as opposed to the disruption and alienation caused by pavements and a ribbon of tarmac.

4. Continuing further south the church, which by now has been hidden by the proximity of buildings (and thus visually forgotten) is suddenly revealed standing in the second space, the quite different space of trees and grass.

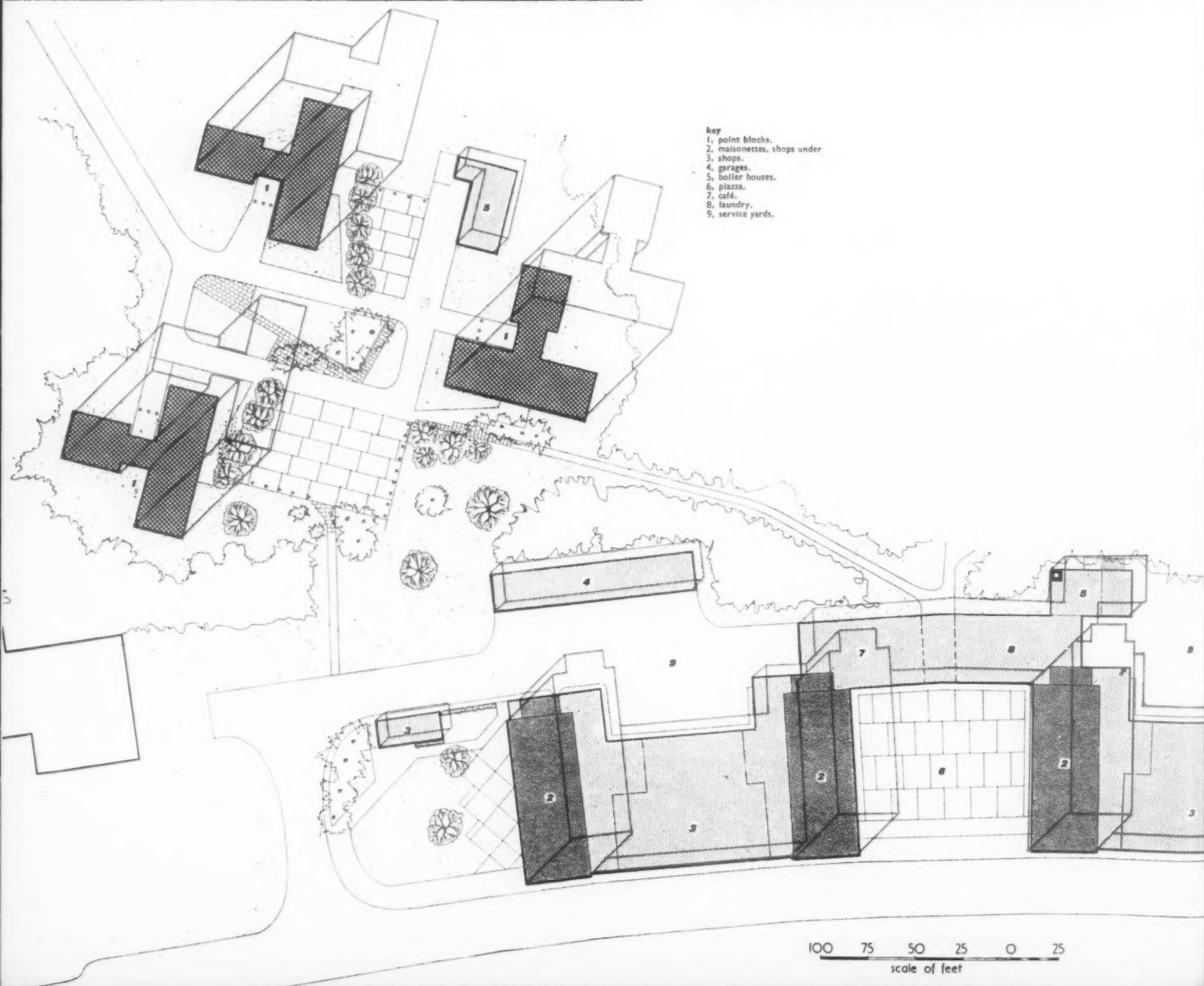
5. Walking to the foot of the tower a new view is revealed. We look back from the sacred to the profane, from the grassy churchyard to the paved town square, and in this way obtain that rare juxtaposition of spaces; the feeling of *Here and There*. The division is clearly marked by the flanking buildings (symbolical gate-posts). The object building is inclined at an angle (deflection), thus it appears to belong to the further space, it belongs to what is happening *There*.

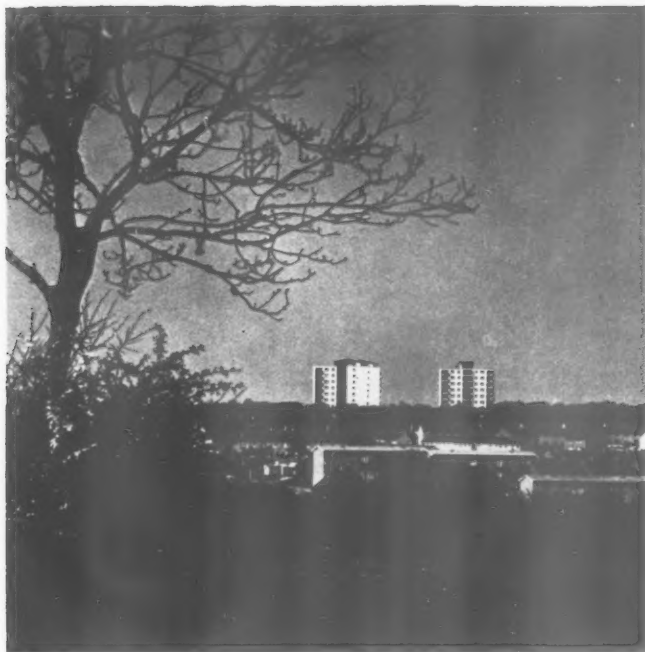
6. Although the actual space is small the sense of authority and spatial dominance is increased by the arrangement of outlying buildings. The chapel, lying well back, is brought right into the drama by its position at the end of a narrow lane. (Pure physical size is not the only way to get a sense of spaciousness and superficial area can kill character stone dead. The amount of space cannot be determined by what is left in the middle of a required number of shops.) This same principle has been used in the replanning to the east of the main street so that the facade of a rebuilt theatre becomes an integral part of the centre.





The population of Coventry has doubled in the last thirty years. The central shopping area is insufficient for the resulting sprawl, and a series of district centres has been planned in the outskirts. This one, at Tile Hill, is the first to be completed. The centre is three miles west of the city centre on a 150-acre strip with compact woodland to the east and west, serving both pre-war and post-war estates. It is on the highest ground in the district and was therefore also the best site for point blocks of flats. These are sited in a clearing tailor-made for them and show seven storeys above the trees, at the same time a distant landmark and a means of making the shopping centre a visual as well as a social focus.





1



The flats from the south-west above the screen of trees and the rest of the estate.

DISTRICT CENTRE AT COVENTRY

ARCHITECT
principal architect

A. G. LING, successor to D. E. E. GIBSON
E. C. Tory



The shopping centre from the top of one of the point blocks.



2

1. THE FLATS

These comprise 99 two-bedroom four-persons flats in three 11-storey blocks, T-shaped on plan. Each block has one lift and one staircase. The planning in its fire prevention aspect has been governed by LCC practice under which a single staircase is permissible given open access and living-rooms at the extremities of limbs.

The construction is in 'no-fines' concrete, poured in one-storey stages. Pockets are left in which reinforced columns are then formed in dense concrete. The resulting structure is a reinforced concrete frame with 12 in. no-fines infilling panels giving stiffness but not support. It is plastered internally and rendered and spardashed externally. The windows are of frameless $\frac{1}{4}$ in. plate glass, sliding in metal tracks, the whole being contained in a timber frame. Translucent plastic strips are attached to the edges of the glass for weather-proofing. The heating and hot water are supplied from a central boiler-house. In the flat the heat is distributed by means of a fan which circulates the air past a battery of gilled pipes and out through grilles into the living-room and passage. A thermostat is situated in the living-room. Each flat has a store on the communal landing and there is a refuse chute at each floor. A cycle store is incorporated with the boiler-house.

**DISTRICT CENTRE
AT COVENTRY**



3

3. two of the blocks from the south-east.
4. the blocks from the south with the westernmost arm of the shopping centre on the right and the fish and chips shop in the foreground.



4

5. facing page, the access side of one of the blocks framed in existing silver birch trees.



DISTRICT CENTRE AT COVENTRY



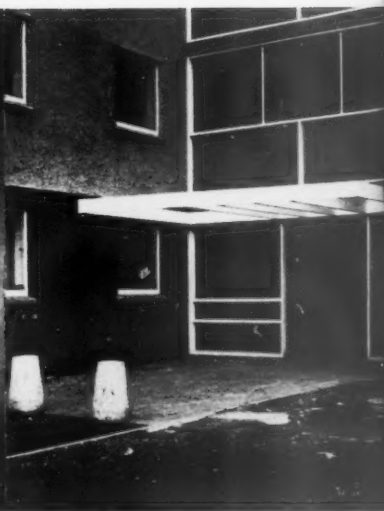
6. view from the south showing relation of shops and easternmost point block.



7

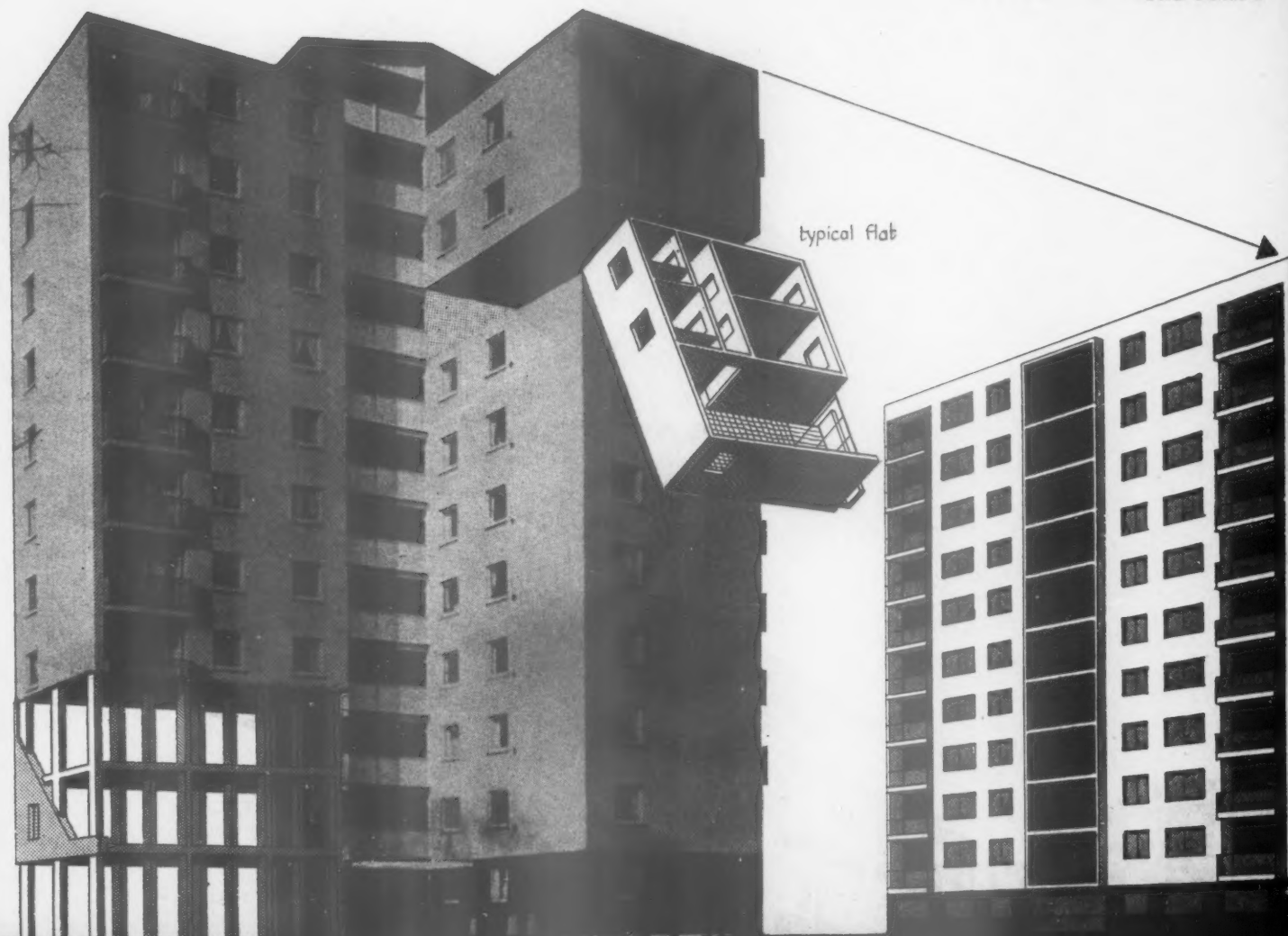


8



9

7. south side of the fish and chips shop.
8. access balcony and doorway to flat, and 9. detail of main entrance to point block.

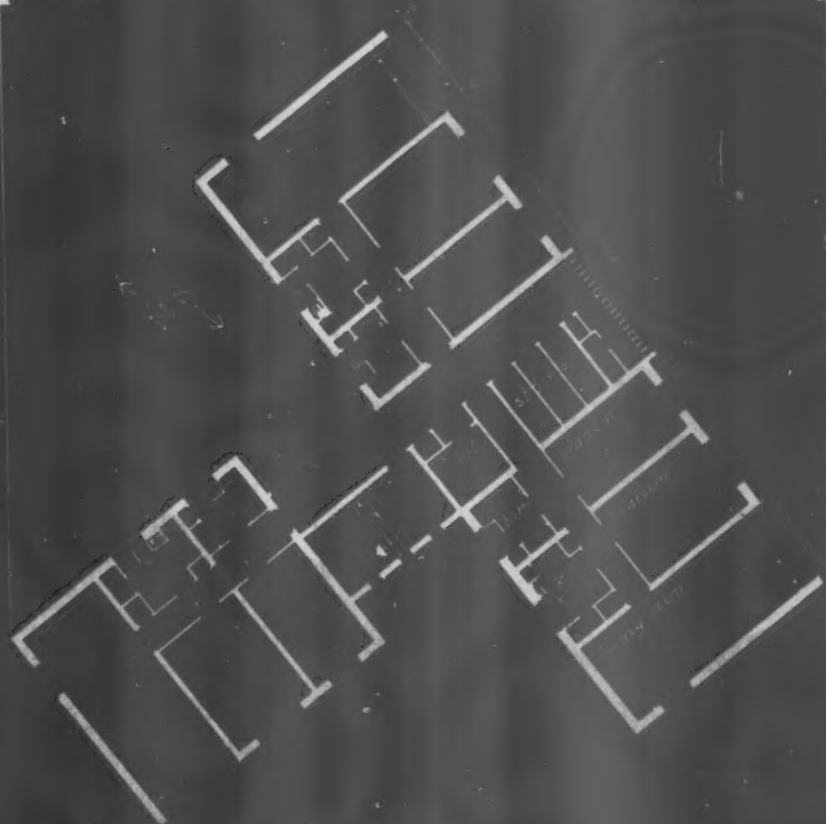


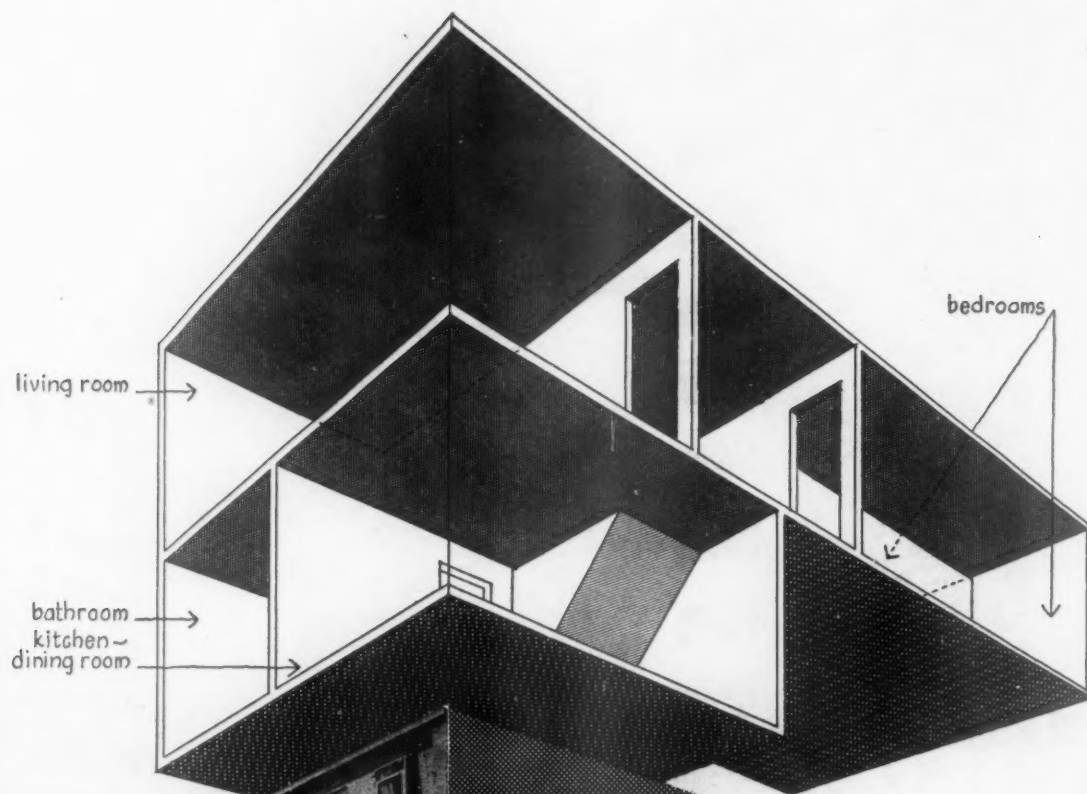
typical flat

construction

south west aspect

east aspect





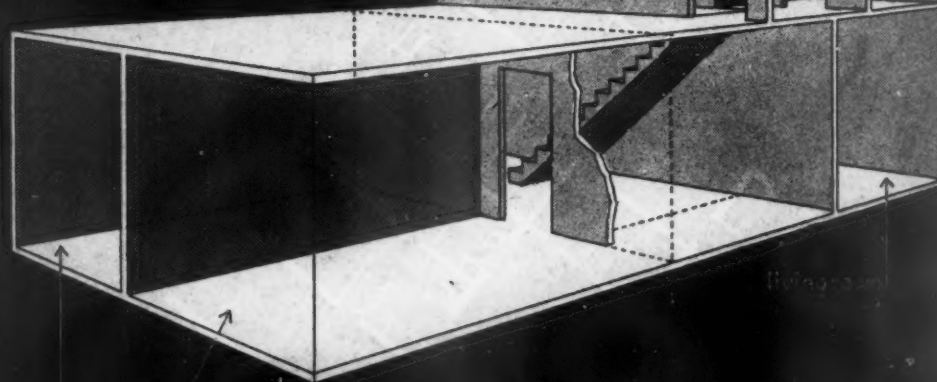
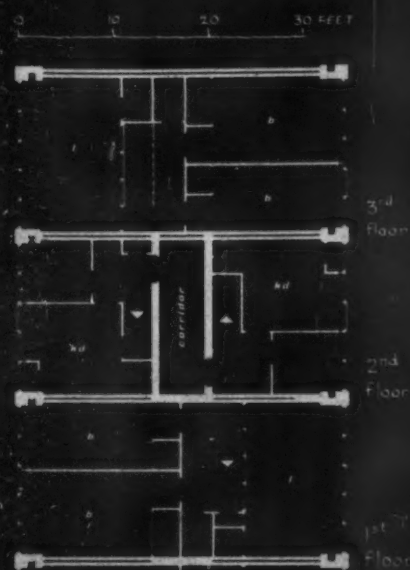
upper maisonette

access corridor

lower maisonette

kitchen-dining room

bathroom



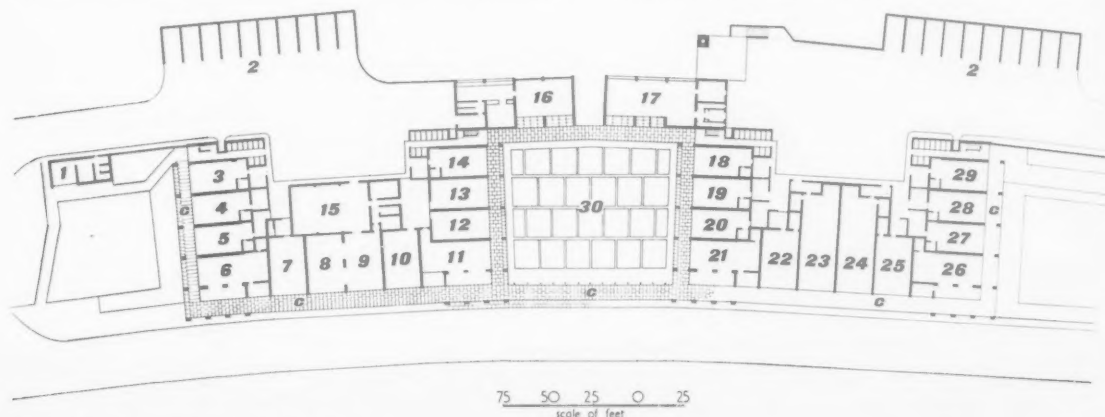
2. SHOPPING CENTRE

The scheme consists of 27 shop units and 40 two-bedroom maisonettes. The plan-form adopted allows sheltered semi-precinctual shopping. The shop service areas are concentrated and largely concealed from the public.

Four-storey blocks have shops at ground-floor level with interlocking maisonettes over, which are approached by staircase and central access corridor terminating at a fire-pick-up balcony on the road end of each block. Each maisonette has a living-room, dining kitchen and two bedrooms. All kitchens and bathrooms are on the access floor, to economise in services. Most shops have warm air heaters of the recirculated type but supply their own hot water. The four-storey blocks are connected by single-storey shops, café and launderette. The fish and chips shop is at the west end of the site, slightly separated from the main group of shops. All blocks are

constructed on the principle of load-bearing brick cross walls with prestressed concrete beam floors and roofs, with the exception of the four-storey blocks which are roofed with open web nailable joists to save weight. The structure of the four-storey blocks is stiffened by solid 9 in. brickwork corridor walls at second-floor level. Curtain walls consist of 16 ft. 3 in. by 8 ft. softwood frames fixed between prestressed concrete edge beams, which are flashed with lead. Cladding is black and pale grey opaque and stove-enamelled coloured glass panels.

Shop tenants were responsible for their own interiors but shop fronts were provided by the Corporation to standard designs with variations to suit individual needs: the majority are of framed hardwood stained black and finished with plastic polish. Decorative tiling to stall board rises and flanks on porches is black and white with a different colour for each shop. Size of fascia lettering was controlled but tenants were allowed choice of colour and letter types.



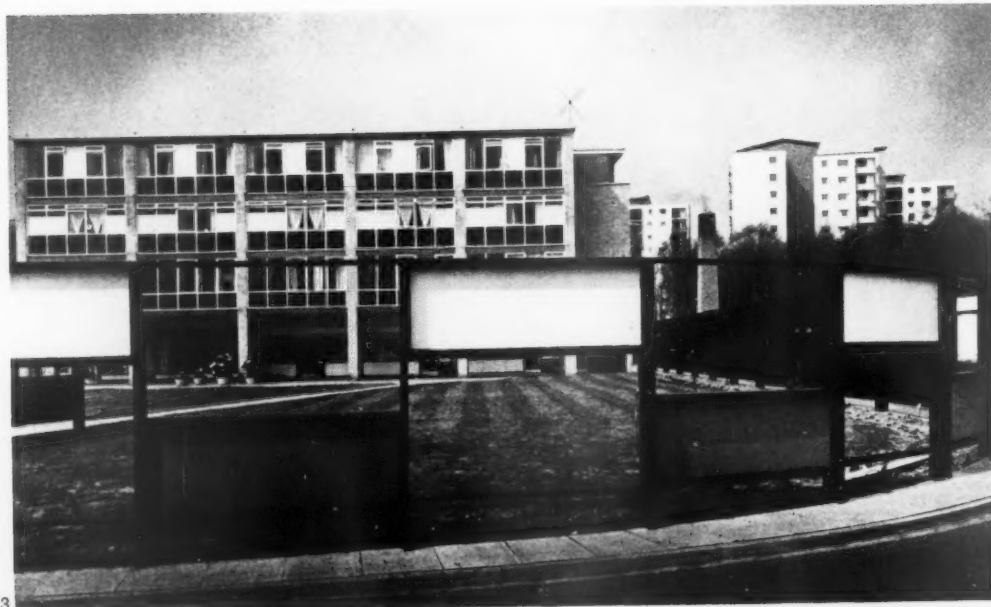


11

11. central piazza ; café and laundry on the right. 12. looking down at the laundry from the roof of the maisonettes. 13. from the east: shops and point blocks behind a screen which will eventually hold display panels.



12



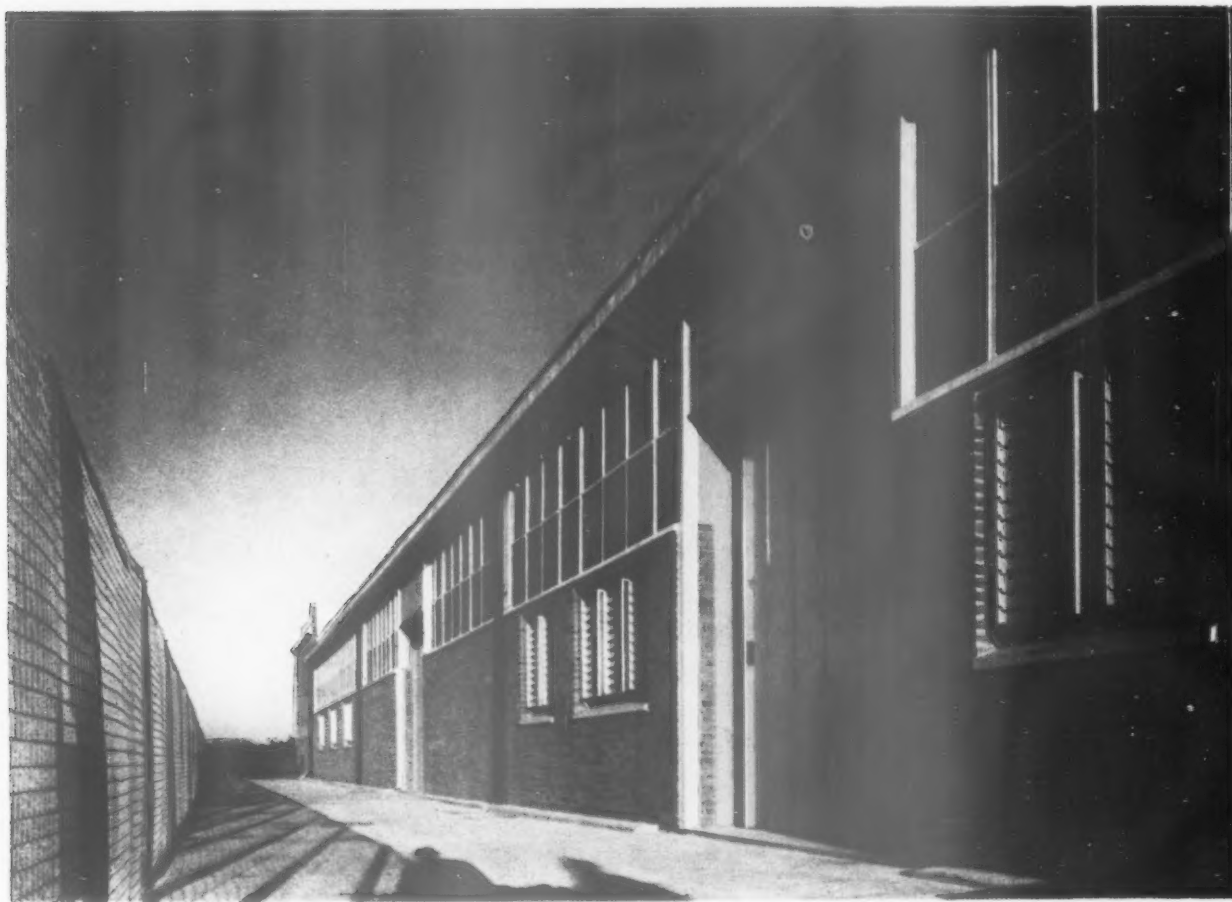
13

FACTORY AT STAFFORD

ARCHITECTS
assistant-in-charge

EDWARD D. MILLS AND PARTNERS
G. Partridge

1, west side of the single-storey production area.



This factory, for the Universal Grinding Wheel Co., is on the Seighford road, about a mile north-west of the city, and occupies an area within the main works of some 60,300 sq. ft. Production buildings are single-storeyed, planned in large bays or shops, each of which contains plant dealing with a specific process. The two-storey building along the main road frontage houses administrative staff for the new factory on the first floor,

and smaller process units and space for storage both at ground- and first-floor levels. There is a large loading bay at the west end of the two-storey block.

The area where the factory is situated has poor load-bearing subsoil. Some 370 reinforced concrete piles were therefore used, penetrating well down into the substrata. These support plant as well as carrying the structure, which includes a reinforced concrete suspended

raft over the whole site in which ducts and tunnels have been incorporated to carry service lines and provide access for certain of the machinery. The barrel-vault type of structure used for the single-storey production areas consists of a light framework of tubular steel over which reinforced vermiculite concrete is placed, plastered on the underside and screeded and finished with a mineral surface felt externally. The barrel roofs are supported on boxed tubular steel columns cased in normal concrete; a series of rectangular precast concrete and glazed units inserted between the barrel give an even distribution of light. Ventilation in non-air-conditioned shops is by continuous units placed along the crown of the barrels.

Owing to the types of materials being handled, the clients insisted on the floor being hardwearing and capable of standing heavy traffic, and at the same time

having a clean and even surface. For the main traffic areas steel tiles have been employed, but the production floor areas generally are finished with a carefully graded crushed gravel concrete, moisture controlled, compacted and power floated. For exterior walling semi-engineering brickwork has been used generally. The two-storey block has a normal reinforced concrete frame separated structurally from the main single-storey building and having clear spans at first-floor level of approximately 30 feet. Compacted concrete has again been used for the floors of the main storage areas; the office section is finished in hardwood block flooring. Air conditioning is provided in certain shops with inlet ducting at high level, and return air ducts are contained within the floor structure. Every opportunity was taken, particularly in the main factory area, to use colour, especially in the exterior finish of panels, doors, windows, etc.

2

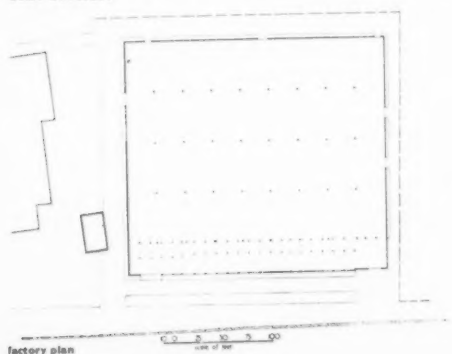
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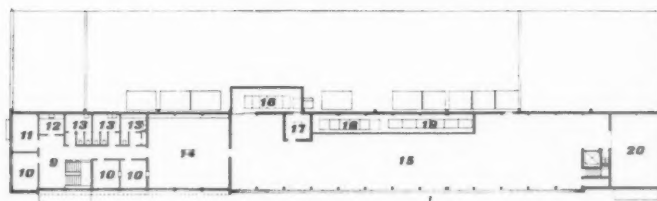
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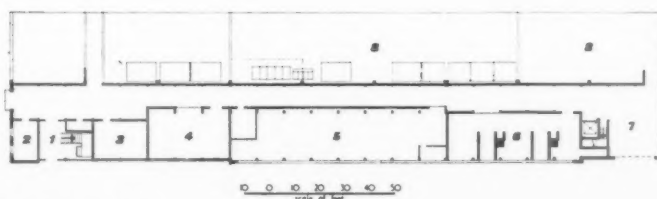
2, air conditioning trunking in press shop. 3, north front of buildings, with entrance and two-storey office, storage and small process block. 4, internal service road between office section and main factory, with loading bay at the end; the vertical pipes on the left feed grit silos in the mixing shop. 5, entrance hall and stairs at north-east corner.



- key
- 1, entrance.
 - 2, returns office.
 - 3, diamond weighing.
 - 4, fine mixing.
 - 5, storage.
 - 6, ball milling.
 - 7, reception bay.
 - 8, factory area.
 - 9, landing.
 - 10, private offices.
 - 11, typist.
 - 12, kitchen.
 - 13, lavatories.
 - 14, general offices.
 - 15, storage.
 - 16, powder resin cyclones.
 - 17, fillers.
 - 18, liquid resin tanks.
 - 19, storage racks.
 - 20, upper part of reception bay.



first floor



office block, ground floor



6, south front, with end of barrel roofing and folding metal doors, 7, entrance hall seen from opposite viewpoint to 5.

6



7

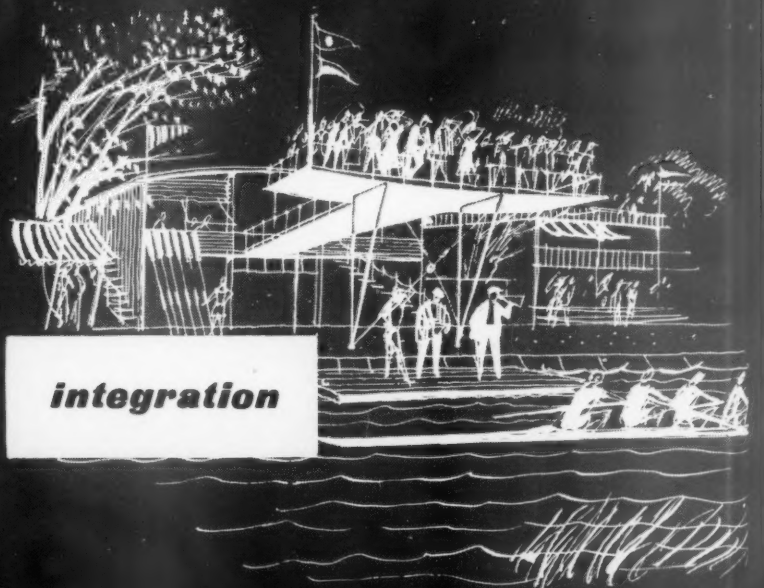


immediacy



alienation

The traditional college barges at Oxford look excitingly what they are, a means of getting people on to the water, as Kenneth Rowntree's painting shows (above). To replace them with brick boxes cowering back from the bank, left, is to lose this immediacy, and Diana Rowntree, in the article beginning opposite, calls for a type of boathouse, below, that presents man directly to water.



integration

OXFORD COLLEGE BARGES

THEIR HISTORY AND DECAY, AND THEIR SUCCESSORS THE BOATHOUSES

It is almost a hundred years since it became the custom for college boat clubs to own a barge. Unfortunately this survey is undertaken not in honour of their centenary, but because the barges are now disintegrating so fast that they may soon have disappeared altogether. The line of barges along the Christ Church Meadows bank of the Isis is a well-known feature of Oxford. Yet their history is so little documented that they might well belong to some remote unlettered community. In this hive of academic activity no single person has got up the subject and some barges have disappeared leaving no record at all. Although many of the barges have been admired and cherished it has never occurred to their owners that they had architectural qualities. Architecture, it is widely believed in Oxford, is a pursuit inseparable from stone. This belief has had serious architectural consequences, and it is to challenge it before it does more damage on the Isis that this article is written.

The barges were originally a prestige item, bought because they appealed to the sense of style of Victorian rowing men. They are an ornament to Eights Week, and form an excellent grandstand for watching the races, with exactly the right air, neighbourly yet exclusive, for entertaining visitors to strawberries and cream. The mid-Victorians seem to have been alive to architectural appeal when they saw it. One salutes the acumen of the City Companies who dangled their redundant barges before these discriminating eyes. The charm of the barges would not have been acknowledged as architectural appeal in those days any more than in these. I have a letter from one of the colleges stating uncompromisingly that its barge 'is, I am sure, devoid of any interest, æsthetic or historic.' It is true that this barge is a pontoon supporting a simple weatherboarded structure lacking entablatures, orders, exuberance, or the well-considered proportions of some of its neighbours. But it has a simple marine character, and the architectural good manners that enable it to take its place in perfect accord with the other barges. Had its deficiencies not been so pointed out to me I doubt if I should have noticed them.

The thing that has made these barges one of the

sights of Oxford is unanimity. They have very different styles of detailing and idiom. Some are pretentious—yet one feels pleasantly so—others delicately retiring, but the tenor of the line was never broken. They remain subservient to the landscape, a well-disciplined row beside the Isis, underneath the trees. The row is broken now. It was fashion and a sense of style which completed the row of barges, but the idea of staking a claim was in the first place grimly functional. Barges of the second vintage were designed to give more accommodation. Eventually the idea of a single building to contain the boats and comfortable changing rooms as well as a club room was bound to be considered. Christ Church who owns the meadows, has considered the matter of rowing amenities and produced a scheme for a row of boathouses on the island site between the junction with the Cherwell and the New Cut. Not, you notice, on the site of the barges. It is hoped that this indicates an intention to preserve this feature of Oxford, whose origin, like much else that has proved successful there, was fortuitous. Oxford is not given to demolishing the old whenever it embarks upon new forms. Many places there still recall the mediæval way of

life. The barges recall very aptly the way of life that was at its peak before the first world war. We look back nostalgically and, as envy abates, with increasing respect to that age which, though within living memory, has gone for ever. The barges, though perishable, are still there, giving us an architectural record of uncanny comprehensiveness. This, no less than mediæval stones, should be preserved.

Christ Church now offers any colleges wishing to build barges a businesslike layout. The frontage is divided into lots for pairs of boathouses, and can by this arrangement accommodate all the college Boat Clubs. Christ Church and four other Colleges built boathouses there before 1939. Seven more are at the design stage now. Any building that is to go up on Christ Church meadows must be considered in terms of landscape. Unfortunately, where landscape is concerned to be businesslike is only a beginning. Much more is required: imagination; someone with an idea. It sounds far-fetched to say passion. Yet to carry a planning project through committees, through the many months, even years, that will pass before the idea or its descendant rises in brick and concrete, requires a strength of purpose bordering on mania.

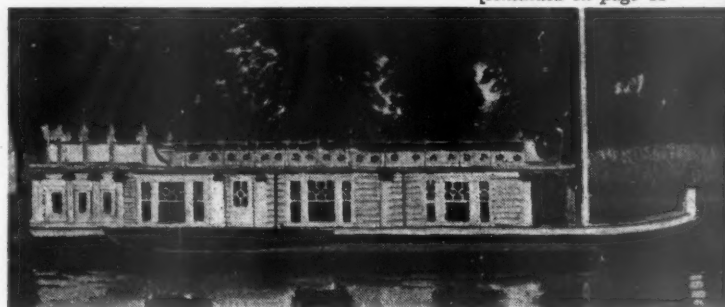
The first boathouses were built in durable materials and were planned for the job. Yet their effect upon the landscape is one of desolation. They give a curious impression that everyone has gone home and left no address. This is in sharp contrast to the barges whose shabbiness, sometimes cheerful, sometimes wistful, never fails to conjure up pictures of exuberant oarsmen, Processions of Boats by torchlight, or Edwardian gaieties on sunny afternoons in May. This is surely because it was the sight of the barges that suggested their possibilities. They were chosen because they were liked, not painstakingly planned. This seems a disloyal distinction to come from the side of the architects and planners. The distinction is in fact the basic one between positive planning for a desired end, and planning to get by. When an artist is at work on planning he has in his mind's eye a picture that delights him and has no doubt it will delight others. It makes no difference whether he is an undergraduate bidding for a state barge or an architect working out eighth scales. The early boathouses were not, I think, inspired by an inner vision, but simply by the wish for a hot shower. There is a vague belief current nowadays that comfort and beauty are alternatives. But one does not expect to find our older universities, guardians of precise thinking, the slaves of vague beliefs.

The existing boathouses fail to enchant; probably because too little was expected of them. It is significant that they are sited down at the end of the meadows "well out of sight." Evidently failure was assumed at the start, and indeed the final result is one of debased, pretentious ugliness. One could hardly find a sadder example of the architectural disease that is smothering the English countryside and transforming it into subtopia. What, more precisely, are these buildings' æsthetic faults? Their cardinal fault is that they do not flatter a well-loved landscape. Their own positive characteristic is solidity, with an air of desolation when the doors are shut. A minor shortcoming is the presence of waste paper on the external stairs.

The damage to the landscape is greater by contrast with the barges, which lie low under tall trees, light against dark foliage and water. Their small scale too is particularly elegant against these large masses. Their beauty is not simply due to the fact that they are floating, as one can see by glancing at the pleasure cruisers moored to the opposite bank, many of them hideous. Nevertheless successful waterside buildings—consider Venice or English water mills—do often rise sheer out of the water. This is impossible for buildings where eights are kept, as at least 30 ft. of ground is necessary in front of the boathouse for turning the boat. But if these boathouses could not rise out of the water, they could have flattered it with colour and tone. This they have not done, all sticking grimly to neutral toned brickwork. The present effect of foliage is equally unfortunate, but this can eventually be altered by putting in a row of trees containing quick-growing poplars behind the boathouses. Meanwhile, with the building line just in front of the existing trees it has been found necessary to lop the fine old trees out of all recognition. The plan to leave one tree between each pair of boathouses took too little account of the spread of the tree and its relation to the view from the terraces. Bridgwater and Shepherd, whose designs for further boathouses are illustrated here, suggest leaving two trees between every two blocks of building instead of one between each block. This would leave a more effective spread of foliage.

Solidity is a curious characteristic to bring to

[continued on page 41]



History: In 1843 Oxford, owing to the illness of their stroke, rowed with seven oars against Cambridge at Henley-on-Thames, and won. The glory of this occasion roused many colleges to found or re-found boat clubs. In those days there was heavy traffic of commercial barges on the Isis, and ferocious feeling between the bargees and the undergraduates. The University Boat Club hired a barge from Heathers, which the Colleges used for changing in, but members had to get someone to punt them across from the meadows to the towing-path where the boats were, and still are, kept. Incompetent or ill-intentioned bargees often undertook this task, and accidents occurred. The OUBC issued badges to licensed punters, but their thwarted competitors countered this by mooring their barges along the shore of the meadows in such tight formation that the undergraduates could not get to the water at all. In 1851 the OUBC moored a raft to that shore, thus gaining a meagre footing.

At this time the state barges of the London City Companies, that had hitherto graced the Lord Mayor's

procession and state occasions, were becoming obsolete. The OUBC had bought the Merchant Taylors' barge in 1846. Balliol bought the Skinners' and Exeter the Stationers'. The fashion spread very quickly and gave the university final control of the meadows shore.

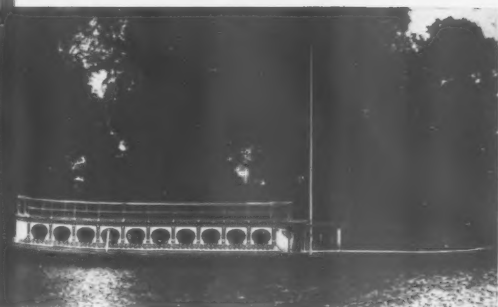
The City Companies' barges were designed to be rowed, with a long prow for the oarsmen and a cabin towards the stern. The colleges rowed them to Henley for the regatta each year. Their other dress occasion was Eights Week, when they made a grandstand for watching the bumping races and were used as a club-house. By the 'eighties the City Companies' barges were mostly coming to the end of their lives, and many colleges had barges built then, on the house-boat plan with more cabin space.

In 1881 Balliol commissioned Alfred Waterhouse to design their present barge, and it was completed by Salters in 1882. In 1885 Wadham hired a barge Corpus had vacated, so presumably Corpus's second barge dates from that year. Magdalen's barge was built by Salters in 1886, and Jesus's in 1887 by Tagg of

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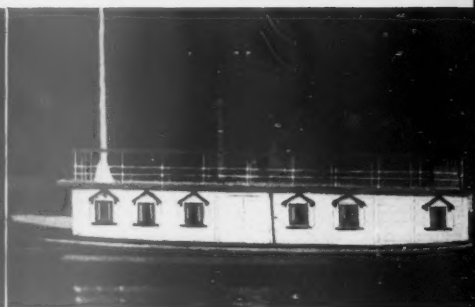
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5

Facing page, 1, New College barge built in 1928 by James Taylor and Bates, Chertsey. 2, the barges as they lie today. 3, Oriel barge designed by T. G. Jackson in 1892 as a copy of the earlier City company's barge; broken up in 1954. 4, St.

Johns' barge built at Reading before 1885. 5, Brasenose barge; yellow and black paintwork on white. Below, 6, Jesus figurehead and stern of St. Johns' barge. 7, detail of Hertford barge. 8, poop detail of Keble barge.

6

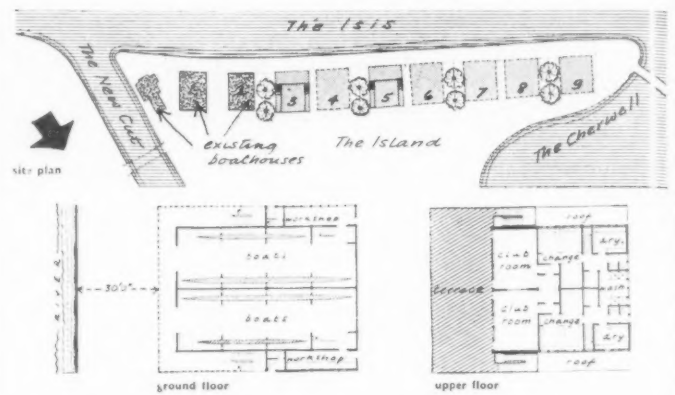
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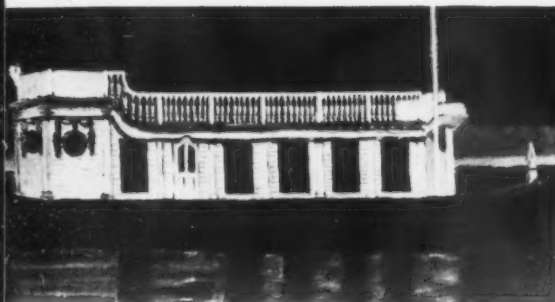




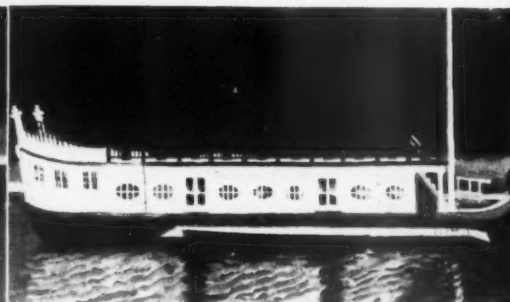
left, boathouse tradition. 9, Thames Rowing Club, Putney, a bold handling of the balcony motif. 10, Ranelagh Sailing Club, Putney, in casual riverside style.



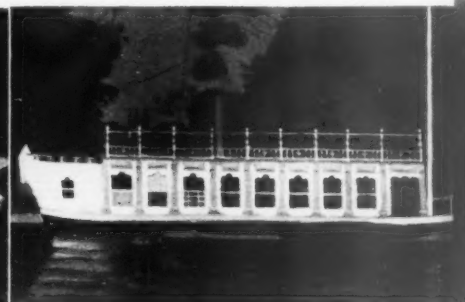
11, Proposed boathouses for Orford by Bridgeate and Shephard.



12



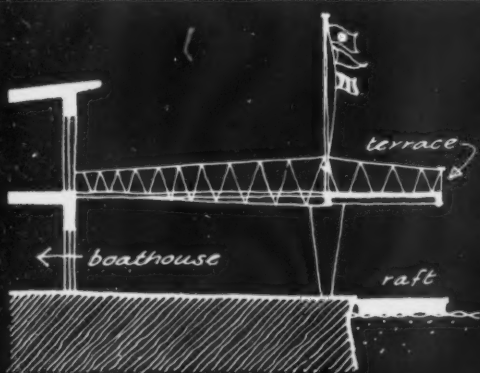
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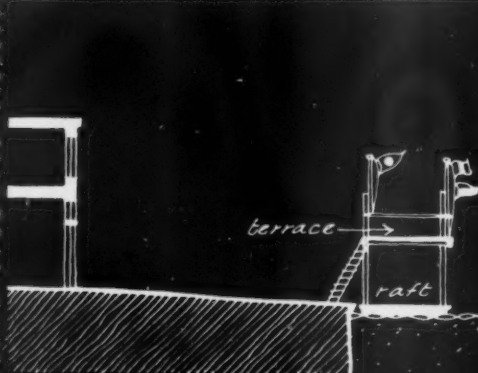
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12, Hertford's Edvardian barge. 13, Corpus Christi barge designed by Harrison and built by Salters, 1930; the hull is bright blue with a scarlet line, the superstructure salmon pink and white. 14, Wadham barge, built in 1897 and probably

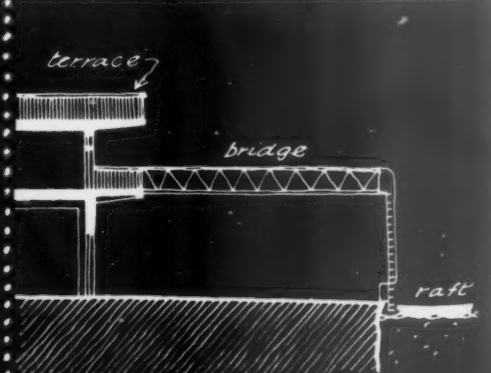
designed by Jackson. Facing page, 15, Jesus barge, built by Tagg, of East Molesey, 1887. (See 6 for figurehead.) Below, the three alternative suggestions given by Diana Roxentree for solving the problem.



a terrace over raft with independent support



b terrace as upper story to raft

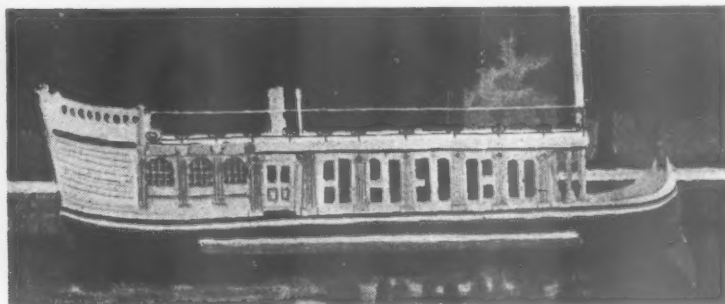


c terrace on boathouse roof - spectators' bridge to raft.

continued from page 38]

water-meadows. These boathouses seem to be modelled on the physique of their users. They would have done better to imitate the style of the boats. The fault is mainly due to the necessarily ungainly size of the boathouse doors. They present a real problem, which in the boathouses already built seems to have been regarded as insoluble. The overall size has been emphasized by recessing the doors, and in one case painting them to contrast with the brickwork. But instead of the rest of the design being logically subordinated to the doors, the upper story has been, on the contrary, heightened with a parapet, and the external stairs untraditionally and unnecessarily added to the visible brick cube. This gives the building, as it always must, the appearance of a cut cheese. Bridgwater and Shephard have tackled the door problem by dividing the front elevation at door height. Everything below this line is solid and painted the same tone; above, all is glass. It would be equally possible to treat everything below door height with a unit pattern, using vertical boarding or something more inventive.

The external stair and balcony is a traditional feature of riverside architecture. The traditional materials are timber or wrought or cast iron. These materials do of course need regular painting, and it is only natural to try to avoid maintenance items. But has anyone ever seen a successful example of a solid balcony? At Putney, where the row of boathouses has, for all its squalor, the authentic waterside



15

continued from page 38]

East Molesey. Pembroke's had just been completed and Trinity's was on the stocks. All this vintage has lasted well. Enormous sums have been spent on the upkeep of the barges, although the colleges ignore the usual nautical practice of painting the hull annually. In the 'nineties Oriol, Keble and Wadham built barges, all designed by architects. Oriol employed the eminent T. G. Jackson, but firmly stipulated that the new barge should be upon the lines of the old. This one lasted until 1954, and Oriol was still so proud of it that the lead decorations are preserved in the College. We hope they may adorn the future boathouse. It is likely that the Wadham barge, built in 1897, was also Jackson's work, as he was an honorary Fellow, and consultant architect to Wadham. This barge has that grace, allied to functional simplicity, with which the Victorian designers who remained unmoved by the battle of the styles carried forward the best English tradition. The designer managed to use the large sheets of plate glass then available without the least sacrifice of delicacy

in the surrounding details.

In 1903 Queen's decided to follow the prevailing fashion in shipbuilding and chose a steel hull, which she expected to last much longer than a timber one. The treatment of this barge lacked realism, as the danger of rust was apparently ignored. One of the Fellows of Queen's who had a great deal to do with commissioning the barge was approached in 1947. Although he could not clearly remember facts, dates or names, he wrote: 'I remember a visit I paid to the builders of the new barge, and my struggle with my aesthetic conscience before approving the design.' The design of BNC's present barge, which is constructed on a steel lighter from the first world war, gave rise also to strong feelings. One of Mr. Salter's men remembers that the then Mr. Salter would not take on the contract because the design was so ugly. It was therefore built by Rowhedge, of Colchester, and its humble East Anglian appearance clearly proclaims its origin. In fact, it has turned out so perfectly in the Essex vernacular that it seems likely that the design was greatly modified.

exuberance, it is most noticeable that the charming buildings are the ones with light and impermanent balconies. The newer boathouses in brick and solid concrete have just that air of desolation we notice on the Isis. Bridgwater and Shephard solve this problem by using a ship's railing for the terrace, and external stairs with open risers. Unfortunately the tight boundaries of the site have compelled them to tack small workshop blocks on to the sides of the building, so that the open stair would be seen against a solid wall and robbed of its effect. One suspects that the waste paper, after blowing through the open stairs will collect after all in the angle of the workshop. If the rear building line could be relaxed, the workshops could go to the back of the block and not be seen at all from the riverside.

In making the change from barge to boathouse, colleges count on cutting down their maintenance costs. This is an optimistic assumption. They fail to take into account the much greater day-to-day upkeep the larger building will need. The litter is an outdoor symptom of the losing battle the watermen are fighting. Indoors there is a similar desolation. But it is not simply caused by lack of charring. The barges had their seating and splendid internal appointments built in. The club-rooms so far are simply three or four thousand cubic feet of club-room space. They appear to have been furnished by odd contributions from home. But it takes much more than this to produce the casual elegance they may hope to achieve. The architect or someone else will have to exercise some skill and spend some money if the change from the masculine dignity of the barge interior is not to be a tremendous come-down. The present appearance of the club-rooms is of such disheartened neglect that it is impossible to believe they are the habitat of the same men who occupied the barges.

The problem of fitting 60 ft. boats into an 80 ft. site does not allow for very great divergence of plan. The difficulties that Bridgwater and Shephard have met will crop up again all down the line. Though I think the landlords mistaken in trying to tuck away out of sight an activity as attractive as rowing, they are certainly right in thinking that the design of the boathouses will cause their architects some trouble. Their mistake is to think an elegant boathouse cannot be achieved.

There are two main planning problems: first the great length and width of the plan of the paired boathouses in proportion to their height. Secondly the effect of a large terrace at first floor level. On the ground floor I can discover very little possible variation. Upstairs there is plenty of space to juggle with the plan components. But since the changing and club accommodation takes up so much less room than the boats, the obvious course is to make a spacious terrace on the first floor for watching races. This means that the admirable river elevation Bridgwater and Shephard have achieved, with the glass wall rising high above the difficult doors, will not in fact exist. The proportions only exist if the ground and first floor glazing can be read as one. If the first floor windows are 20 ft. further back than the strip above the doors, the dominant ground floor reasserts itself.

In these boathouses, as in many buildings, a painful choice seems necessary between an ideal plan and a successful elevation. During Eights Week the terraced plan will be ideal. For the rest of the year this gracious site would do far better with buildings with the glazing vertically above the doors or projecting beyond them. If the clubroom is brought to the front of the plan and given sliding-folding windows we get this effect. What then will serve as a terrace for the Eights Week crowds? There are several possible solutions, but let us first return to the problem of the large squat form of the building. This is due to the insistence on paired boathouses. The long, narrow form of the single boathouse would be an easier assignment for the architect. Since the landlords do not seem very sanguine about the capabilities of architects to surmount their difficulties, it would seem a good idea to cut down the difficulties as much as possible. If any colleges who wished to build single boathouses could do so, the row would gain in variety. A waterfront needs variety; particularly this one. Bridgwater and Shephard's building is a conscientious and skilful solution of an exacting problem at the minimum cost to allow proper workmanship. If there is to be any architectural excitement or flight of fancy on this waterfront it is going to cost extra. Some colleges may have available endowments, gifts or bequests. It will be unfortunate if it turns out that these colleges are handcuffed to others less well endowed so that they cannot decently have their fling. The plan to hide the boathouses from sight will worsen their appearance, both by crowding them and by insisting upon uniformity. Building in pairs makes a saving in initial cost, but it means nine buildings instead of seventeen. This puts double the weight of responsibility on each design. Far more important, it introduces a compulsory symmetry. Symmetry has the virtue of emphasizing an axis. Here there is none. It also helps to build up an atmosphere of grandeur. But though pageantry has always been associated with rowing on the Isis it is hardly the same thing as grandeur. In the last century there was the annual Procession of Boats, and there was a procession for the opening of the New Walk in 1872. These traditions suggest colour and gaiety rather than symmetry.

It is very important to brood upon tradition and it may well solve problems which would seem entirely intellectual ones. An architect faced with the design of one of these boathouses has as his cue the elegance of racing boats, the barges lined up before his eyes and riverside tradition in general. Boatbuilding suggests tapering curves, stressed plywood, slender masts and shrouds, brasswork and gleaming varnish. The barges, timber detailing on a more solid scale, and above all bright fresh colours. Riverside tradition means railings, rafts, and balconies. The thought of all this does immediately suggest solutions both to the land-locked look of the boathouses and to the terrace problem.

The most mundane solution to the terrace is to put the Eights Week spectators on the roof. Though this will increase the load on the roof it will not increase the total load on the building, as the same weight of spectators would have to have been supported on the first floor terrace. The roof terrace has the added

advantage of being out of sight during the long period when it is not needed. It gives the building extra height which it needed, and an excuse for a decorated skyline. A second promising idea is to build first-floor terraces to the rafts which are necessary in any case to deal with differences of water level. If the rafts had tall posts at four corners the terraces could even be dismountable. This structure would have the architectural charm of the barges, and link the boathouses visually with the water, restoring to the scene the riverside architecture that the exigencies of boathouse planning have taken from it. The terrace could be reached by a light overhead bridge from the club room, to keep the spectators out of the way of the boats, or by a hinged stair from the towing path. Unfortunately this does not work on plan, but it gives rise to other ideas. One is simply to run a footbridge from the clubroom to the raft and let guests watch the races from the raft, after the boats are in the water. A more ambitious scheme for any college still fairly well endowed would be to cantilever two girders from the boathouse across to a pier at the river edge and support a terrace on these. The girder would support a bridge and form a handrail. And why should not the colleges that have no funds for cantilevers, girders and piles stick to their barges and use them as the spectators' terrace, and as a point of interest supplementary to a new functional boathouse?

Such detailed analysis may strike some people as disproportionate to these dull little buildings, which are after all only boathouses. Unfortunately the disease the existing Oxford boathouses suffer from is one that threatens to consume the whole of England. What has happened on the Isis shows exactly how subtopia creeps in. Evidently subtopia need not be the by-product of commerce, but may arise from the good intentions of the most august of clients. When the client happens to be a college it is unlikely that its past and present members should not include some people who care about architecture and landscape enough to be informed about them. At present great interest in art is discernible in Oxford, almost more in junior than in senior common-rooms. It is to be hoped that officers of colleges will co-opt the opinion of members who are interested in art, regardless of their age and standing.

As a result of Christ Church's magnanimity in keeping the meadows open to the public there is a vast body of people scattered over the entire world who have the future of this bit of landscape at heart. It is on their behalf that I urge Christ Church to use the same magnanimity in its dealings with tenants and architects, to give the scheme the consideration and revision that it deserves, and to apply it in the broadest and most amenable way when suggestions arise.

Other colleges who propose to build boathouses are urged to take the barges as an aesthetic standard, a standard not a model, and unless they have the courage, the vision and the architect to build a delightful boathouse, to have the good sense to stick to their barge.

Of the paintings by Kenneth Rowntree illustrated in the article, the following are from private collections: page 36, top, David Booth; 1 and 5, Lionel Cinnamon; 13, Dennis Clough.



1, common room from the west. The roof is an 11½ in. timber roofing unit supported by a timber frame. The lower roof in the foreground covers the occupational therapy room and the store.

ADMISSION UNIT AT WALLINGFORD, BERKS.

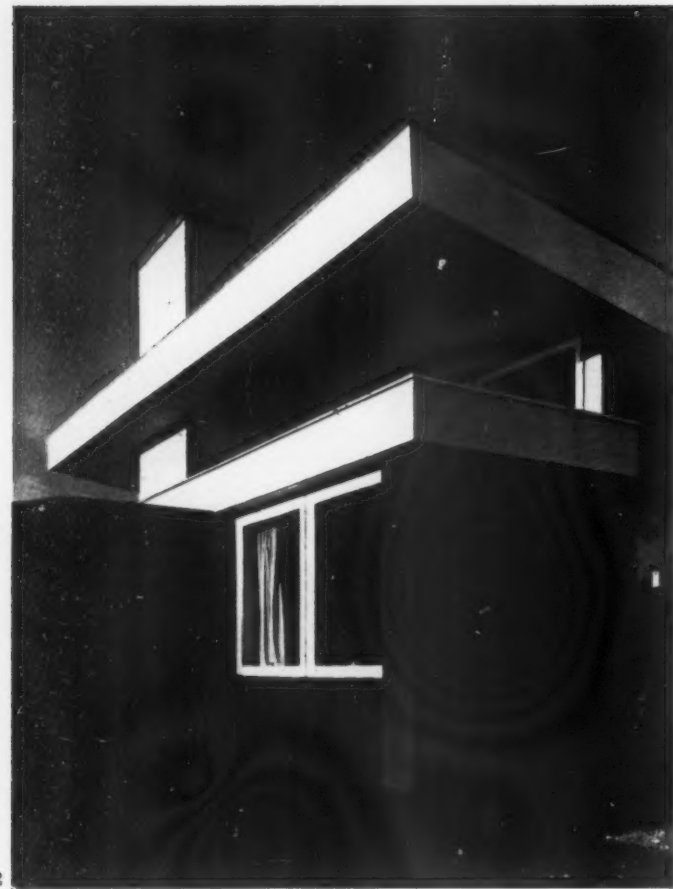
ARCHITECTS, POWELL AND MOYA

ASSISTANT ARCHITECTS, ROBERT HENLEY AND DEREK STOWE

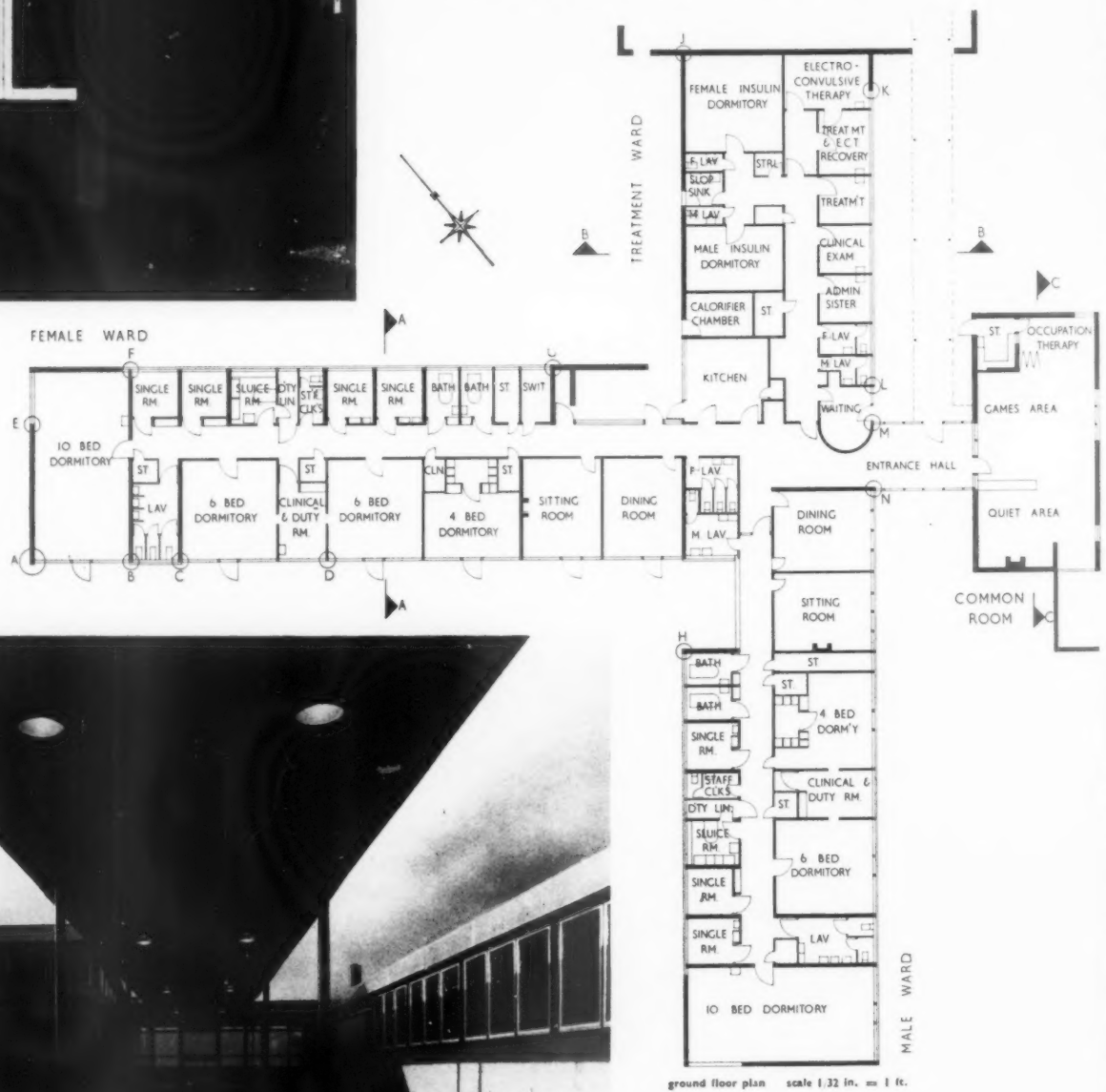
The admission unit of the Fairmile Mental Hospital, on the Reading road south of Wallingford, accommodates all new patients to the 950-bed main hospital. Many of these are discharged after observation or become out-patients; the average length of admission is six to eight weeks, and the emphasis has been on a cheerful atmosphere, which has been helped by relaxation of some of the previous requirements—e.g. that panes of glass must not be bigger than 15 × 12 in. It is on a gently sloping site with good views to east, south and west. As all the accommodation is on one floor, use has been made of different ceiling heights—10 ft. for the larger rooms and 7 ft. 6 in. for the

Admission Unit at Wallingford

smaller to obtain clerestory lighting to wards, corridors and stores. Windows generally are of clear glass, privacy being obtained by planning the rooms so that no overlooking is possible; where this is not done, window cills are above eye level or, in the rooms next to the entrance path, venetian blinds are provided. Load-bearing brick cross walls are 9 in. thick where sound insulation is needed and 4½ in. thick elsewhere. Roofs are of light composite plywood and softwood construction in troughed units. External walls are 10½ in. cavity construction of two skins of 4½ in. expanded clay blocks. The opening lights of the windows are hinged so that the opening is limited to a few inches; below door-head height, ¼ in. polished plate glass is used to reduce the chance of breakage. However the windows are everywhere larger than is usual in mental hospitals. Floor finishes are mostly thermoplastic tiles; with woodblock in the common, dining and sitting rooms, and quarry tiles in the w.c.s, kitchen and sluice rooms. Heating is by a low-pressure, accelerated hot water system.



2, the south end of the common room: the lower roof is over a fireplace recess.
3, the main entrance and covered way, with the treatment block on the right and common room on the left.





4, the junior wing from the south.

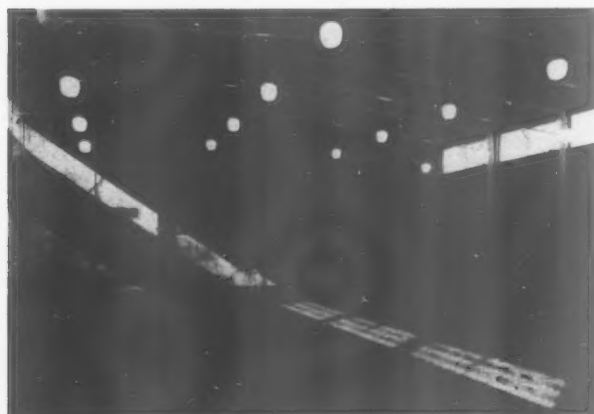
SCHOOL AT HIGBURY, N.6

ARCHITECT, JACK HOWE

ASSISTANT ARCHITECT, ANDREW BAIN

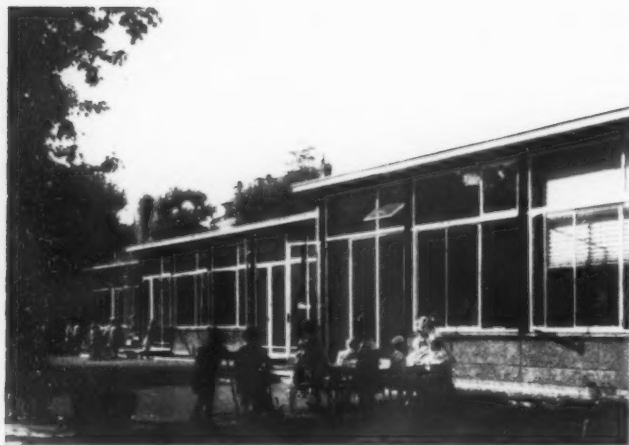
The present buildings (representing the first of two stages) have accommodation for 320 juniors and 280 infants. The final stage will add three further classrooms, bringing the total accommodation to 720. The infants wing and the two-storey junior block are arranged at right angles to Highbury New Park and Petherton Road. The latter is the noisier road and the main teaching wings are therefore well set back, and run east west. The main entrances for both juniors and infants are in Highbury New Park. In the ultimate development a covered play area will be provided at the end of the junior block, adjoining the junior court.

The Ministry of Education cost limit of £140 per place has exerted a strong influence upon the planning and general arrangement. Construction is based on an 8 ft. 3 in. module. The two assembly halls are built as one unit thus reducing external walling; the junior hall will be used for public meetings and entertainments. There is no separate dining hall but the junior entrance hall can be combined with the junior assembly hall to provide adequate



5, the infants assembly hall.





6, infants classrooms from the south.

School at Highbury, N.6

dining accommodation. Separate cloakrooms are not included; fittings for coats and shoes are provided in the 8 ft. wide corridors adjacent to the classrooms. Direct staircase access is available to each pair of rooms on the first floor of the junior wing. This enables good daylight to be obtained on both of the main walls, and the room height to be reduced. The 8 ft. 3 in. module provided a larger area in the junior classrooms and general purpose rooms than is required. Separate stores have therefore been omitted, but a storage fitting is provided on the north walls of the rooms. Kitchen and service access is as close as possible to Highbury New Park for the sake of short approach roads. The cold water storage tanks are above the chair stores between the two assembly halls; with the main sanitary accommodation at a lower level than the halls, a sufficient head of water is available. The stores with tank room over provide an excellent sound barrier between the two halls.

Heating is by means of hand-fired solid fuel boilers operating a low pressure hot-water system, with convectors in all classrooms, fan convectors in assembly halls and junior entrance, and radiators in corridors and lavatories.



7, the baths from the south, with medical centre beyond.

PITHEAD BATHS AT BINLEY, WARWICKSHIRE

ARCHITECTS, JOHN DUDDING AND PARTNERS

in association with W. A. WOODLAND

These baths serve Binley Colliery, in the small coalfield between Coventry and Rugby, and contain locker and bathing accommodation on two floors for 1,000 mineworkers. They are of brick and concrete construction, the reinforced concrete frame finishing at first floor level, except for supports to water storage tanks. The water tower normal to pithead baths design has deliberately been avoided and the storage tanks housed on the roof.

External walling is of National Coal Board machine-made bricks, the lower panels and water tank cladding in buff facings and the upper storey in warm brown.

The site is alongside a colliery refuse tip and the entrance level from the pit is half way between ground and first floors.



EXHIBITIONS

It would be difficult under any circumstances to arrange an exhibition that contained enough material for a fair assessment of the German contribution to the modern movement in painting, and if I dwell on some of the factors that led to the distorted view of twentieth-century German art recently presented at the Tate Gallery I shall seem ungracious, but I think that most English people who saw the exhibition have been left with the impression that the modern movement in Germany was for the most part in the hands of crude provincials who were desperately trying to outshine their Parisian betters, and as it is likely to be a very long time before we are given the opportunity of seeing a more balanced survey, I think it is rather important to try to defend German art against the impression left by this selection.

When the trustees of the Tate asked the organizers of the exhibition to cover a period of a hundred years, from 1850–1950, they were virtually asking for two shows in one, and Professor Hentzen was given the task of conveying the general aspect of two distinct periods in a space that was barely enough for one. Twentieth-century German painting started abruptly and sensationally with 'Die Brücke,' the group formed by Kirchner, Heckel and Schmidt-Rottluff in 1905; it was a savage and unconditional break with every kind of dark tonality favoured by academician and secessionist alike until the turn of the century, and from that point on the 'German' contribution to painting (which includes Russian, Swiss and Austrian artists who worked in Germany, and German painters working in Paris, Holland and the United States) remained in one way or another intransigent, whether in the boundless fantasy of Klee, the paradoxes of human behaviour celebrated in Beckmann's exploitations of the triptych, the satire of Grosz, the automatism of Max Ernst or, in his pictures made of rubbish, the anarchism of Schwitters.

Klee and Beckmann are included in Professor Hentzen's selection, but not at their finest, and the fact that most of the exhibits had to be borrowed from collections in Western Germany may well have been an insuperable handicap, since it seems likely that Germany is now less rich in her own moderns than Switzerland or the United States. Nevertheless, although the Professor warned us in his very useful introduction to the catalogue

that it would be an injustice to German art to measure it by a conception of painting derived from French art of the same period, I cannot help feeling that he himself disclosed an 'aesthetic' bias, and made as mild a selection as possible from an art that has attempted to use form and colour to capture the human condition rather than the visual sensation. A balanced survey would have been fiercer and uglier, more convulsive and irrational, but at the same time it would have dispelled the illusion that German art is a poor and loud-mouthed relation of the School of Paris.

The exhibition was, of course, fascinating and instructive, and the best way in which we could show our appreciation of its value would be to organize a full-scale exhibition of the art of Max Beckmann. Three of the six paintings which represented him in the Tate show were characteristic, and the 'Odysseus and Calypso,' 1, a kind of



visual counterpart of Winckelmann's expressionistic descriptions of classical statuary, provided a glimpse of the sensual grandeur of his triptychs.

It is a sign of our neglect of the German school that Alexej von Jawlensky, a Russian associate of the *Blaue Reiter* group who died in 1941, has just been exhibited in England for the first time. The early examples of his remarkable paintings of the human head, 2, in the Redfern Gallery exhibition are fauvist in colour, but although the greens and reds and mauves of the flesh are typical of fauvist practice they are not conceived in the same spirit. The fauvism of Vlaminck and Derain was a gayer and more extrovert enterprise, a kind of pictorial buccancering in the domains of Gauguin and Van Gogh, and they dropped it as lightly as they took it up. Jawlensky on the other hand went on



striving for many years to relate his arbitrarily brilliant colour to his sense of the mystery of the human look, and his emotional response to the personality of the model. When he was in his fifties he turned to a much more abstract treatment of the head, which the Redfern catalogue calls 'a revitalized vision of the Russian Ikon,' but which seems to me to be closer to the Germanic yearning for the darkly sublime. Two of these heads were in the Redfern show and their harshly simplified and totally unrealistic forms bear a curious resemblance to some of Wyndham Lewis's early vorticist work in spite of a vaguely religious content.

Two paintings by Christian Rohlf, a German painter who was born three years before Van Gogh and died in 1938, were in the German Exhibition, and one of them, a cottage with a blood-red roof, evoked the atmosphere—homely yet sinister—of German fairy-tales. But a group of some eighty works by Rohlf shown at the Arts Council Gallery made a blurred and mournful impression. The best of them were ghostly flower pieces, 3, painted in a peculiarly misty body-colour, which had a touching air of 'otherness' as if they had been gathered in another world and brought back as proofs of its existence.

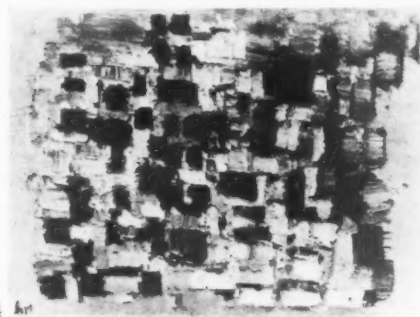
Nicolas de Staël, a Russian painter whose work truly belonged to the School of Paris, died last year at the age of forty-one. He had an enthusiastic following in this country, and two memorial exhibitions have been held in London; one at Arthur Tooth & Sons, where a group of late works in English collections was shown, and the other at Whitechapel Art Gallery where Mr. Bryan Robertson put on a large retrospective. His popularity



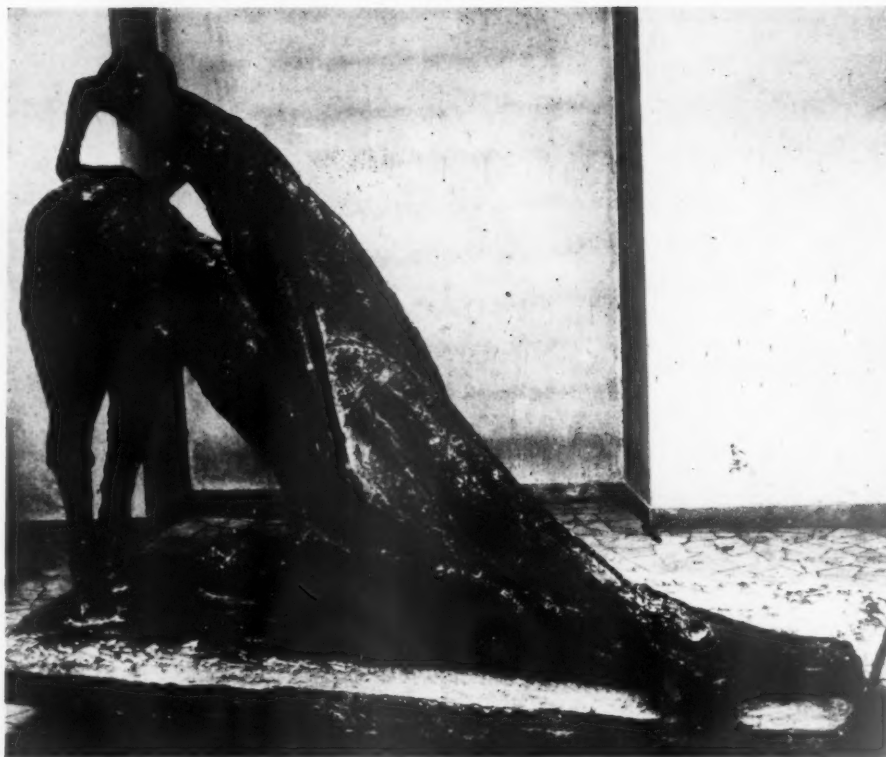
is a reminder of the fact that innovations in modern art are less revolutionary than they used to be, for although it has been claimed that de Staël developed a new way of seeing, his work presented no problems

to connoisseurs, who recognized each new phase as delectable picture-making, no harder on the eye than Renoir, Bonnard and Braque.

Much has been written by painter-critics about the squarish blob, gob, dab or briquette of paint with which de Staël in his first important phase created lovely, light-filled walls to keep out objects, 4, and a flourishing school of square-dabsters



has been founded on his hypnotic and phantasmal brick-laying. I see the squarish dab as a 'rich nought' with which the magician in de Staël propounded the painterly statement that 'nothing' was very well worth doing. But this turned out to be only the defensive aspect of de Staël's strategy, and when he moved out into the world it was not to collaborate with it but to remove its particulars from sight and take over its spaciousness. He did this by perceiving the world as if it were under a



pall of thin silky paint, which covered it like a wet dust-sheet. The very late landscape reproduced here, 5, is as eerily soft and runny as a Dali, and it seems to me that his pursuit of pictorial values finally became a paranoid activity and turned 'significant form' into highly significant form in the quite different senses in which a psycho-analyst and a poet might use such a term.

If one were looking at Marini's bronzes at the Hanover Gallery in terms of Moore's concept of 'truth to material' it could be argued that he has brilliantly exploited the hollowness of the bronze cast. It would justify not only his elaboration of surfaces but the sense his forms convey of a kind of drum-like plumpness instead of solidity. The *chef d'oeuvre* of his latest exhibition is a huge bronze of a horse and rider in a catastrophic situation, 6. It would have become pretentiously symbolic in more solemn hands, but is in fact an over-ripe example of Marini's ability to capture physical sensations in which the painful and the pleasurable are inextricably mingled.

Robert Melville

LANDSCAPE

MAN-MADE TOPOGRAPHY

The newcomer's first impression of Johannesburg is of the mine dumps. They approach to within half a mile of the city hall and could be the basis for an urban park of tremendous size and scale. Everything else but these large hills of white sand is normal twentieth-century building. From the air they can be seen set in the green of the mine lands stretching in a wide band along the sixty-odd miles of the reef, pinched here and there by nodules of towns. There are three main varieties of dump, the sand dumps some 300 or 400 feet high with the familiar silhouette of fine debris deposited by cocoa pans, the rock dumps similar in form, and the slimes dams, 50 to 100 feet high, covering wide areas, flat-topped, mastaba-like. Mostly their surfaces are bare, the sand dumps a glittering white, the slimes dams a yellowish colour. On the older sand and rock dumps occasional growth is taking place and persistent blue gums have established themselves. Here and there between the dumps are flat pans of water, a result of the mining process.

The dumps are beautiful things, particularly in the slanting pink light of sunset when the smooth surface of the sand glistens against the evening sky or



the eroded corrugations of the slimes dams cast deep mysterious shadows. In the surrounding flat country they form an exciting piece of topography. To the locals they symbolize so much of what Johannesburg is, its quick growth and its raw but somehow attractive crudity.

The dumps are Johannesburg's backyard. In the early days building was begun to the north and, since the reef formed a barrier hindering development to the south, the city has spread out in a wide fan to north, east and west. A small section of industrial and lower class residential building has squeezed between the dumps and out to the south. To-day from the city centre the character changes in quick gradation from commercial to industrial and ends against the dumps in a collection of corrugated iron buildings, often old and always unattractive.

The mines will not last for ever. Already there are abandoned mine dumps too large for future use or inconveniently placed for present working. There has been much discussion as to whether or not the dumps provide safe building land. An old sand dump very near in has been purchased by an enterprising business man who tried to develop it, first commercially, and then residentially. Official prejudice was strong, however, and so far nothing but his own lightly constructed offices have been built. It seems certain that in time the consolidation will be sufficient on the top and on the more gradual slopes for light building.

In time, if uncontrolled, the dumps will probably become part of industrial expansion. They will be either levelled or built upon without imagination. The area that they cover is vast. Within a three-mile radius of the city hall alone some 4,500 acres are mine land. Within the municipal area there are approximately 10,880 acres, about 25 per cent of the total area. Johannesburg is fortunate to have such a valuable stretch of land still undeveloped and it would be a great pity if its scenic possibilities were not exploited.

For this to be done aesthetic and planning control is essential. Unlike the rest of the city land, this area is not as yet divided into plots and an outstanding opportunity exists for imposing the necessary regulations and allocating big enough areas for unified development.

Three uses for this land come to mind. Firstly, some of it must be used for relieving the congestion in the city centre, secondly, it provides an excellent opportunity for planning parkway approaches from east to west, and, thirdly, some of it should be set aside as a stretch of the open space which Johannesburg is so conspicuously lacking. This suggests the retention of the present form of the area with an encroachment of buildings along

the edges so that, in effect, there would be two 'green wedges' penetrating to the centre of the city.

The imaginative design of buildings in conjunction with the unusual forms of the mine dumps could produce most exciting results. The smaller dumps particularly, 1, are within the same scale range as multi-



storey buildings and might well be treated as elements in a composite composition, 1a.

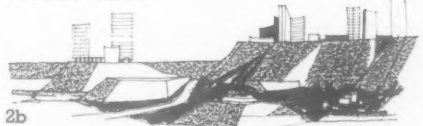
So far as building on the dumps is concerned it is desirable not to destroy their form and the skyline is, therefore, of primary importance. On the high sand dumps, 2, low, uniform building forming a narrow crown at the top would appear best, 2a. Since these areas are in any case rather inaccessible, low density, perhaps even residential, building would be suitable here. The access road mounting the face of the dump diagonally would form a



THIS ...



... NOT THIS



dramatic approach and provide a visual link between the bottom and the top.

The slimes dams, on the other hand, 3, provide excellent sites for large scale commercial and industrial building. Their height is such that details of building can easily be perceived from below and the extra height therefore lends dignity while

in a distant view they will stand framed against the higher sand dumps, 3a. It is,



however, very important that all the buildings on one slimes dam should be designed together since they will necessarily be seen so, standing on their common pedestal.

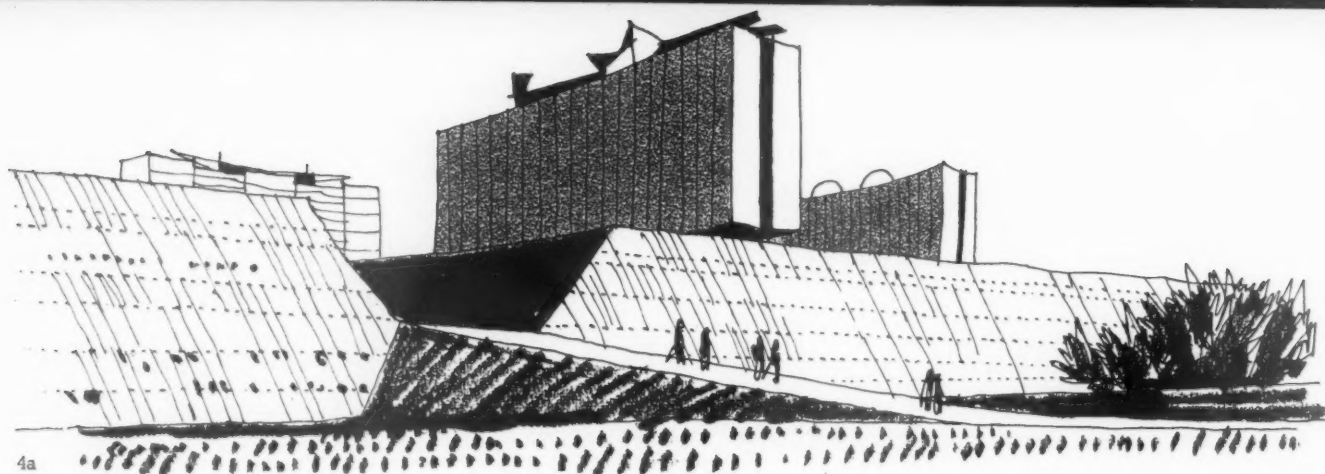
Here, in order to preserve the mastaba-like form, 4, the access roads might well mount in cuttings, 4a.

The most important roads approaching Johannesburg are from the south and east and must pass either across or along the reef. There is, therefore, a very good opportunity for building new roads which would be used by almost all visitors. In South Africa practically all ground travel is done by car. Whereas in England most road traffic is commercial and only a small percentage private cars, here the situation is the reverse. So it is particularly important that the approach roads should be impressive and agreeable. There is, indeed, an excellent opportunity with an imaginative use of the mine dumps and viaducts to create interest and elevation enough for distant views.

Large parks so consistently appear in all the greatest cities of the world that one is tempted to conclude that they contribute towards their fame. Hyde Park and St. James's in London, the charming El Retiro of Madrid, the Tuileries and the open spaces along the Quais of Paris, the Pincio Gardens in Rome, the Tivoli at Copenhagen. All these parks are from 300 to 800 acres, but in America both Philadelphia and Los Angeles have parks of 4,000 acres, New York has one of 2,000 acres and the famous Central Park is 840 acres.

Both by their position and their topography the mine lands provide the opportunity for the development of a very beautiful central park. Of the 10,000-odd





acres within the municipal area some 2,000 acres would be ample for this purpose. Such a park, seen from the Braamfontein Hill, over which most of the roads from the northern suburbs pass, would form a green back-drop to the towering mass of building.

The park would need to provide recreational facilities for city and factory workers during lunch hours and after work. Its most valuable asset would be the

and the nearest scenic area is 40 miles away. In a city where outside living is the vogue, most of the inhabitants have to make use of their own gardens, often beautiful, but limited in function.

Betty Spence

HISTORY

THE SFERISTERIO OF MACERATA

The vogue at the end of the eighteenth, and for the first half of the nineteenth, century of the 'Gioco di Pallone' in Italy, resulted in the building of 'Sferisteri' which were the direct precursors of the modern football stadium. The best known and probably the most interesting, architecturally, of these arenas is the 'Sferisterio' of Macerata in the province of the Marche.

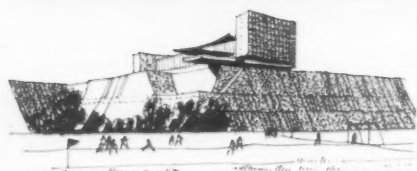
The 'Gioco di Pallone,' the Italian version of Fives, Pelota, and the old French game 'Jeu de Paume,' is still played with a curious spiked wooden cylinder, which covers the hand, and a leather ball, some 12 cm. in diameter. It is of very ancient origin, and by the sixteenth century was universally popular in Italy. It was usually played in an open space outside city walls, the walls themselves being used in the game in the same manner as the Chapel wall at Eton. When, at the end of the eighteenth century, 'Sferisteri' began to be built, they usually occupied a similar site, just outside one of the city gates.

The 'Sferisterio' of Macerata is no exception to this rule and occupies an open space outside the Market gate where the game had been played for centuries. It was built as the result of the munificence of 'Cento Consorti, desiderosi di arrecare maggiore lustro e decoro all' Città.' Originally forty citizens banded together and offered a hundred Scudi apiece for the cost of erecting the building; but as time went on quarrels, and the

cost of building, grew and in the end the 'Sferisterio,' whose first stone was laid in 1820, cost 40,000 Scudi and was only finally completed in 1829.

After the first interruption in the work of construction, a month after the first stone was laid, all the plans were changed and the design of the building was finally made the subject of an open competition for architects all over Italy. The terms were simple: 'A circus for the Gioco di Pallone and other spectacles. Apart from the supporting wall, it should contain steps, two rows of boxes, and a terrace above.' The designs of the competing architects were examined by the Academies of Bologna and St. Luke, in Rome, but there were so many differences of opinion that not much practical progress appears to have been made until the Apostolic Delegate at Macerata (which was then part of the Papal States) singled out the plans of Ireneo Aleandri and succeeded, after some difficulty, in getting them adopted. The architect's fee appears a trifle niggardly, only 17 Scudi, but one is relieved to find that he was allowed another eight Scudi for his expenses for two visits to Macerata in order to explain his plans.

The 'Sferisterio,' which is in the form of an arc, with two straight walls set at right angles to it and to the 'supporting wall' (which is in fact still the city wall), is built in the 'neo-classical style popular at that period, and has a double tier of



restful shade of green grass and trees with here and there a peaceful lake. Restaurants could be provided for snacks, a sport area for the more energetic, swimming baths, perhaps even a golf course. In addition, certain cultural buildings, museums, theatres and so on, could be well sited in such an area, 5a.

The mine dumps themselves would require individual treatment. Some of them, cleared of the buildings and obsolete mine gear, 5, at their feet, would best be preserved as scenic features in the open park. Others, more accessible, could be planted and provide an enticing ascent for the adventurous.

Where the park adjoined residential areas certain slimes dams would lend themselves most effectively to development as children's playgrounds.

Johannesburg is in great need of such a park. The environment of the city is flat





2

boxes separated by columns. It is constructed of brick throughout, and is a remarkably commodious and solid building. The main saloon over the entrance is now a good-sized cinema, and each of the 100 boxes approximates in size to a large double cabin on a modern liner. The whole building has emerged in a remarkable state of preservation from having been used more or less continually as a barracks for ten years, before and during the last war.

The floor of the arena, which provides ample space for the field of 95 by 17 metres required for the 'Gioco di Pallone,' has been the scene of many and varied festivities. After the opening on September 5, 1829, these continued for a month, and included a balloon ascent, jousts, tombolas, illuminations, bands and, of course, innumerable matches of the 'Gioco di Pallone.'

The Italian national finals of the 'Gioco di Pallone' are still played every September in the 'Sferisterio,' for the Marche is a conservative province, but the glory is departing and if today you talk about the 'Gioco di Pallone' in Rome or other big cities of Italy, your hearers will assume that you mean 'Futbal,' or 'Calcio,' as it is more commonly called, and many of them will be ignorant of the very existence of what was once their traditional national game.

Georgina Masson

S.O.S.

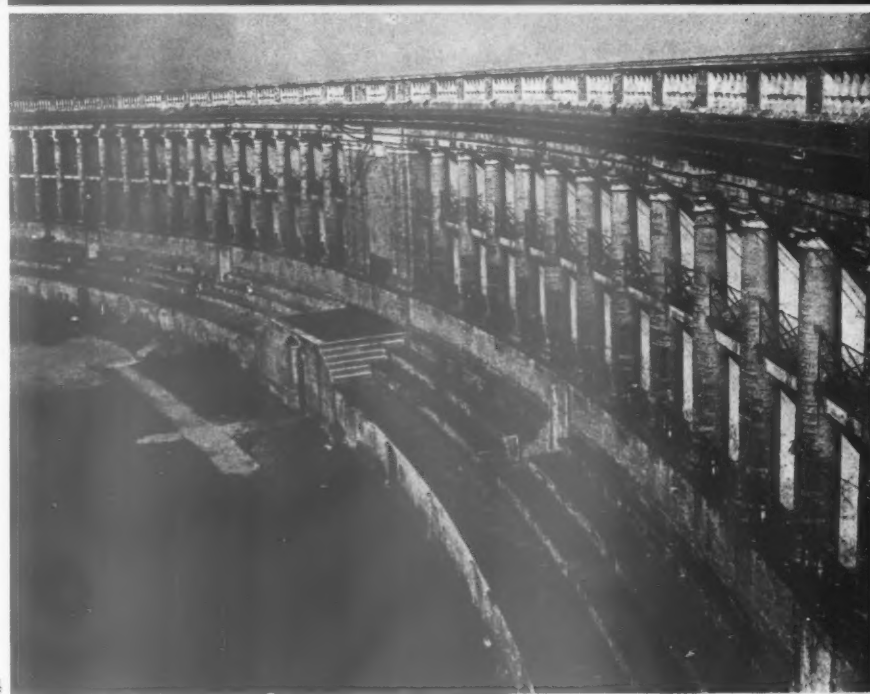
[The miscellany label S.O.S. will be used when needed to draw attention to any deserving cases of beauty in danger. Sometimes it will be a call for immediate action; in other cases, such as Abbey Street, Faversham, described below, it will be an attempt to forestall an outrage by alerting public opinion.]

ABBAY STREET, FAVERSHAM

Faversham is that most elusive of all things, a town which is just off an arterial road—A.2 to Dover,



3



4

Canterbury and Margate. You are either going somewhere else in a hurry or you are so put out by the traffic that you get no farther than the splendid jam at Rochester.

That is a pity. If you turn off the main road you find first of all an exceptionally pleasant Kentish town: sprawling vernacular market hall, encroached market place, system of back alleys still intact—to say nothing of a church steeple which is a copy by George Dance, Senior, of St. Dunstan's-in-the-East, complete with Scots crown, that would brighten up any day's outing. Beyond the market place there is a cul-de-sac—Abbey Street—that

runs down for half a mile to the Swale marshes; and suddenly, as the street narrows, there bursts into view a tremendous curve of c.15-c.19 vernacular building—the sort of thing that you know existed in English towns from old photographs; that you can just sense today in King's Lynn, that you can recognize as having been there, under the pattern of 'redevelopment' in Boston and Norwich and Yarmouth. It is a marvel of unity-in-diversity: a street to demonstrate townscape's Radical Principle if ever there was one. It is hard to credit that the photographs 1 and 2 (overleaf) were taken on a grey morning recently and not fifty years ago.

However, a close look shows peeling plaster on the framing of the house with the overhang in 1, and a walk down Abbey Street would show one or two houses empty, one or two more beginning to look shaky. Most of them are scheduled, even if it is only the purely nominal Grade III, and there is no plan for wholesale clearance. The threat is purely from neglect and piecemeal rebuilding, and the onus fairly and squarely on the private owners of the properties. The fate in store is familiar and inevitable, unless something is done quickly: decay, condemnation, demolition, then replacement—perhaps by a detached bungalow set back 25 ft. from the street line, or a cut-rate pair of shops, all fascia and nothing else.

The tragedy is that it is just this pattern of piecemeal rebuilding that made Faversham into the marvellous place that it is: to oppose it is to break the natural rhythm of small-town growth. But with an existing collective masterpiece, such as Abbey Street, it isn't worth the risk—one can't trust today's by-laws or today's builders or even today's provincial architects. In Basle or Amsterdam it would be a very different thing.

Abbey Street can still be saved, and the best way to help it is to go and see it and make as much fuss locally as you can. Go, in any case, to enjoy a street in the

East Anglian manner which is better than anything in East Anglia: no cosy plaques, no fake timbering, no souvenirs. This is part of the real 'Tourists' England'—for the traveller with eyes, if not the flock of blurb-conditioned sheep.

Ian Nairn

PROJECT

ANTI-PRAIRIE PLANNING

This scheme is an attempt to suggest one form of high-density housing which offers the possibility of a complex and coherent urban pattern.

It is limited to five storeys and uses a net residential density of 136 persons per acre, the normal maximum for London, though in fact no specific site was chosen. The architects are W. and G. Howell, Killick and Partridge.

The S-shaped-wall house unit has an 18 ft. 6 in. frontage. On the road side, the narrow bay is an entrance and staircase link between towers of habitable rooms, which being on the public side can benefit from a higher proportion of solid wall. On the garden side, the narrow bay becomes a tower housing all the services, and the living areas become the link, giving large glazed areas on to the private garden.

The living area is adaptable—one or two rooms per floor, with or without double height or changes of level (which can be used to solve problems caused by changes of level from front to back). As the main living area runs right through the ground floor, the house can face any way, provided the window to the street is increased when facing south or west. The front doors are up a few steps so that the sitting-room is 3 ft. above pavement level. There is a small terrace at this higher level, enclosed by railings, on which babies can be parked to observe the passers-by, or which can form an outside play-pen for mobile infants—with access through the french window into the sitting-room. On sites that fall away from the pavement, this terrace could be replaced by an 'area' in traditional London manner, giving access to an extra floor for use as a playroom, workshop, lettable bed-sitter, resident mother-in-law's quarters, etc. This gives a possible solution to larger houses, still keeping only three floors above entrance level.

Garage-in-the-house solutions were rejected, because with narrow frontages roughly half the pavement becomes cross-overs, and half the ground-floor elevation becomes garage doors. The garages are approached by a mews road with rough

paving, which discourages speeding, and is less likely to be made sordid by oil-stains than a smoother surface. The mews could be double sided, with courtyard flats over the garages, or could form one side of a square. In this case the mews road would be screened by a 6 ft. brick wall, so that the square gardens would not peter out in a scrabble of dustbins and garage doors. The basic frontage allows for two garages—one for the flat or maisonette, but either being capable of being let separately. Some of them could be used as workshops or studios if not required immediately for cars.

The flats or maisonettes over the garages are reached by a raised pavement, screened from the private gardens of the houses by a 6 ft. wall, with ramps at the ends for pram access. The staircase towers of the maisonettes stick out into the walkway, leaving a bay outside each front door for baby parking, geranium cultivation, carpet beating or budgerigar airing.

The houses can also have maisonettes on top of them, set back to form access and private balconies. These, like the maisonettes and flats over the garages, have a large roof terrace, so that each family has an adequate outdoor space for the activities of children, horticulturists and sun worshippers (Londoners appreciate every fleeting moment of sunshine, but have woefully inadequate facilities for enjoying it).

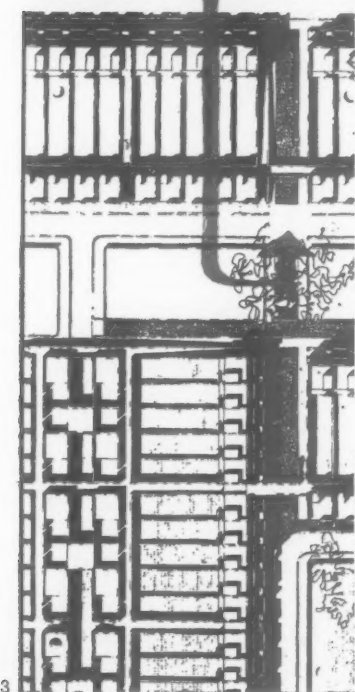
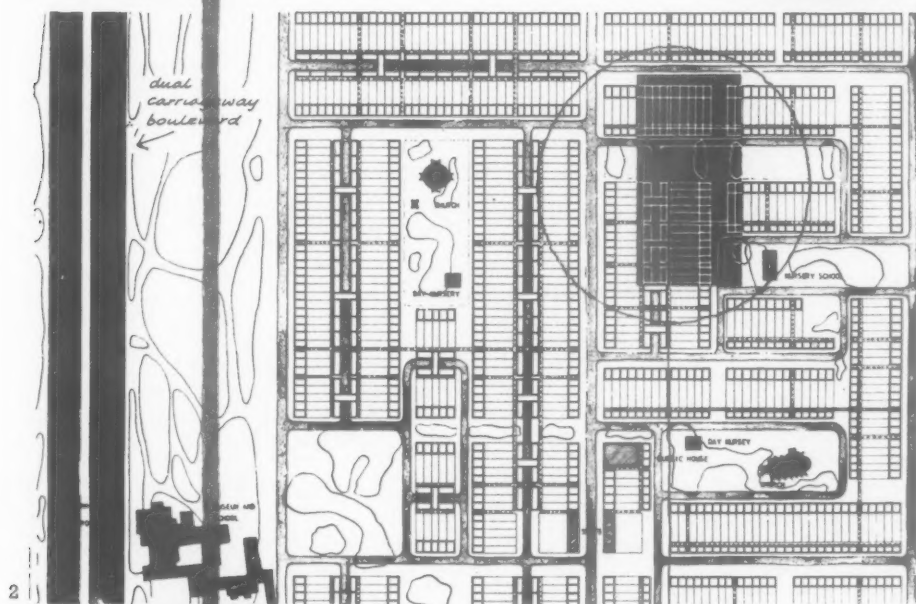
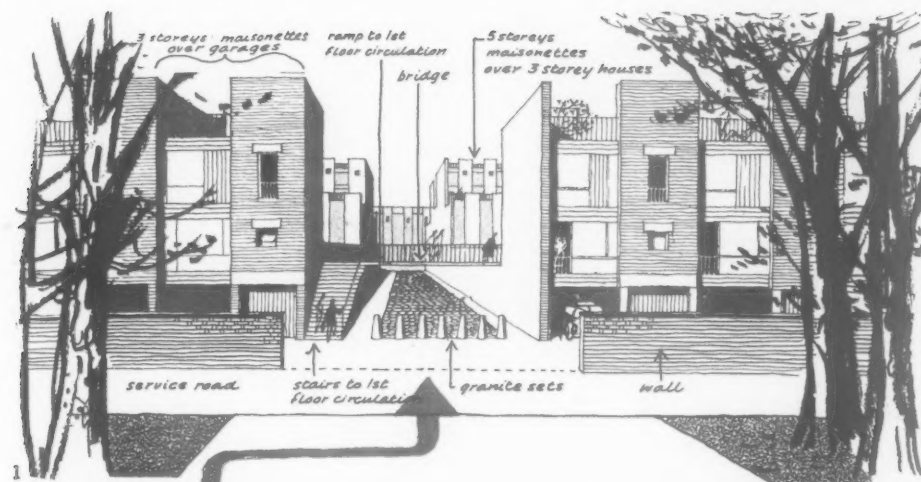
There are alleyways through the terraces at the public staircases at first floor level, linking with the access pavements over the garages. There can therefore be a complete network for pedestrian movement at first-floor level. This means that the maisonettes can be approached (or escaped from) in a variety of directions, which would seem to offer a less restricted feeling than the one-way access balcony.

The five-storey unit makes a high density compatible with wide squares or gardens, which would be large enough for trees to develop to full stature without overshadowing the houses. The gardens could be part public, which could be mainly paving and trees, and part private, enclosed for the use of the immediately adjacent houses, and kept up co-operatively. Shrubs and grass would have a better chance of surviving to enhance the urban scene in such semi-protected circumstances. This arrangement would permit the private part to be used as a supervised kindergarten in the day-time, so that wives could make occasional unhampered expeditions.

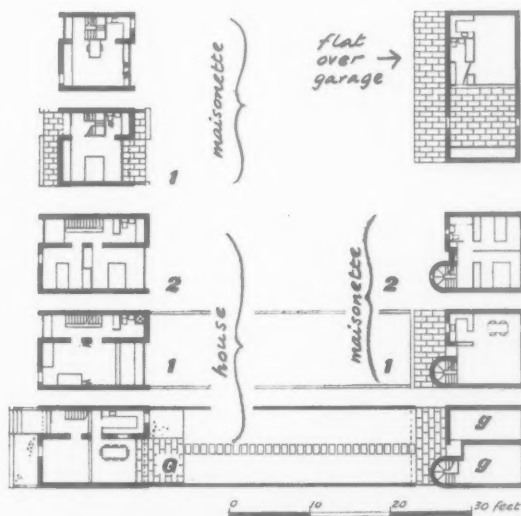
The majority of houses have a road coming to the front door forming a continuous system through the area, with frequent right-angle turns to discourage their use as short cuts between the main arteries of traffic. There are no cul-de-sacs,

1, 2



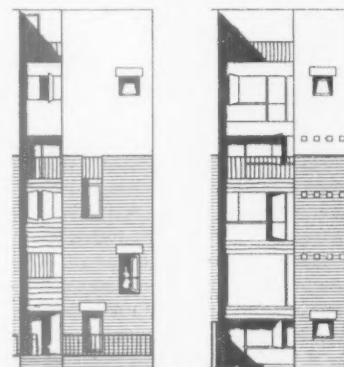


2, 3, plans showing layout of high density scheme. 3 is indicated on 2 by dark area, upper right. same area enlarged



4, left, 3-storey house with maisonette over. Right, maisonette over garage.

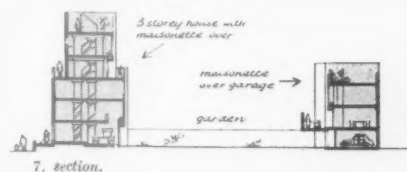
which are very frustrating to the motorist, and are sometimes rather dead and depressing. The 'tower' form of the houses means that the terraces can be stepped down hills, the access balconies having steps or ramps (depending on the degree of slope) behind the solid parapet.



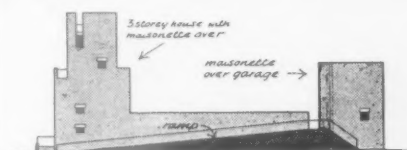
5, 3-storey house with maisonette over.



6, maisonette over garage.



7, section.



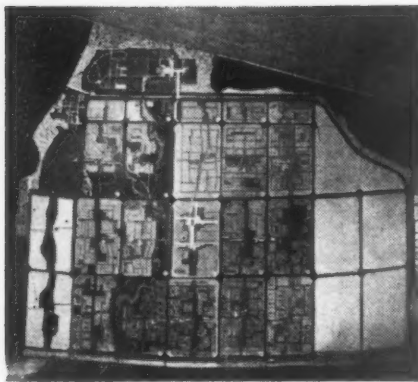
8, side elevation.

This proposal constitutes 'mixed development,' but it is suggested that each site should not necessarily attempt to contain the complete gamut of building types from bungalows to multi-storey blocks, though the city or town probably will. This particular proposal is one form of mixed development limited to five storeys, and assumes that other sites will be solved in terms of high buildings.

TOWNSCAPE

PREDIGESTED PLANNING

It comes as a surprise to realize that the battens which fix the plan of Chandigarh to the wall are not battens



at all but a grid of roads—part of the plan itself, 1. It also comes as a surprise to see bearded Sikhs cycling through Hemel Hempstead and naked Indian children romping in Stevenage, 2 and 3.

Why be surprised? Because Chandigarh is an evocative name, and in our parochial way we load on to it our phantasies, our



hopes of something new and strange, remote and lyrical. A sort of twentieth-century Angkor Vat, an intricacy of dark polished vaults stabbed by slits of blinding light, of cool cisterns reflecting deeply undercut walls of sculpture.

Let us go back to the battens; the phantasy that was destroyed when they were discovered to be roads was surely a quite legitimate phantasy. The plan seemed to have the genuine complexity resulting from the imagination of personal vision in the unborn town. To digress for a moment, the use of a centre line in designing simplifies the work a lot. It

means that having made the original creative line the rest of the problem is taken out of the sphere of creation and resolves itself into the form of cunning useful in packing a trunk. 'Where can we fit this in? That would go over there,' etc.

Similarly, in town planning, one can escape from the exacting task of organic design by drawing a gridiron of roads and then starting to fit things in. Let us conquer the immensity of this vast plain with a formal device so that we can relax; something, anything to shield us from the challenge of continual creation and let us start putting our socks in one drawer and our shirts in another, a civic centre here, a business centre there, and so on.

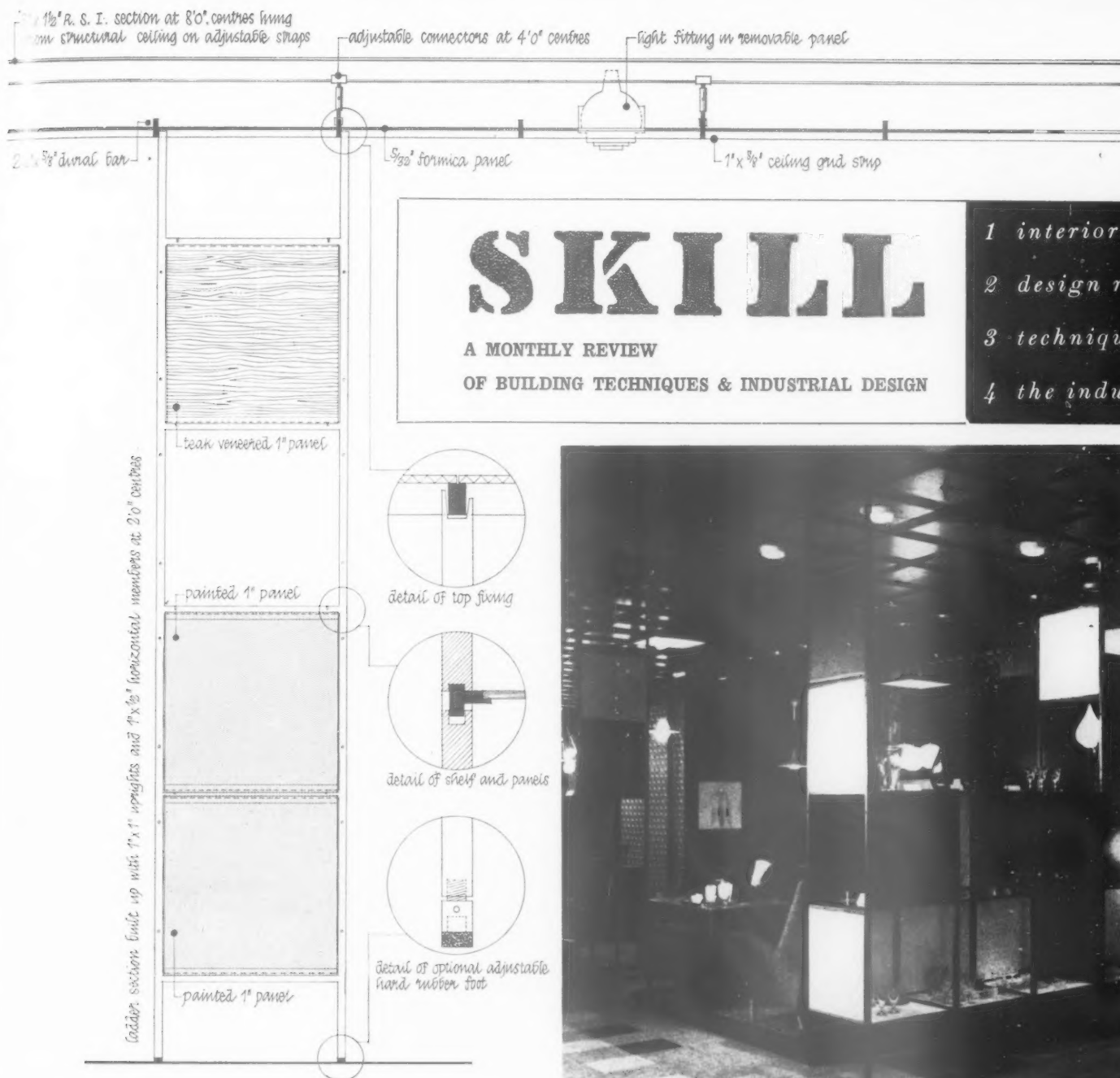
An empty sheet of paper presents just the same challenge to an artist, it is so clean, so ready and so vast (because the line is the experience of one's life). And it is interesting to note that this emptiness can be conquered artificially, by a formal device, as Steinberg shows by his witty comments on graph paper or on a music sheet. Here the paper is predigested and all that remains is to be witty. In the same way the grid of roads provides just such an opportunity for the inspired disposition of utilities, but I would hesitate to equate this with creative design; it is an alibi for it.

Roads there must be, and usable roads (giving rise to the one great contrast of



road and precinct, 4), but to interpret this as meaning a gridiron layout is stretching the point. The necessity for roads has been used to conquer the site visually and so create the predigestion which, in my view, precludes the real art of town design.

Gordon Cullen



SKILL

A MONTHLY REVIEW
OF BUILDING TECHNIQUES & INDUSTRIAL DESIGN

- 1 interiors
- 2 design review
- 3 techniques
- 4 the industry

1 INTERIORS

THE DESIGN CENTRE, LONDON, S.W.1.

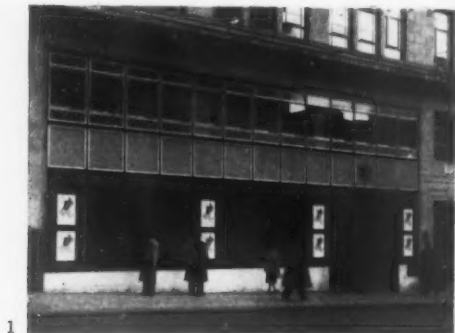
The Design Centre in the Haymarket was opened in April by the Council of Industrial Design to house a permanent but changing exhibition of well-designed fittings, furniture, textiles, etc., indoor and outdoor. The opening exhibition will have partly changed by the time this issue appears, but it has been described in detail because it indicates the whole range of the COID's activities and displays particularly well the flexibility obtained by the use of the modular grid for the ceiling and the display units. Shelving, ladder units, ceiling panels and lighting can all be altered to meet the particular needs of any exhibition.

Interior Designers, Robert and Roger Nicholson



Above, one of the ladder display units showing how it is related to the ceiling grid. A section through a typical unit and details of the fixings are shown above, left.

The Design Centre occupies part of the ground floor of Haymarket House, covering an area of 8,000 sq. ft. on three levels, and including a conference room and



1

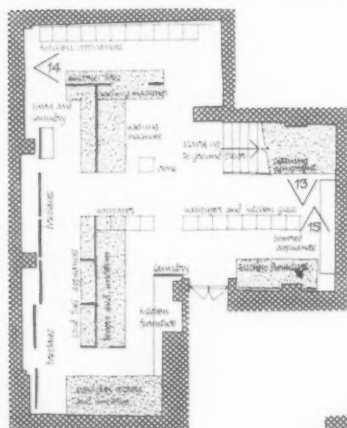
accommodation for the COID's Design Review. The Architects' Department of the Ministry of Works were responsible for adapting the premises, and on the recommendation of the Council of Industrial Design they commissioned Nicholson Brothers to design the interior and the exhibition fittings. Ward and Austin designed the Haymarket front with its two non-reflecting windows.

[continued on page 38]



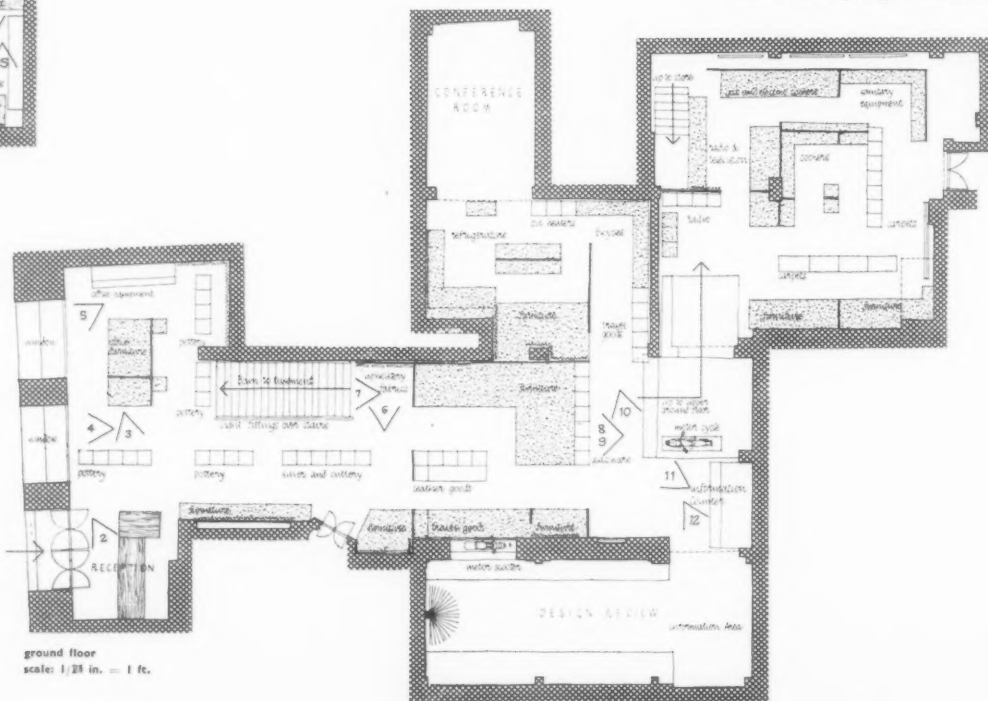
2

1, the Haymarket fascia by Ward and Austin; ironically it is set into one of the most reactionary and lumpish office blocks built in London since the war. 2, the entrance lobby with the green-stained photostat mural of the British lion by Roger Nicholson.

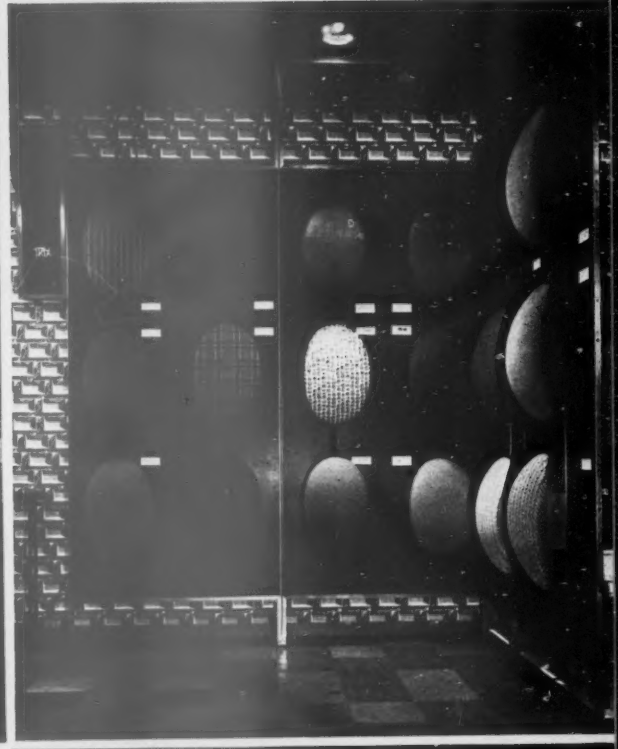


basement

key
The viewpoints on the plans correspond to the numbers of the illustrations on pages 56-60. Ladder units are shown unshaded; platforms have dust-grained shading.



ground floor
scale: 1/28 in. = 1 ft.



3 4
5 6
7 8

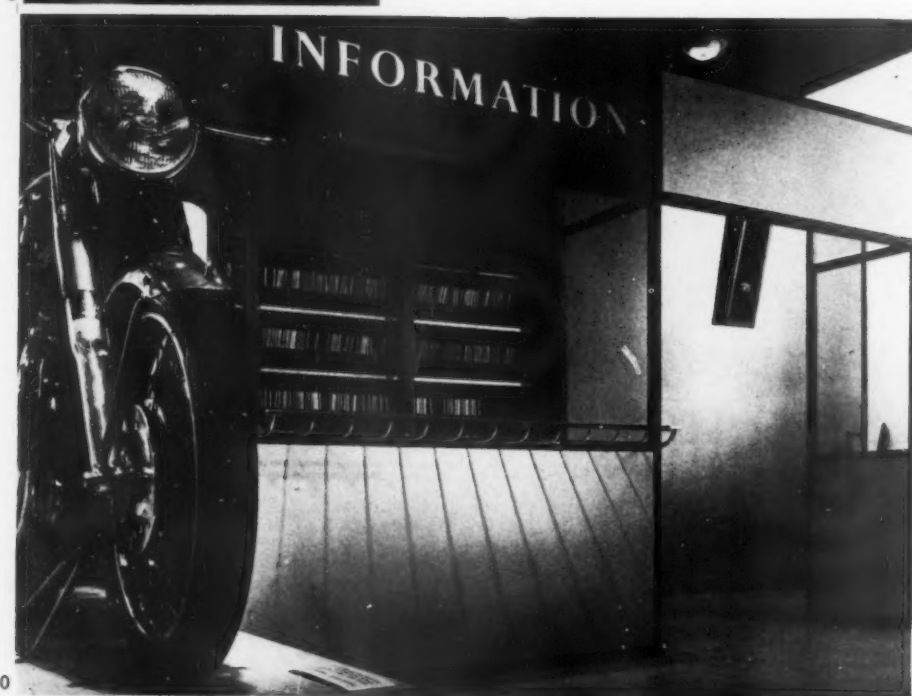
3, looking back to the reception desk over one of the pottery displays. 4 and 5, the two window bays on the Haymarket frontage. 6, display of covering fabrics at the head of the basement stairs. 7, looking down the basement stairs to the washing machines. 8, a window bay framed in part of the glassware holder unit.





THE DESIGN CENTRE, LONDON, S.W.1.

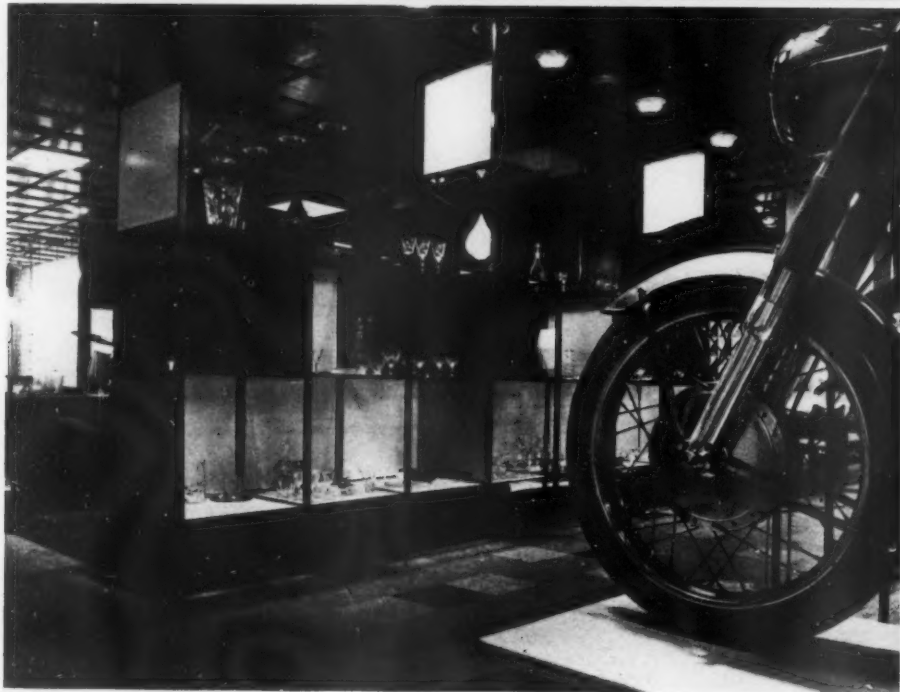
9, looking back down the line of the ladder units from the glassware stand. 10, the information counter and the motor cycle display. 11, the glassware stand from the information counter; and 12, looking past the counter into the information area. The space set aside for Design Review is round the corner on the right.



continued from page 56]

The Nicholsons' problem was to make the interior arrangement flexible enough to be at once a permanent and a changing review of well-designed goods. The display fittings had to be unobtrusive, easy to erect and dismantle, and able to be lit as needed. The key to their solution is a grid system on a module of two feet. A suspended aluminium ceiling grid is filled in with interchangeable coloured melamine plastic panels—for which panels containing various types of display lighting can be substituted. Thus there is the utmost flexibility in the lighting system, with spot lighting available where needed, and general lighting movable according to the layout of an exhibition. Aluminium ladder units, anodized slate grey, can be fitted between the floor and ceiling, and the 12-in. linoleum tiles line up with the ceiling grid so that they can be set vertically. Partitions either 2 ft. or 4 ft. wide can also be erected to divide up the areas and to act as backgrounds to larger exhibits. The ladder units are variable in size and are intended mainly for the display of smaller articles. Other display fittings include shelves, small panels and showcases which can be fixed either to the vertical partitions or to the walls. There are also display tables and raised platforms. Most of the horizontal display surfaces are covered in PVC plastic; the shelves of the ladder units are made of glass. The vertical display surfaces are covered in felt and their background, i.e., the parti-

[continued on page 59



continued from page 58]

tions or walls, are either painted or veneered with rosewood.

The rectangular grid pattern of Ward and Austin's fascia relates it, through the module, to the interior. The non-reflecting windows not only provide a view from the pavement right through the 100-ft.-deep run of the main floor, but can accommo-

date self-contained displays; the fascia includes both mezzanine and ground floors within a single unit. Just inside the entrance is a photostat mural representing the British lion, by Roger Nicholson, and a specially designed reception desk of grey pickled sycamore with a Macassar ebony top, set against a mauve wall.



13



14

THE DESIGN CENTRE, LONDON, S.W.1.

Three photographs of the basement: 13, the display of cleaning equipment and public callbox under the stairs from the main showroom. 14, part of the display of household goods: kitchen appliances in the ladder unit on the left; electric fires on the platform on the right. 15, a corner displaying kitchen furniture textiles and powered appliances.



15

2 DESIGN REVIEW

Swedish Hollow-ware

Stainless steel handsome, valuable, labour-saving and unbreakable. Is it simply an oversight that it is not the standard coveted tableware of this century? The cost is high but that is not always considered a disadvantage, and it can be offset against breakages.

The pieces illustrated are designed by Folke Arnstrom, made by Gense, Eki'stuna, Sweden, and marketed here by Finnmar Limited. As well as excellent workmanship and simplicity, these designs have a weight and dignity not always found in contemporary work.

Diana Rowntree

Moulded Plywood

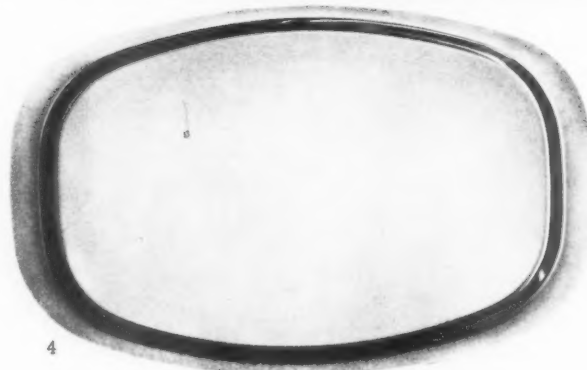
Chairs

Arne Jacobsen has designed two four-legged chairs, 5 and 6, from the same elements as his classic three-legged design. The broader base is off-set by wider support to the shoulders. Visual elegance is less than in the three-legged design but not as much less in fact as in the photograph. The chair legs are in brushed steel, with rubber feet. This admirable practical arrangement does not add to a chair's elegance. These chairs are made by Messrs. Fritz Hansen and marketed in this country by Finnmar Limited. As stacking chairs they carry no tax.

D.R.



- 1, fruit and bread server, 9½ in. long, £2 15s. 6d.; 11 in. long, £3 9s. 0d.
2, square dish, £4 11s. 0d.
Casserole, £5 1s. 3d. The forthrightness of these designs, reminiscent of the best unpretentious Victorian design, is the outcome of assurance, and a welcome change from much strivingly contemporary work.
3, open vegetable dish, 1 pint size, £2 1s. 0d.; 1½ pint, £2 8s. 9d.
4, serving tray, 19 in. long, £5 2s. 6d.



5, this chair* is produced in teak or palisander, or in a black finish. Black, £7 16s. 0d.; teak, £8 10s. 0d.; palisander, £11 0s. 0d. A modification of the design is made with arms. 6, produced in beech at £5 17s. 0d., or in black at £6 10s. 0d.



The Carlton Lavatory

Makers of sanitary fittings have in the past frequently changed their designs, but have usually been concerned with their being 'up to date' rather than graceful or even functional. It is encouraging to note that Messrs. Shanks are, in redesigning their range, taking the



7, The Carlton Lavatory.

visual element more seriously. The Carlton lavatory seen in isolation is not the inherent distinction of Adamsez Lotus, illustrated in November Skill. It could however be seen at Heals' spring exhibition that it is very well in the spirit of contemporary interior design. Its breadth and shallowness fitted in to the idea of designing a bathroom with a long work-table like a kitchen, and looked elegant and unassertive. The chromium stand, taps, and waste are extremely well designed.

Approximate retail price of the 27 in. basin with chromium stand, £17 12s. 9d. The trap £3 10s. 9d. D.R.

Exhibition Stands

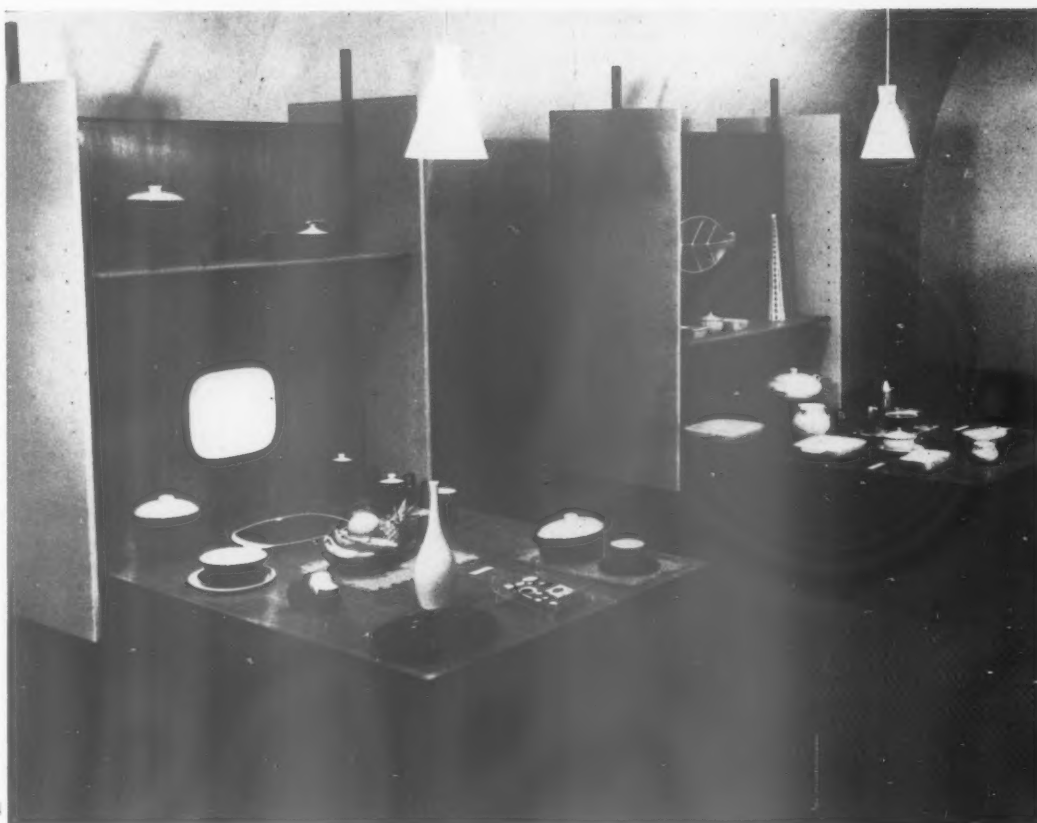
These stands, 8, designed by Robert Wetmore for an exhibition of Denby Pottery were particularly successful in providing plentiful display space, and quietly creating a stimulating and expectant atmosphere. The use of plain metal channel and the simple construction of the movable shelves emphasises their temporary nature and dissociates them from the exhibits, while the use of a different veneer for each stand flatters the contents. The height of the table top and the proportions of the stand have been designed with mastery, to give a generous and leisurely effect. The detailing of edges has been well considered and eye-catching prettiness of detail carefully avoided. D.R.

Two Notable Easy Chairs

The two chairs illustrated successfully demonstrate contrasting techniques of design.

Dux 2, a Swedish fireside or casual low chair marketed by Finnmar Limited, 9.

The extreme simplicity which is the virtue of this design is the result of approaching the problem from the angle of structural analysis. The structure is an assembly of turned wooden members, with flat battens to support the seat cushion. The upholstery takes the form of two rectangular Dunlopillo cushions, their stark outline contrasting with their



considerable comfort.

This chair can be used as a unit to build up long seating, very unobtrusively. But when it is used singly its well considered frame gives it individual elegance, and it never looks like a slice of settee. The frame is in natural beech, grey, or black.

Prices are according to the fabric chosen for the covers. These approximate retail prices include tax. In cotton, £12 10s.; in wool, £14 5s.; in unika or cumulus, £16 10s.



9, left, Dux 2, from Sweden. 10, above, The Heron, by Ernest Race.

THE HERON, a larger easy chair designed by Ernest Race for Ernest Race Limited, 10.

Here frame and upholstery are used as a synthesis. The intention, to exploit the possibilities for free shape offered by welded steel used as a frame for upholstery. The designer has not only used this freedom to

produce an inviting looking chair on generous lines, but its elegance and spareness mark an important step forward in his work. Hitherto Race chairs have suffered from a slight primness, sometimes about the neatly tapering legs, sometimes a fat look about the upholstery seeming to guarantee one's money's worth of

comfort. The Heron, while using the exactitudes of mass production, has achieved a fineness of line, an almost rickety look which brings humanity and vitality into the lines of an interior. It may be mere fashion which at present seeks for this quality in design. I think not, preferring to see the quality as one sought after in salerooms, belonging to the simplest seventeenth and eighteenth century cabinet work, and to real and revival Gothic. This quality of stark

attenuation has been suggested as one of the poles of Englishness. If so it is as appropriate as it is unexpected to find it in the work of this most English of personalities.

It is always an event when mass production turns out true elegance instead of the good second best. May this spindly Heron prove as economic as the well-stuffed Dormice.

Construction note: Polyurethane foam is applied to the steel frame, supported on Pirelli webbing, and

made up into reversible cushions. The steel legs have a satin chrome finish and are fitted with Armstrong furniture rests, which give a good bearing surface and slide easily.

Export: For economic packing and shipment the chair hulls can nest, and the legs be packed separately.

Prices, which include purchase tax, vary according to the covering fabric. In range 3 fabric, £28 12s. 3d.; in range 2 fabric, £30 3s. 10d.; in range 1 fabric, £32 12s. 8d. D.R.

level. The question of temperature gradients and the precise behaviour of warm air in heated interiors are difficult to be certain about, and although much research on the matter has been carried out, it is still at an early stage.

The essential requirement of a recirculated warm-air system is a heat exchange battery over which the air passes to raise its temperature. The simplest type is that in which the battery is exposed in the heated space, the air movement being caused solely by convection due to the battery itself. The conventional column-type 'radiator' is an example; even simpler forms are ordinary pipe runs and gilled tubes.

By enclosing the heater battery within a special casing, the natural convective air-flow can be increased, so cutting down the size of the battery, 1, and the weight of transmission medium for a given heat output. This reduction in the 'thermal mass' of the installation is one of the main reasons for the shorter time-lags associated with warm-air systems. Also, the casing provides protection of the battery against accidental burning (it will never be hotter than the emission air temperature), so that higher water or steam temperatures may be used, or batteries running on electricity or gas.

A fan may be introduced into the casing to increase the air-flow further, and this principle is often referred to as 'forced convection.' A distinction should be made here, however, since beyond a certain speed of air-flow, and depending on the position of the warm-air outlets in the room, the movement of air in the heated space ceases to be what is generally understood by convection.

Apart from the greater heat output, one advantage of using fan-power is that two useful variables are obtained: the temperature of the battery, and the speed of the fan. Both of these can be controlled thermostatically and by time-switch, and by making good use of this possibility very sensitive systems may be designed.

As has been said, the most efficient systems tend to be those recirculating large volumes of air, but in practice the quantities which can be moved by a propeller fan are limited. This type of fan, even if driven by a very silent motor, begins to make a noise when the tips of the blades reach high speed (the tip-speed considered to be the limit for quiet operation is 3,500 f.p.m.). Beyond a certain point centrifugal impellers, 2, must be used, and the initial cost of these is high.

For many industrial purposes, however, noise is considered not so

3 TECHNIQUES

RECIRCULATED WARM-AIR HEATING

by Robert Maguire

The number of different types of heating system is now so large as to defy any simple classification. The authors of a current textbook have attempted a classification under two main headings: direct and indirect; direct systems being those consuming the fuel within the heated space and subdivided according to fuel type, and indirect systems being those in which the fuel is consumed elsewhere, subdivided firstly according to transmission medium (e.g., hot water, steam), and secondly according to fuel type. This classification is a useful one for those concerned with the detailed design of heating systems. Architects, however, have tended to approach the problem in their own characteristic way, making the end-product as a basis for classification. Here, the three main headings are primarily warm-air, primarily radiant, and combined systems.*

* Faber and Kell, *Heating and Air-conditioning of Buildings*, Architectural Press, 1951.

Personal comfort is a highly subjective sensation where the heating of buildings is concerned, and although scientific principles have been applied and produce evidence that combined radiation and warm-air systems offer the highest degree of theoretical comfort, there are bound to be many people with preferences which contradict this. An official survey* of a number of schools using various heating methods showed that the occupants professed to be satisfied in all cases where the heating, by whatever method, fulfilled its design requirements. It is not therefore proposed to answer here the objection sometimes heard, that recirculated warm-air heating as such has drawbacks as far as comfort goes, although some matters of actual arrangement of the systems which affect comfort are important and can be dealt with.

The great advantage of recirculated warm-air systems, not found in other types, is their quick response to control. With even the simplest type of installation, this means a shorter warming-up time, and with the more advanced forms (for which equally advanced control mechanisms have been developed) the 'heat machine' may be so sensitive to changing conditions and intermittent occupation of the building as to procure very large fuel savings.

From this it is evident that a warm-air system is an obvious choice for buildings which require heating

intermittently, whether this intermittency is short-period or long-period, e.g., schools, which are occupied almost daily but then only 30 per cent of each day; or halls and churches, which may be occupied only one day in the week.

In addition a form of warm-air heating has been developed for use in factories and workshops, where less exacting requirements are found, which circulate warm air so rapidly that its effect is immediately felt. In this way the time-lag, at least at the transmission end of the system, is almost eliminated.

General principles

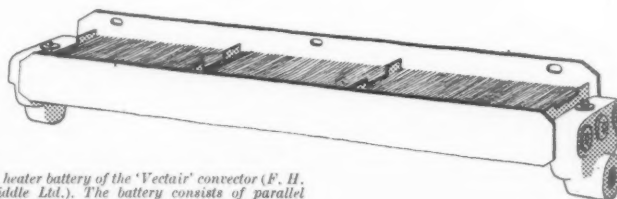
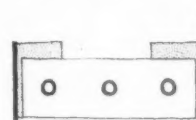
Since warm air rises, the air immediately under the ceiling of a heated space tends to be hotter than that in other places. This is so for all types of heating methods, with the possible exception of radiant floor systems, but is obviously most pronounced with recirculated warm air. The vertical temperature gradient may be so extreme as to give a difference of 20°F. or more between working or sitting level and ceiling level.

Since heating systems are generally designed to satisfy a given temperature at the lower level, it follows that excess temperatures above that point are wasteful. Not only will the system have to produce a greater quantity of heat to attain the design temperature, but there will be increased heat losses through the ceiling and by natural ventilation,

for air usually leaves the building at the upper levels.

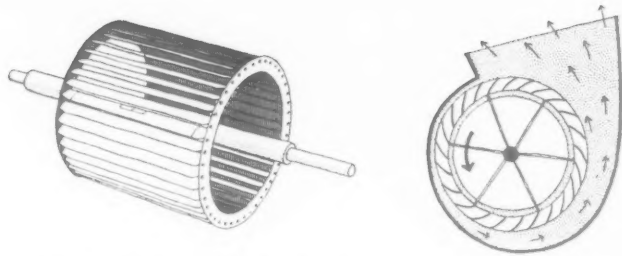
Some method of reducing the temperature gradient is therefore necessary if greater economy is to be achieved. Most of the various forms of warm-air heating have their own characteristic way of dealing with this problem, but it may be said that in general those which discharge a large quantity of air at a relatively low temperature are more successful in this way than those emitting a smaller quantity of very hot air. One other factor is the height at which the air is discharged; low-level discharge tends to produce a smaller gradient than high-level discharge.

There is one point, however, which works against what has been said. A layer of very hot air against a ceiling will warm it, if it is well insulated, to the same temperature; the ceiling will then act as a low-temperature radiant panel and add considerably to comfort at working

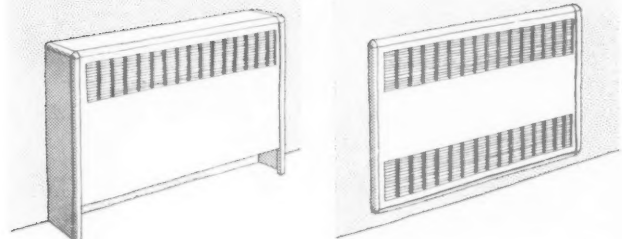


1, heater battery of the 'Vectair' convector (F. H. Biddle Ltd.). The battery consists of parallel pipes in contact with metal fins (section, top); this arrangement is typical of hot water and steam batteries for all kinds of warm-air equipment.

* Carried out by the Building Research Station and published in MOE Building Bulletin No. 13, H.M.S.O. 1955.



2, centrifugal impeller fan (C. A. Dunham Co. Ltd.)



3, the 'Vectair' convector (F. H. Biddle Ltd.). Left, cabinet model; right, concealed model. Natural convectors of this type are available in a large range of sizes. Maximum heat outputs (for a convector 73 in. long by 42 in. high) are 20,000 B.Th.U./hour with low pressure hot water, and 40,000 B.Th.U./hour with steam. The largest electric model has an hourly output of 10,000 B.Th.U.

important, and units are made which use propeller fans running at high speeds. Industrial unit heaters take many forms. They may be conveniently divided into overhead and floor types, although some are designed for flexibility of position.

Natural convectors

These may be regarded as a substitute for orthodox 'radiators,' although their manner of heat emission is not quite the same—radiators do in fact emit a small proportion of their heat as radiation (they should not be confused with panel-type radiators, which have a much larger radiant component).

The units are compact in design, standing about 30 to 40 inches high, and may be unobtrusive free-standing cabinets or concealed in shallow recesses in the wall, 3. Their height is governed by the flue effect of the casing; this increases rapidly with the height up to about 36 inches and then falls off again owing to the resistance of the casing to the air-flow. They are installed as close as possible to the floor in order to pick up the colder air. As a result the warm air discharge will be at a fairly low level, and this helps to lower temperature gradients by allowing the stream of warm air to expand and spread its heat early on its inevitable journey to the ceiling. To assist this effect the discharge grilles have louvres which direct the air somewhat downwards and away from the unit rather than allowing it to come straight out and upwards.

Units are obtainable to run on low or high pressure hot water, steam, electricity and gas. Electrical heater batteries generally consist of high-temperature elements of nickel-chrome; gas batteries of a combustion chamber surmounted by 'heat dispersal tubes' through which the hot products of combustion pass before mixing with the heated air. Gas convectors generally run hotter than the other types, and the discharge of the products of combustion into the room calls for good ventilation

if healthy conditions are to be maintained.

Being rather limited in individual heat output, a number of units would be necessary to heat a space of any size.

Silent forced warm-air units

These units are not, of course, absolutely silent, for the electric motor, the fan and the resistance of the heater battery to the air-flow

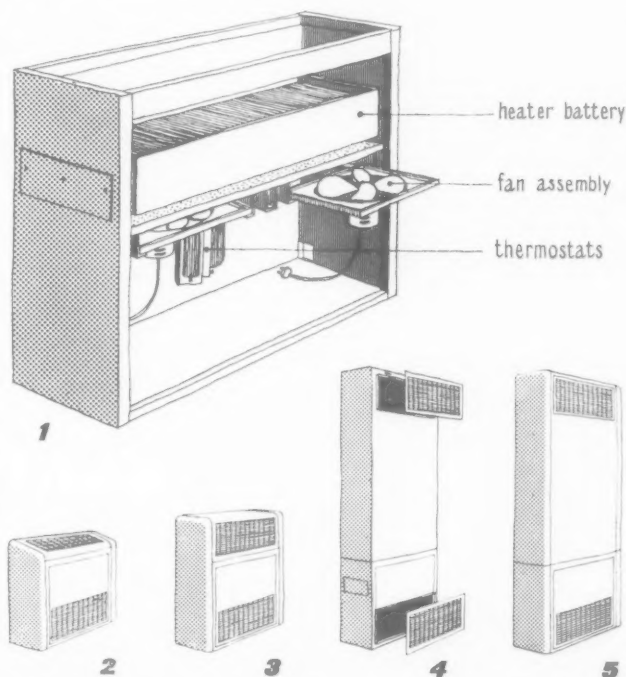
all contribute to produce noise. The noise level is, however, kept as low as possible consistent with output, and even when installed in quiet places such as libraries is not found to be objectionable.

Each unit consists of a duct casing within which an electric fan or impeller and a heater battery are mounted, with grilles for intake and discharge at the ends. Since the air-flow is forced, the duct need not be arranged vertically as in natural convectors, although most standard models adopt this arrangement. A common type of layout is to use a basic unit containing the essential mechanism, with various extension pieces and loose grilles, 4. In this way the unit may be built up into low or high, freestanding or recessed forms.

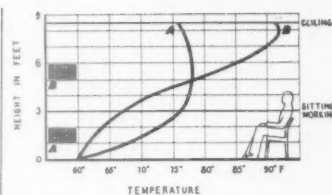
It has for long been thought that the best position for discharge grilles was at a fairly high level, the principle being to let the warm air into the heated space somewhere near the ceiling and continually to force down the hot air already there from above. A number of interesting tests[†] have been carried out in one of the Hertfordshire schools (in which this form of heating is a well-known success) in order to find out, among other things, the position of the discharge grilles which would give the lowest temperature gradient. Here the manufacturers, Weatherfoil Heating Systems Ltd., adapted their units to operate either vertically, with the discharge grille at a height of 5 to 6 feet, or horizontally, with the grille at 1 to 2 feet.

The low-level discharge arrangement gave the lower over-all temperature difference (about 15°F.) between floor and ceiling, 5, but most of this difference occurred in the first few feet above the floor, the upper part of the room remaining fairly constant. The high-level discharge arrangement gave a very high temperature difference (about 32°F.) but the

[†] Reported in full in MOE Building Bulletin No. 13.



4, silent forced warm-air units (Coppered Ltd.). 1, basic unit, consisting of a chassis on which the essential equipment is mounted; 2, top discharge model, formed by the addition of grilles and end covers to the basic unit; 3, front discharge model, built up in a similar manner; 4, high-level discharge model with loose grilles, for building into a recess; basic unit plus extension; 5, high-level discharge cabinet model. These units give heat outputs of up to 55,300 B.Th.U./hour for low pressure hot water, 103,200 B.Th.U./hour for high pressure hot water, and 58,800 B.Th.U./hour for low pressure steam.



5, temperature gradients given by warm-air discharge at heights of 1 to 2 ft. (A) and 5 to 6 ft. (B), in a room 8 ft. 6 in. high.

gradient in the lower levels was more reasonable. A large difference in temperature between one's head and feet can be objectionable,[‡] and so it seems safe to infer that one arrangement gives less heat loss while the other slightly greater comfort.

It is assumed that the reason for the smaller temperature difference given by the low-level grille is that the 'jet' of warm air is able to spread its heat rapidly to the air surrounding it, while that at higher level is to some extent prevented from doing so by the ceiling.

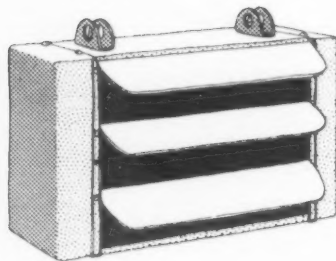
Some makers are now producing horizontal-type units, and besides their more usual positions these can be built into such places as counter-fronts and under the stage in assembly halls.

One method of automatic control which has been developed for this type of system regulates both fan-speed (i.e., air-flow) and battery temperature. The fan has two speeds; fast, for initial warming-up, and medium, for normal running. Occasionally a third speed is used for 'tick-over' periods, but it is generally considered that the fan may be stopped for this. The fan is switched on and off, and its speed governed, by a thermostat situated in the heated space itself. The temperature of the heater battery is regulated centrally from the boiler, which has a thermostat coupled to an outdoor compensator. The two variables are linked, since a reduced air-flow will cool the battery less, and this will reduce the heat demand on the boiler, which will begin to shut down. In such a way many rooms may be heated to different temperatures from the same central plant, while all of them control their own heat requirements. Every small saving in heat requirement in each room will be reflected as a fuel saving.

Industrial unit heaters

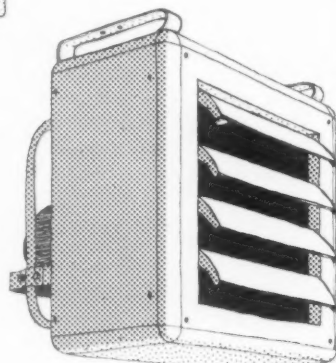
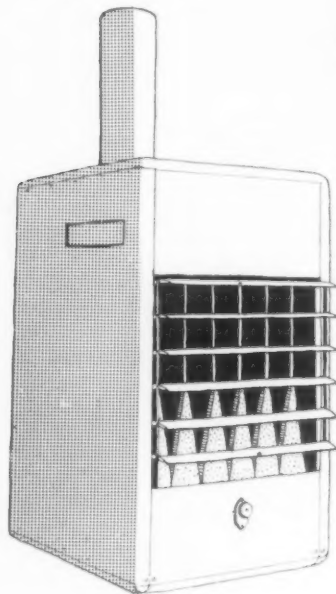
Overhead Units. These are being used increasingly in factories, particularly where floor space is valuable or where periodical arrangement of plant requires an unobstructed floor. The units are hung from the ceiling or the roof trusses, and draw in and discharge air at the same level. By taking air from high level, where it tends to be already fairly warm, the unit does not need to raise its temperature through so great a range as would be necessary if it were taken from near the floor. Also there is less possibility of picking up floor dust, which would both clog the battery and be spread into the air. On the other hand, unless the colder air at floor level is warmed, it will continue to cool and the vertical temperature gradient will become progressively greater. Overhead units are therefore designed to project the warm air with considerable force towards the floor. For mounting heights of about 8 to 14 feet there are horizontal discharge models,

[‡] The floor level temperatures were the same in each case.

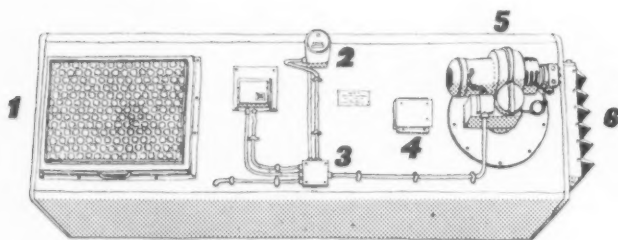


6, left, 'Uniceaire' overhead industrial unit heater, for operation with hot water, steam or electricity. This type of unit heater consists of an electric propeller fan mounted immediately behind a heater battery. It is made in a very large range of sizes, varying in heat output from 17,000 to 260,000 B.Th.U./hour. They may be used to fan unheated air in summer.

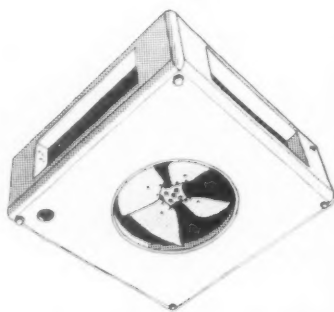
7, right, Hursaal electric unit heater (Hursaal Ltd.). The heater battery of this unit is a nickel-chrome high-temperature element of nest formation. Available in three sizes, 2,625 kW, 5,25 kW and 10.5 kW; these loadings correspond to heat outputs of 8,950, 17,900 and 35,700 B.Th.U./hour.



8, left, an indirect gas-fired unit heater (Harris Engineering Co. Ltd.). The burning gas heats a pressed steel venturi tube, through which an electric propeller fan blows the air to be heated. The products of combustion pass out of the heater through a flue at the top, and are not projected into the heated space. This is especially important where industrial heaters are concerned, for apart from the matter of health, the products of combustion, if discharged into the interior of the building, tend to corrode structural steelwork. The heater also incorporates thermostatic control, and an overhead cut-out. It is available in three sizes, rated at 50,000, 100,000 and 140,000 B.Th.U./hour.



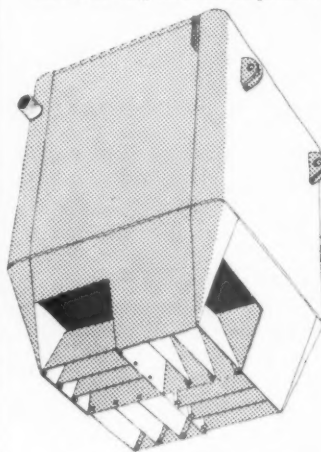
9, an oil-fired industrial unit heater (Harris Engineering Co. Ltd.). 1, air intake grille with filters; 2, fan and limit control; 3, switch for operating fan without burner; 4, inspection door; 5, oil burner; 6, air discharge outlet. The oil burner, which is fed by a small diameter pipe from a storage tank, fires into a stainless steel combustion chamber. The hot products of combustion pass through a heat exchanger, consisting of parallel flues, and out of the unit into a flue pipe. Air is drawn in through the filters by a centrifugal impeller fan, and forced between the flues of the heat exchanger and then over the combustion chamber, to be discharged at a temperature of about 160 F. through the outlet louvers. The heater is equipped with completely automatic controls, which ensure that no air is circulated until the heater has warmed up; that the heated space is kept at a constant pre-set temperature; and which attempt twice to re-establish normal operation should the flame or burner fail. The model shown is intended for overhead operation; a vertical type is also available which stands on the floor. Heat outputs vary with size from 75,000 to 300,000 B.Th.U./hour.



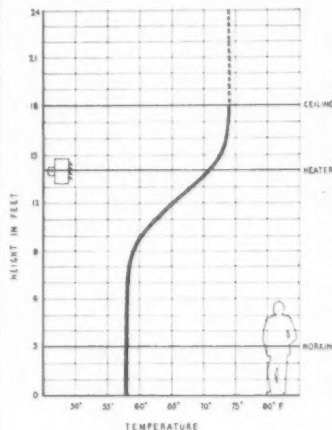
10, the 'Projectaire' downward discharge industrial unit heater (F. H. Biddle Ltd.). Indented for mounting heights from 14 to 36 ft., this type of unit heater gives a greater floor spread than the horizontal discharge type. An interesting feature is the position of the fan, which is on the discharge side of the heater battery. This arrangement, necessary for reasons of compact design, also gives a more definite jet of air which reaches a greater distance. Heat outputs vary from 40,000 to 300,000 B.Th.U./hour for low pressure hot water, and from 70,000 to 400,000 B.Th.U./hour for steam.

6, 7, 8 and 9, which have louvers to deflect the air stream downward at an angle. Above this height vertical discharge units, 10 and 11, become necessary; these give a very powerful jet of warm air with a wide floor coverage.

An interesting form of temperature



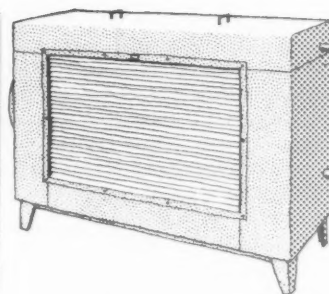
11, the 'Downstream' industrial unit heater (Copperad Ltd.). Similar in function to that shown in 10, this unit is fitted with louvers to deflect the heated air to some extent sideways.



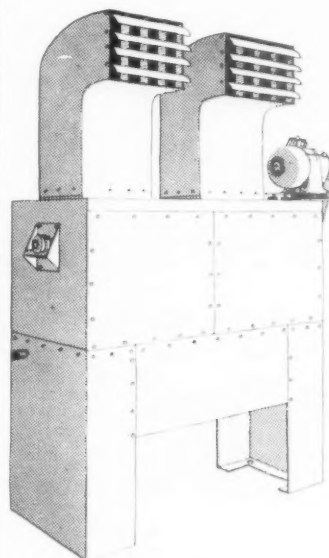
12, typical temperature gradient given by overhead unit heaters.

gradient, 12, is obtained with overhead industrial units. The temperatures are fairly even in the important lower levels, and then climb rapidly until a level just above the heaters is reached, above which the air temperature remains constant. This is due to the fact that there are two separate air-movement zones, one above and one below the level of the heaters. Conditions are good at working level, while the even temperature above heater-level is fortunate from the point of view of heat loss since there is no large increase immediately below the ceiling. The position of the kink in the curve depends only on the mounting height of the heaters; the height of the ceiling does not have much effect on the situation.

Floor Units. There are two types of industrial floor units, the one a heavy-duty version, 13, of the 'forced convection' type already described, and the other a high velocity projection type, 14. These last send a stream of warm air 30 to 40 feet; special nozzles discharge the air in any direction. They are ideal for factories where overhead mounting is impracticable, as for instance where there is a travelling gantry crane. The discharge temperature of the air is moderate, and



13, floor type industrial warm air unit (Weatherford Heating Systems Ltd.). Available in three sizes; 50,000, 75,000 and 100,000 B.Th.U./hour.



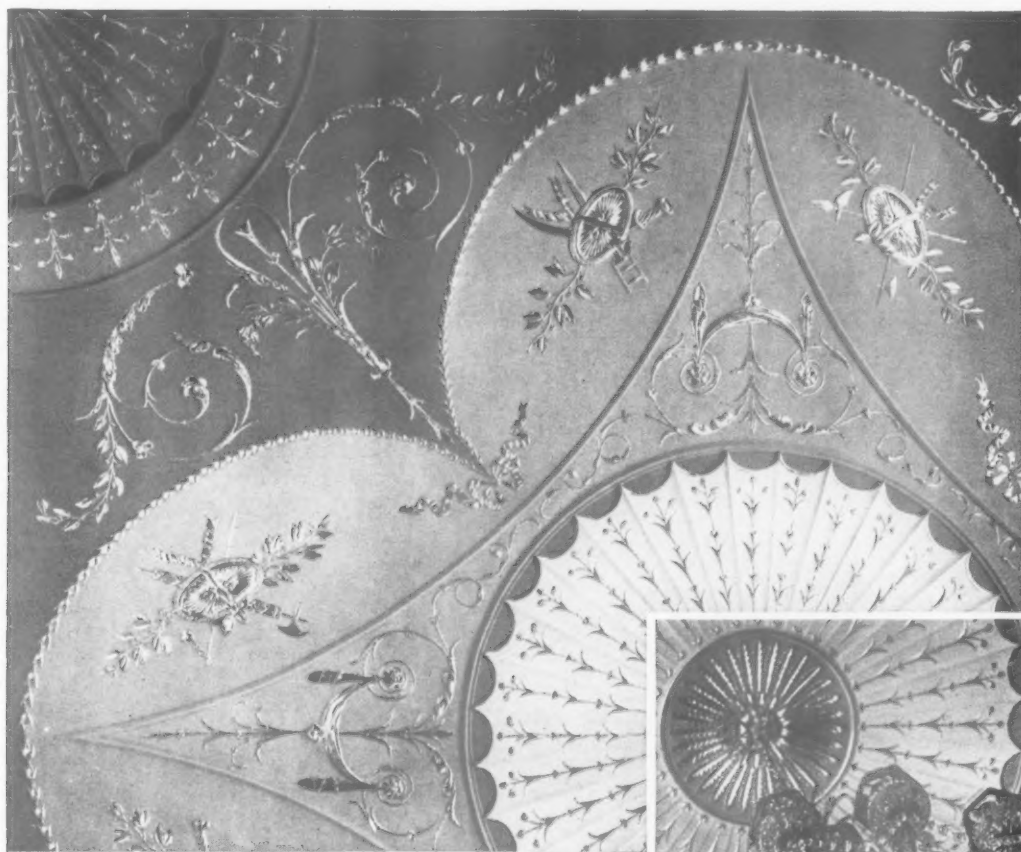
14, 'Jetstream' heavy duty unit heater (Copperad Ltd.). Although these heaters generally stand on the floor, they are also made without legs and with special nozzles for mounting in any position, vertical or horizontal. They send a jet of hot air over a great distance, making them ideal for factories where the only position for heaters is along the side walls. Average output for this type of heater is about 300,000 B.Th.U./hour.

the nozzles somewhat above head level, so that the stream of air is not objectionable. Hot water and steam types have a heavy finned heater battery and a centrifugal impeller to each nozzle; models are available with one, two or three nozzles. A direct oil-fired version is also now available.

Direct fired stoves

One last type of warm-air heating system which should be mentioned is the warm-air stove. This has a much longer history than the other types described. Large freestanding stoves with gilled fireboxes, fired with coke or coal, were once a common form of church heating, and many are still to be found. The next development was to put them in a chamber below the floor, fed with air by natural convection through short ducts with floor grilles. The early forms of stove were very primitive in design, and almost always received the minimum of maintenance. Complaints are still heard from time to time when these old installations fail (generally producing asphyxiating fumes when the firebox burns through) and as a result they have fallen into disrepute among heating engineers.

There is no reason, however, why this method of heating should not be satisfactory given a higher



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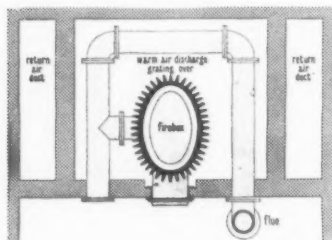


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standard of design. One such improved system, 15, has been installed in a number of recent buildings, mainly churches, with extremely good results. It consists of an elliptical fire-box, built up vertically in sections, with exterior gills. The flue pipe, which may be taken off the top, back, or side of the firebox, is arranged to turn a complete loop around the heater before discharging into the main flue stack. This gives a maximum area of heat emission

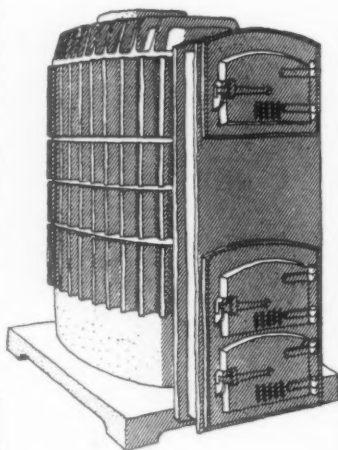


15, the 'Hestia' air heater (John Grundy Ltd.). The heater may be fired with coke, oil or gas. It consists of an elliptical firebox with gills, which stands in a brick chamber. Cold air enters the chamber near the bottom through ducts and warm air leaves through a grating or duct at the top.

surface, and cuts down heat losses in the flue. The heater and flue coil stand in a brick chamber, which has a short warm-air discharge duct ending in a grille in either the floor or wall of the heated space. Return air ducts enter the chamber at low level. The air circulation is usually by natural convection (although fan assistance can be provided, for installations where this is inadequate) and the ducts must be big since the

system relies on the delivery of a large volume of rather hot air at low velocity.

The heater may be fired with coke, but the shape of the fire-box and the arrangement of the flue pipe make it very efficient when oil-fired. Oil-firing itself has the advantage that it is capable of sensitive thermostatic control. Since there is no water to heat up in the system it begins to deliver heat very soon after firing has started and may

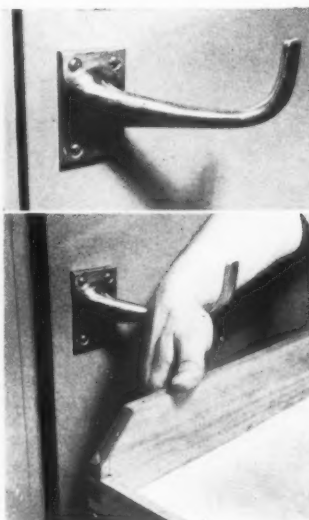


also be left unattended in frosty weather without fear of freezing—an important consideration in buildings such as churches where heating is required only occasionally. Lastly it has the great advantage of low initial cost.

4 THE INDUSTRY

Door Pulls

One of the many fittings specially designed for the experimental ward at Larkfield Hospital, Greenock, was a door pull fixed with the top of the crook 3 ft. 4 in. above the floor. Although designed for obvious hygienic reasons, more widespread applications are envisaged such as



in the kitchen or a canteen—anywhere in fact where a door must be opened with both hands full. The

crook projects 4 in. from the face of the door and is supplied in brass, BMA or satin chrome (the latter costing 28s. each) by Alfred G. Roberts Ltd., River House, 182-3, Upper Thames Street, London, E.C.4.

Daylight through the Roof

Following last month's article 'Daylight and Ventilation through the Roof,' it is interesting to note that a further criterion is proposed by Durasteel Ltd., the manufacturers of Galt-Glass. This is 'brightness ratio' by which is meant the ratio between the illumination levels of light and shadow. It is claimed that Galt-Glass shows a brightness ratio of only 8:1 where unreinforced thermoplastic shows 190:1 and wired glass 114:1; and that this spectacular lessening of glare is achieved without lessening the amount of light let through. Galt-Glass, an unreinforced thermoplastic, lets through 91 per cent as against 79 per cent for wired glass.

Durasteel Ltd., Oldfield Lane, Greenford, Middlesex.

Houses into Homes

Ascoot continue their good tradition of beguiling the architects with hard facts by publishing a book on the conversions of erstwhile middle-class properties. Their point is made by illustrating a fair number of conversions up and down the country, most of them in spiky and intractable premises, giving plans before and after, and costs: the results are sanitary and neat but not beautiful, but the good people who do this

[continued on page 68]

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The illustration shows service counterung at Hobart House, London, for the National Coal Board, by whose courtesy the photograph is reproduced. This installation consists of service top and plain top hot-closets and cold service units, with tray shelving the entire length of the counterung and a superstructure over the cold units. A tea and coffee service unit is also provided and can be seen in the background. The installation shown is one of many in which we have co-operated with Architects in planning for efficient catering service with economical use of floor space.

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continued from page 66]

valuable work are not trained aesthetes. The book concludes with full—we repeat full, because this is so rare—technical data of the equipment used and a sensible account of the art of placing flue terminals.

Near the beginning of the book are some interesting figures comparing the costs of installing multi-point gas water heaters as against back boilers in four different building types, which show that the gas water heater costs about the same in a bungalow, a few pounds less in houses and 4-storey flats, and £25-30 less in tall flats. In this connection it is perhaps worth noticing that the back boiler—which up to a few years ago was considered the answer to the Housing Manager's prayer—got a bad press at the recent Institute of Fuel Conference on Domestic Heating. The trouble is that on cold nights you have a choice of a cosy evening by the fire or a hot bath; you can't have both. While in summer you have the choice of roasting to death or of going dirty to bed. The case for the use of a refined fuel for water heating is very strong.

Ascot Gas Water Heaters Ltd., 255, North Circular Road, N.W.10.

CONTRACTORS etc

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Tile Hill Shopping Centre, Coventry. Architects: A. G. Ling, City Architect, in succession to D. E. E. Gibson. General contractors: J. G. Gray Ltd. Sub-contractors: heating and hot water installation: Weatherfoil Heating Systems Ltd. Prestressed concrete floors: Pierhead Ltd. Bricks: London Brick Co.; G. W. Jacques Ltd. Reinforcing bars and fabrics: Twistee Reinforcement Ltd. Wood window frames: Boulton & Paul Ltd. Electrical installation: P. D. Brady. Prefabricated joists: Benfix Steel Co. Stair balustrades: George Wragge Ltd. Preformed plumb-

ing stacks: J. S. Wright & Co. Shopfronts: Frdk. G. Plumb & Son. Rooflights: Guildford Glass & Metal Works Ltd. Terrazzo rooflights, tiling and thermoplastic flooring: Coventry Tile Co.; Marboline Co. Bituminous felt roofing: William Briggs & Sons. Sanitary fittings: Matterson, Huxley & Watson Ltd.; Edwin H. Fryer. Doors: F. Hills & Sons. Tiling: Carter & Co. Thermoplastic flooring: The Premier Tile Co. Ironmongery: Lockerbie & Wilkinson Ltd. Oil paints: Docker Brothers Ltd. Emulsion paint and distemper: Debnay Fuidge Ltd. Tanking: Ragusa Asphalt Paving Co. Sliding windows: P. G. Allday & Co. Plywood fascias: Saro Laminated Wood Products Ltd.

Factory at Stafford. Architect: Edward D. Mills and Partners. Quantity surveyor: L. W. Clark. Engineer for latticed shell roof: C. V. Bloumfield. General contractors: Wilson Lovatt Ltd. General contractors for latticed shell roof: Overstructures Ltd. Sub-contractors: vermiculite barrel roof and reinforced concrete columns: Overstructures Ltd. Foundation and piling: West Piling Construction Co. Design of reinforced concrete frame 2-storey section: B.R.C. Engineering Co. 3-ply roofing felt: Highways Construction Co. Asphalt roofing: Val de Travers Asphalt Ltd. Metal windows: James Couper & Co. Precast concrete roof lights and eills: J. A. King & Co. Glazed partitions: Sankey Sheldon Ltd. Thermo-plastic flooring: Armstrong Cork Co. Folding metal gates: Bolton Gate Co. Bricks and facings: Himley Brick Co. Wall tiling: Cope & Co. Hardwood flooring: Horsley Smith & Co. Radiators: Ideal Boilers & Radiators Ltd. Plumbing and heating: A. G. Curtis & Son. Lift: Gimsen & Co. (Leicester).

[continued on page 70]

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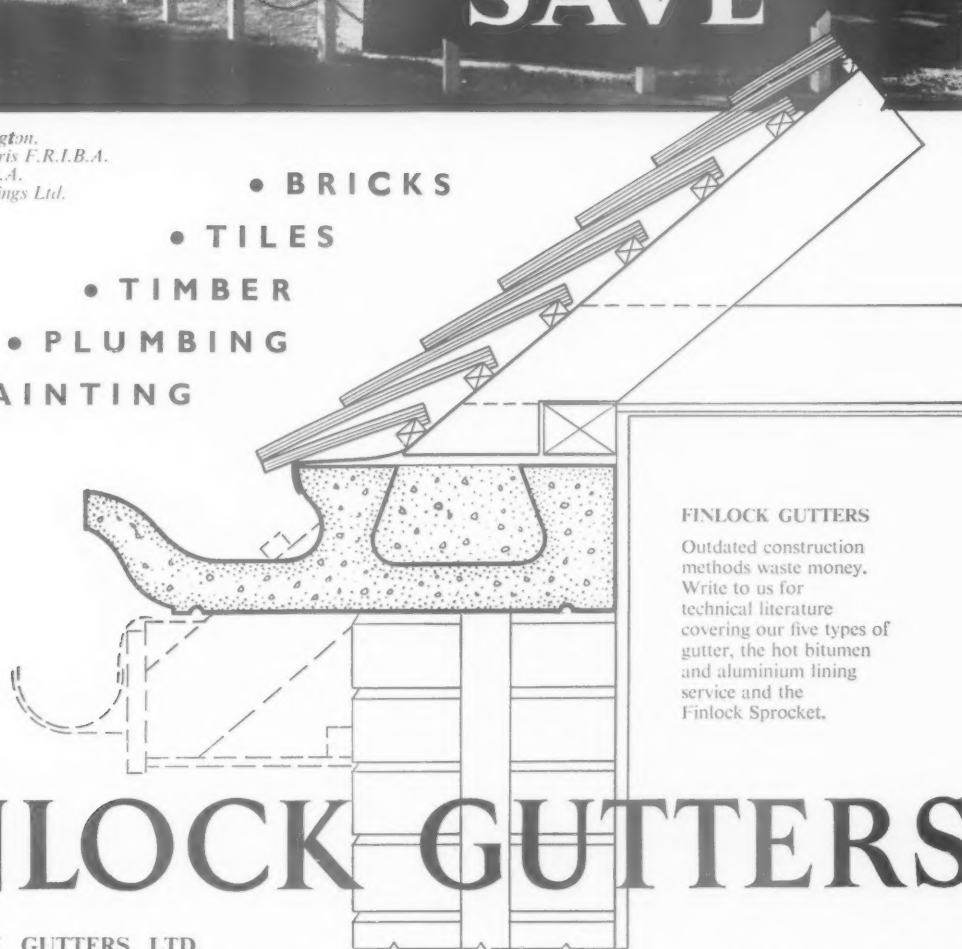
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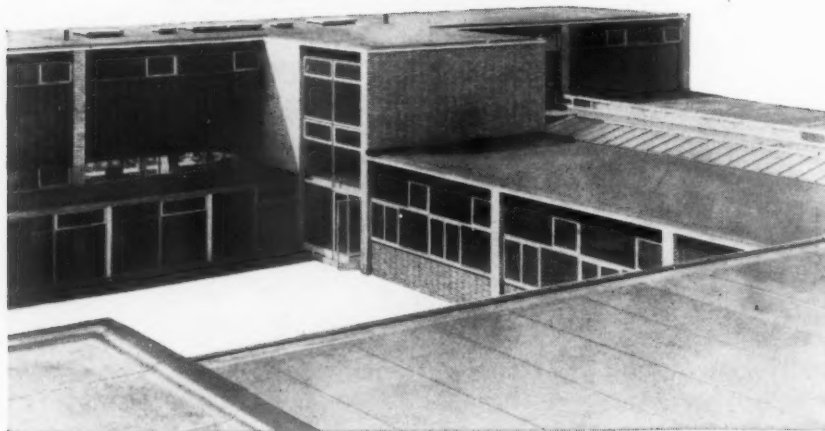
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