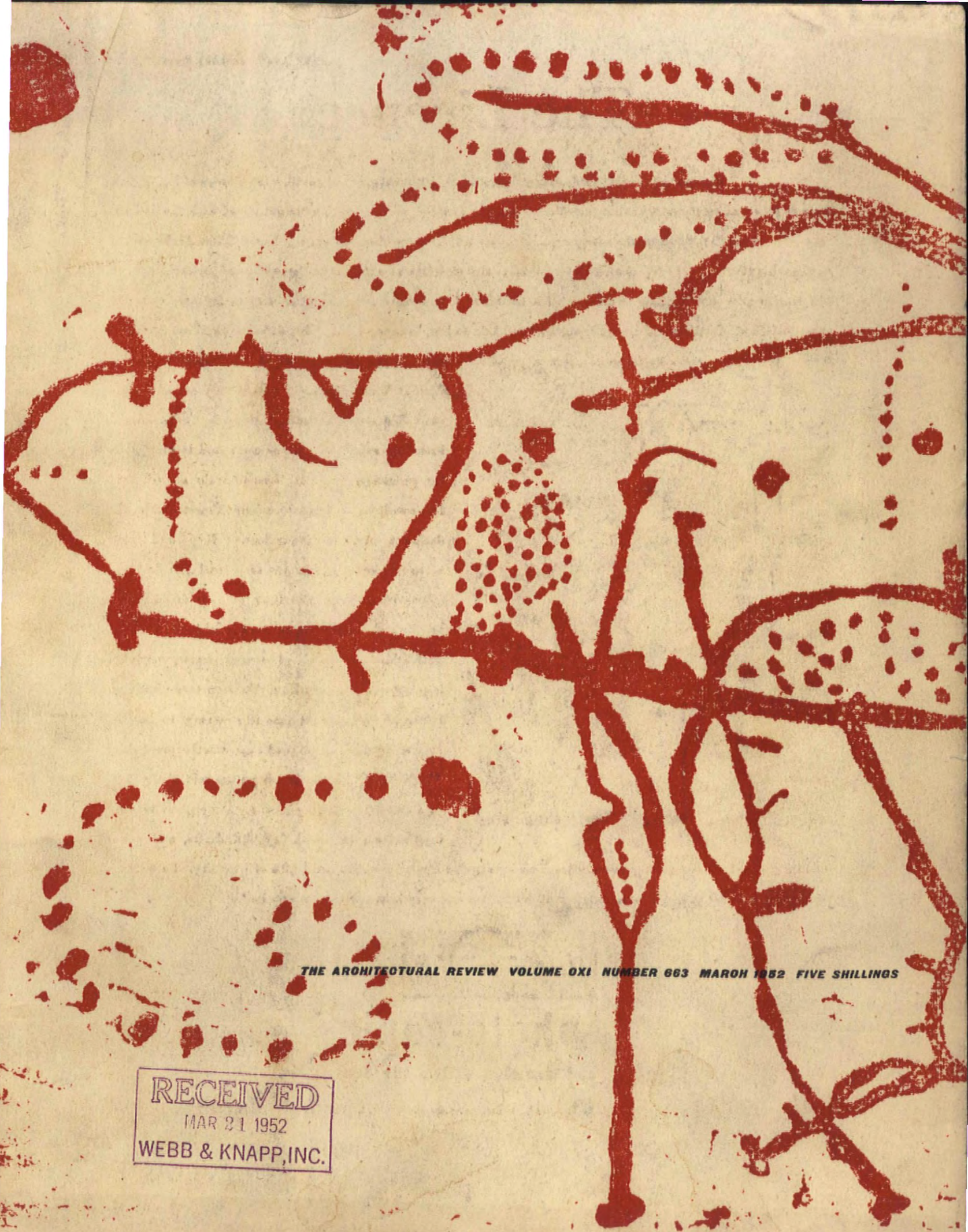

THE ARCHITECTURAL REVIEW VOLUME CXI NUMBER 663 MARCH 1952 FIVE SHILLINGS

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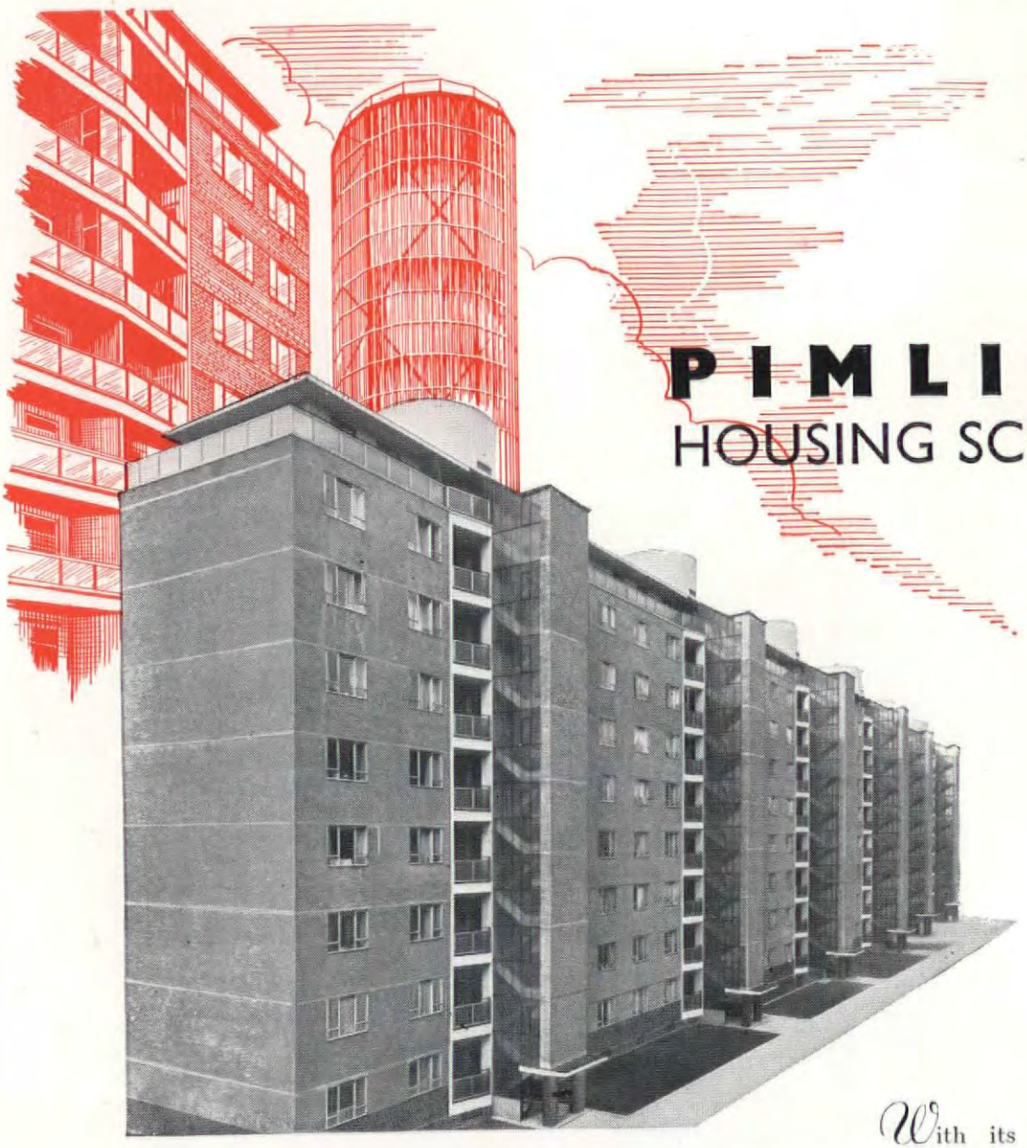

PIMLICO
HOUSING SCHEME

With its now famous hot water accumulator dominating its surroundings this housing scheme is one of the most modern now under construction. Designed by **Messrs. Powell & Moya,** A/A.R.I.B.A. winners of the open competition set by the Westminster City Council, the scheme will be in four sections on a 30-acre site and will eventually provide flats for approximately 1,600 families.

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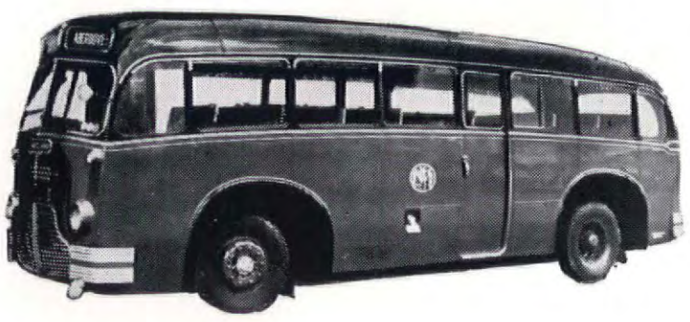

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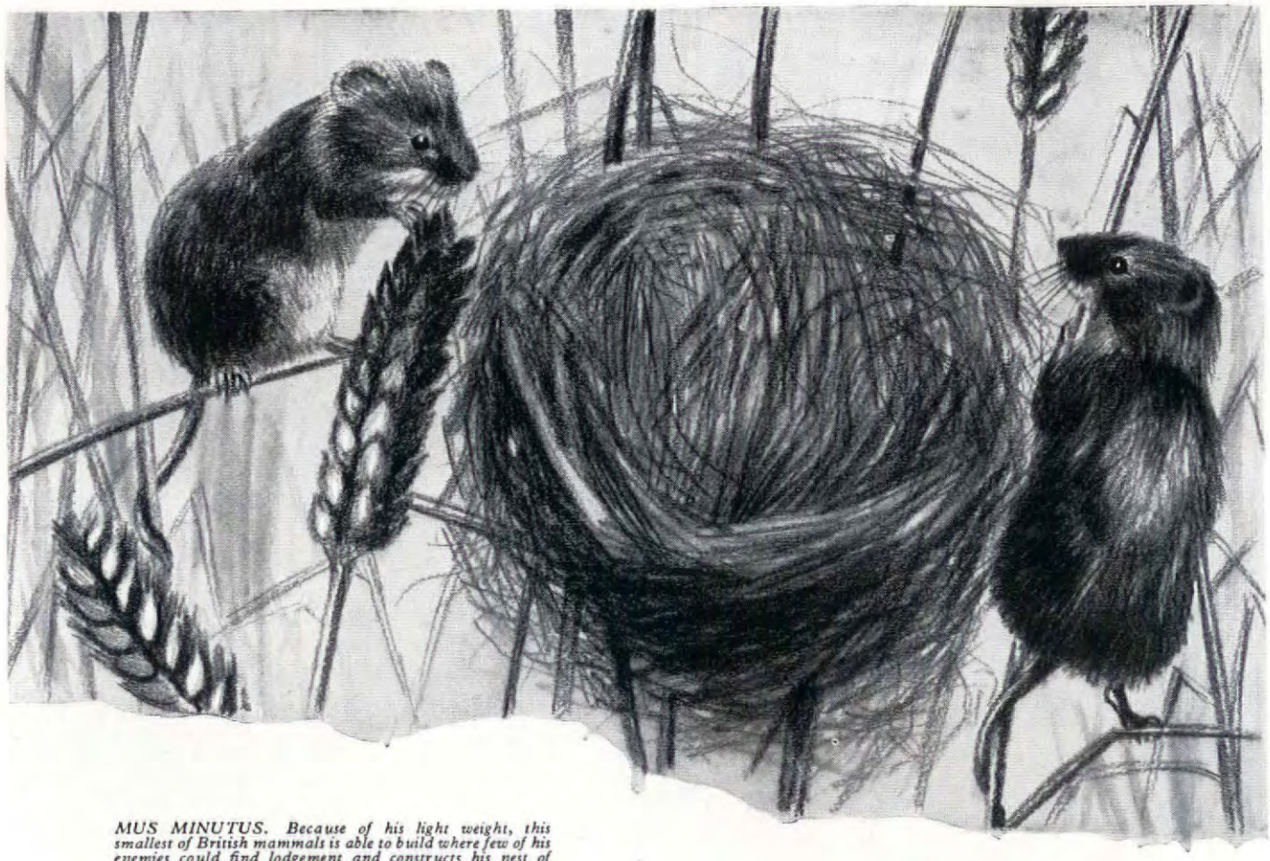

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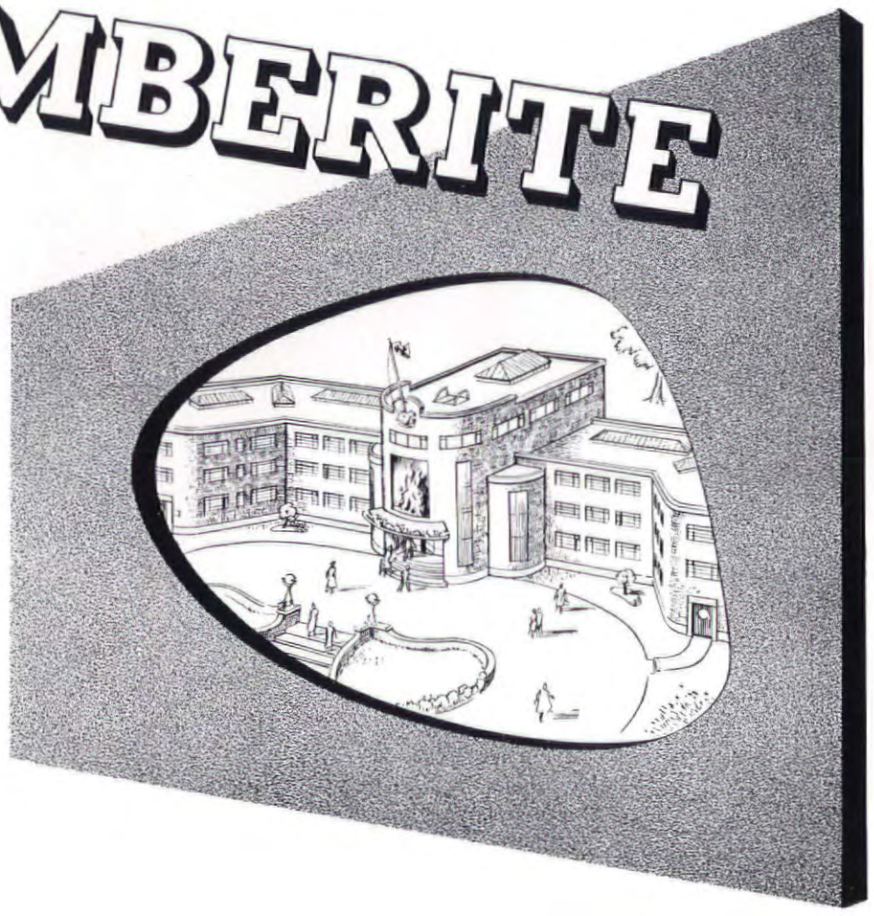

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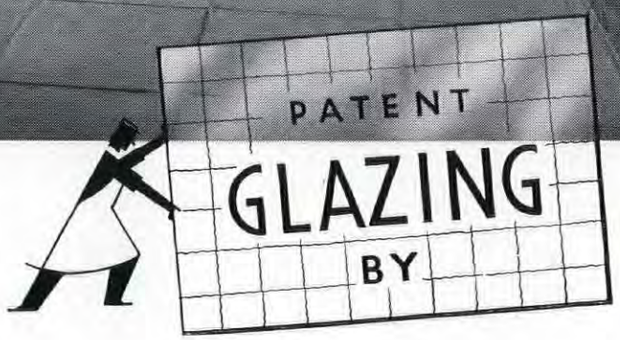

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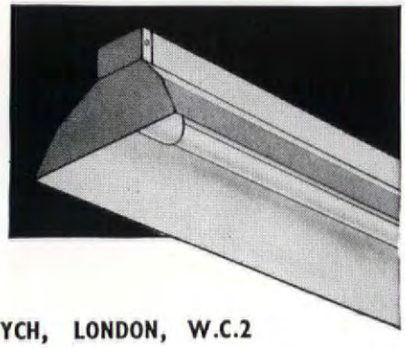

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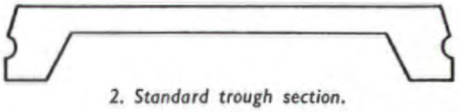

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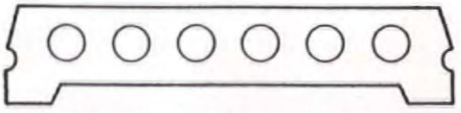

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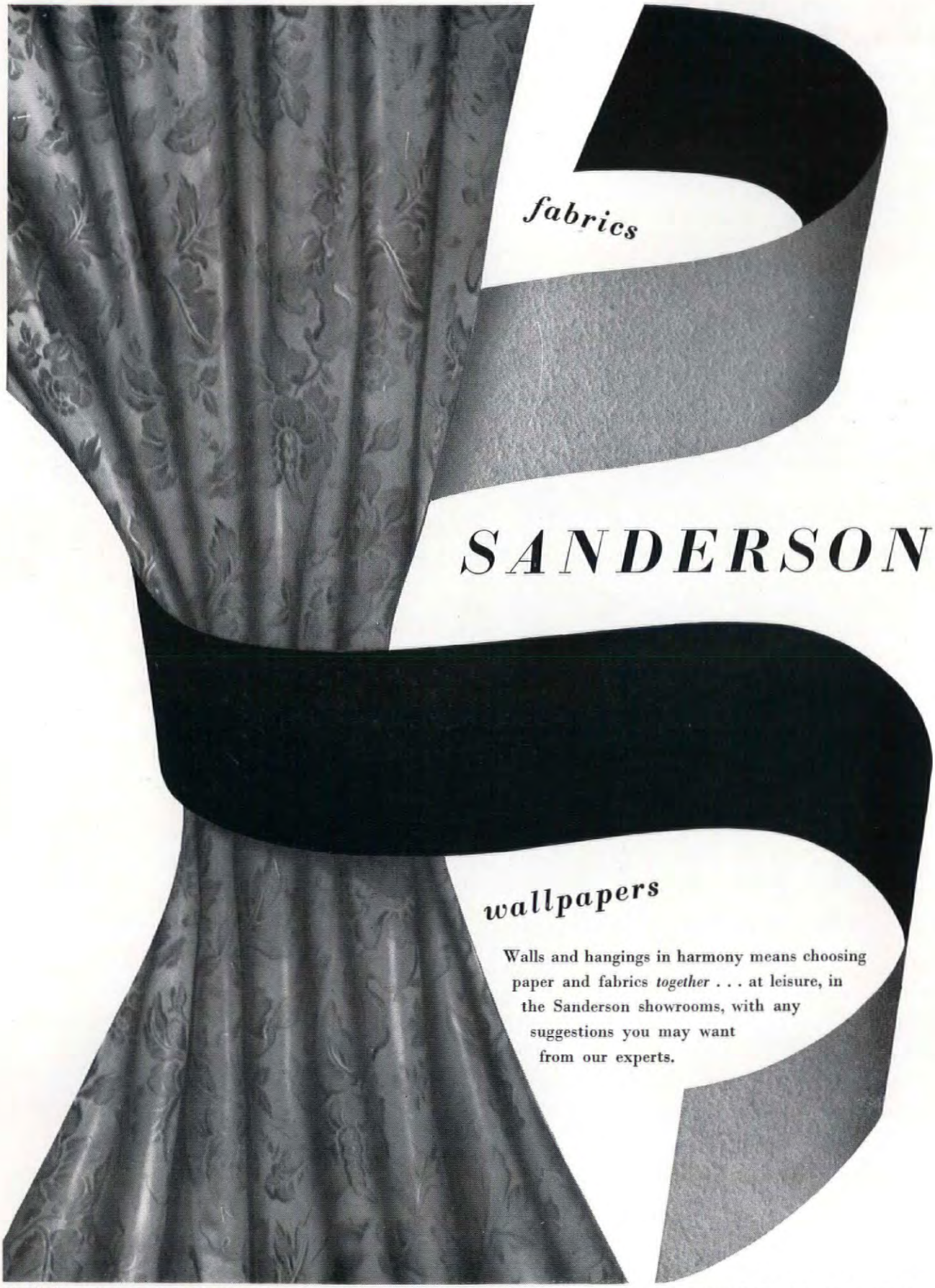

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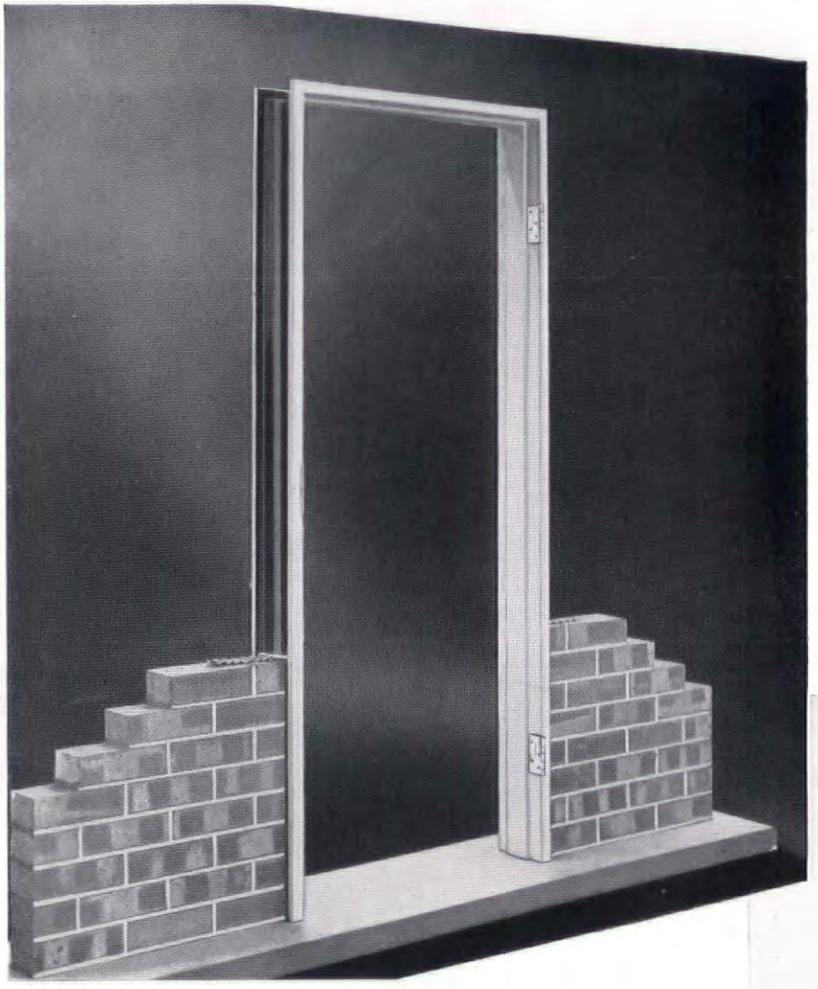

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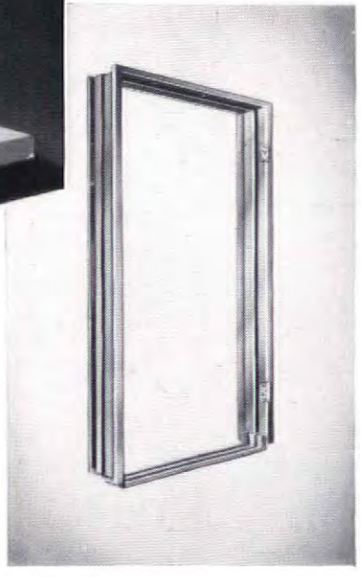

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Fluorescent Lighting's new London abode — the Thorn Electrical Industries' Showrooms in Shaftesbury Avenue. ATLAS fluorescent lighting developments, in surroundings of contemporary design, produce a wealth of novel effects — to delight the eye and stir the imagination of the Architect, the Lighting Engineer and the Interior Designer.

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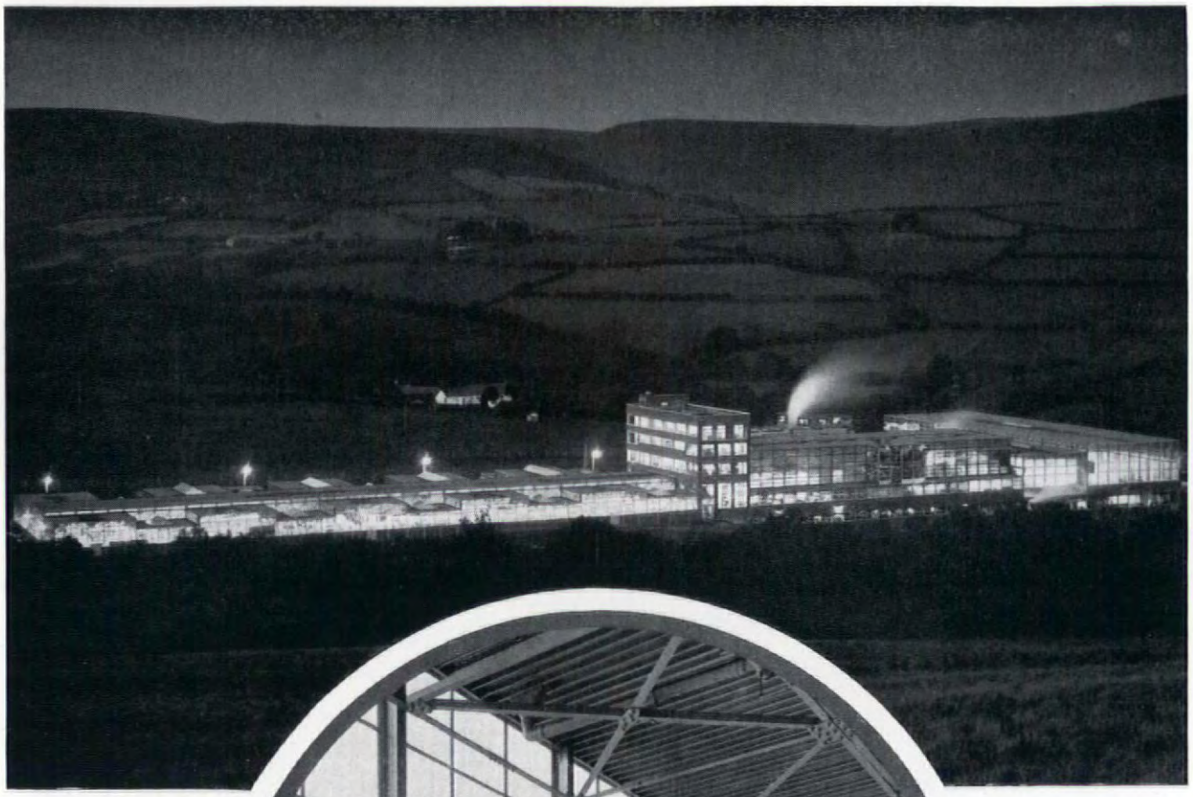

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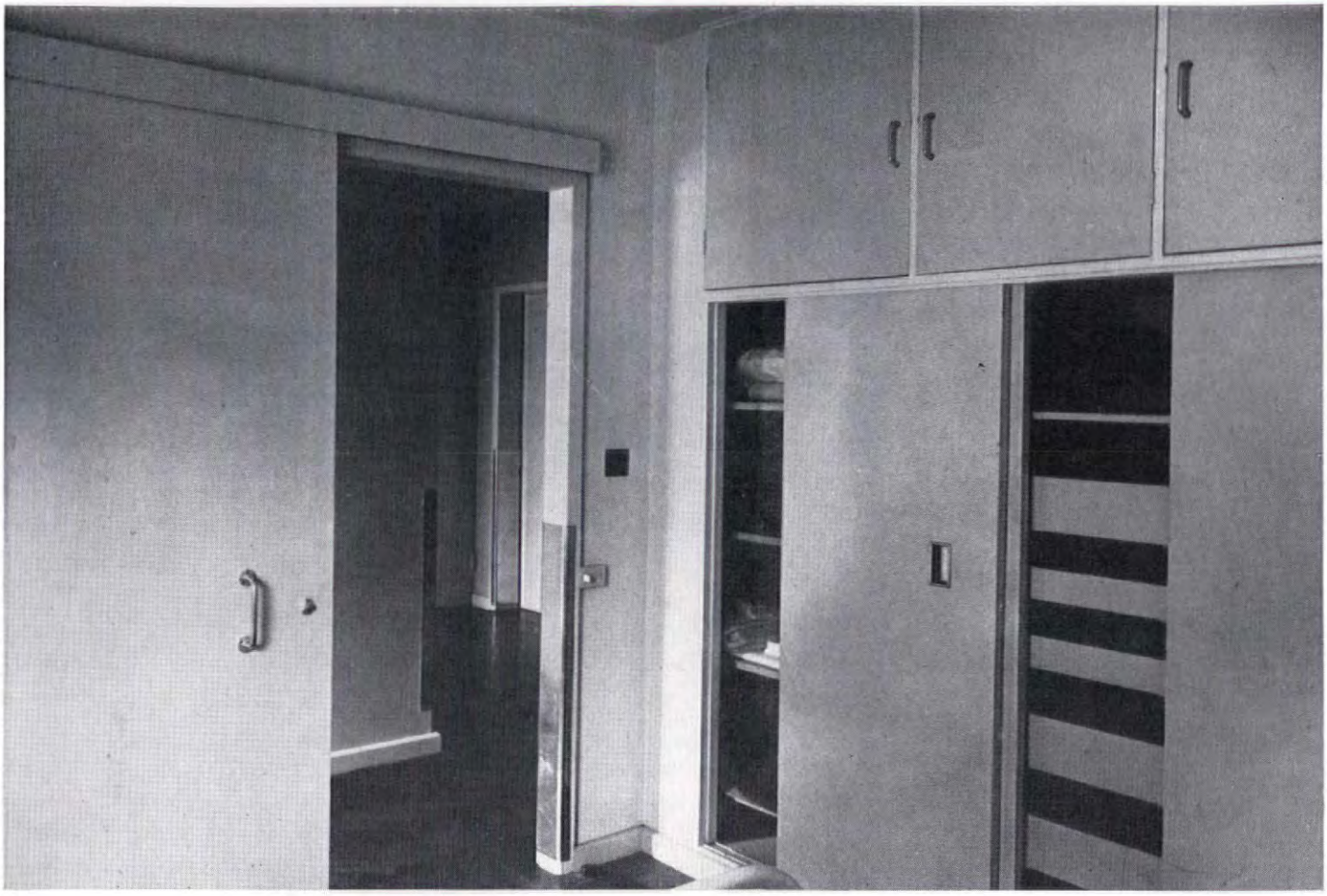

ESTATE SLIDING DOOR GEAR

Photographs by courtesy of The Architectural Review.

ESTATE Sliding Door Gear has once again been chosen for an important housing project: the Kytes Estate, Garston, Herts. The communicating doors in these houses have been fitted with ESTATE Sliding Door Gear. The top illustration shows an interior, and attention is directed to the free and easy access afforded to all rooms and passages, with complete clearance across thresholds. Note also the application of sliding doors to cupboards. Pleasing appearance, effortless action, compactness, and maximum value from every inch of space, are assured by the use of ESTATE Sliding Door Gear.

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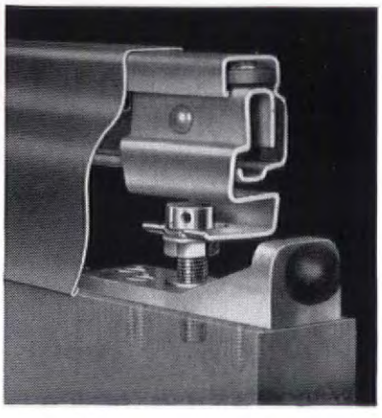

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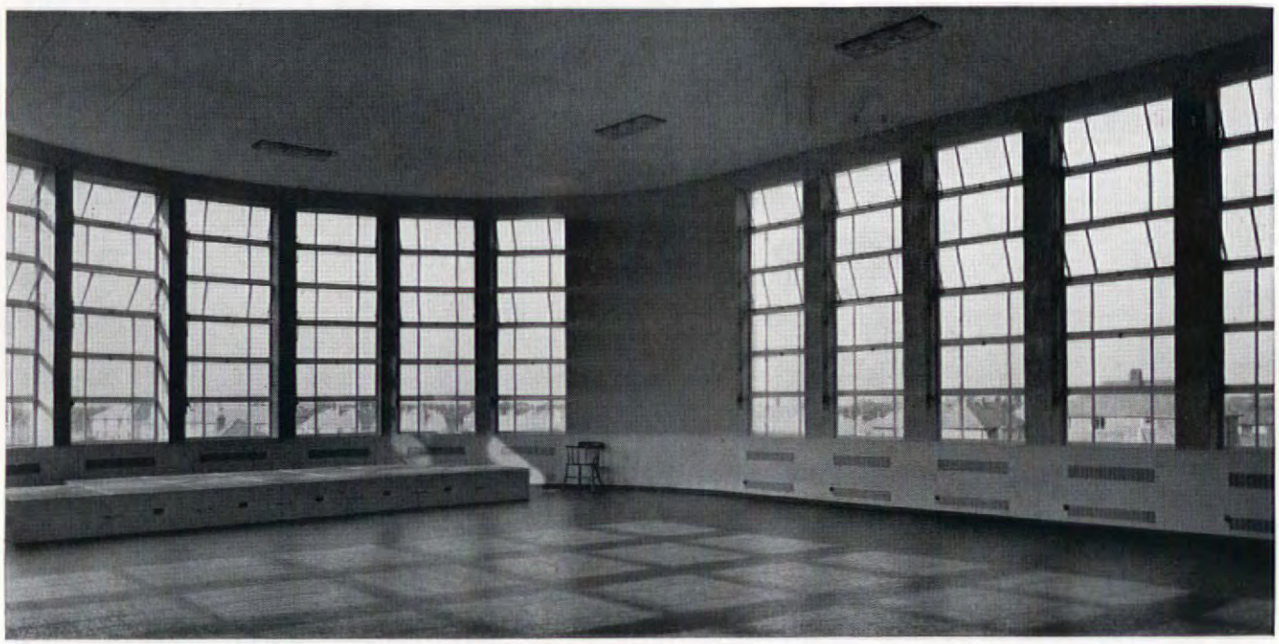

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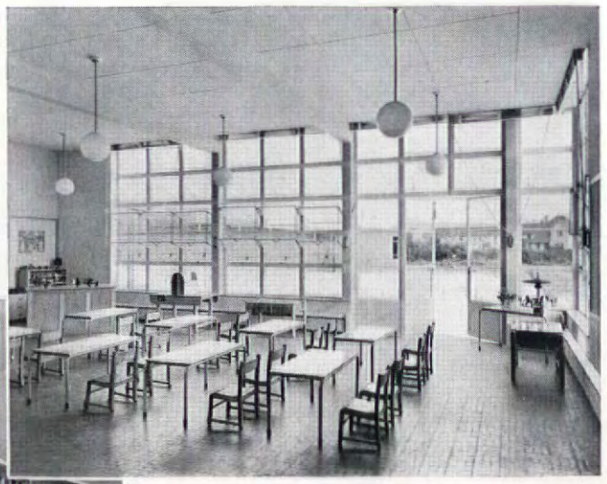

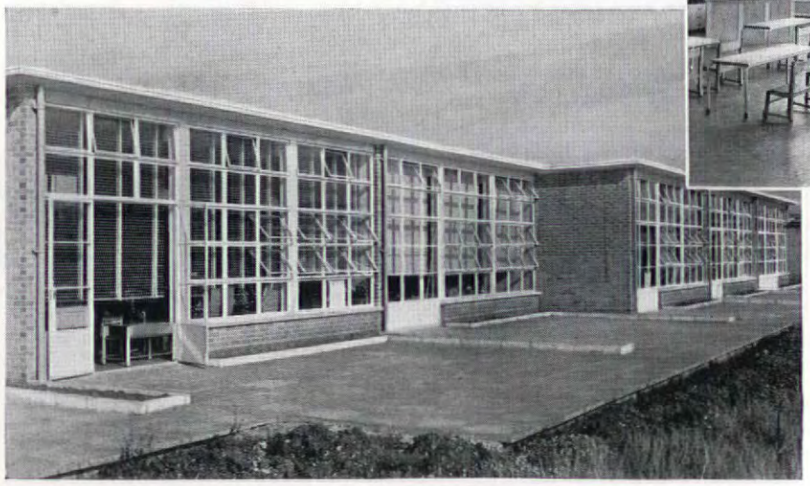

SOUTH KINSON SCHOOL
BOURNEMOUTH

Architects:
Ronald Phillips & Partners, F/ARIBA
Bush House, 15 Christchurch Road
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for St. Pancras Borough Council.
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The London-to-Birmingham television radio-relay link. Illustration by courtesy of the Research Laboratories of the General Electric Company Limited, Wembley, England

another technical stride

– but science continues to progress

To-day's triumphs can lead to greater achievements. In these triumphs aluminium can play a key role. Engineers, technicians and designers have already improved hundreds of processes, perfected and beautified products, with the aid of light metals. Men of television are looking with ever-increasing confidence to aluminium for solutions to difficult problems, such as the use of aluminium tubing for these parabolic radio-wave reflectors.

Progress has brought ever-increasing new uses of aluminium. Keeping pace with these developments requires adequate supplies of this light metal, produced in the most economical manner through an integration of the many stages of production from the mining of bauxite, shipping of raw materials and generating of hydro-electric power, to the ultimate extraction and fabrication of the metal — all assisted by research, technical and commercial services. This co-ordination is achieved through Aluminium Limited, the Canadian Parent Company, whose subsidiaries are located chiefly in the British Commonwealth.

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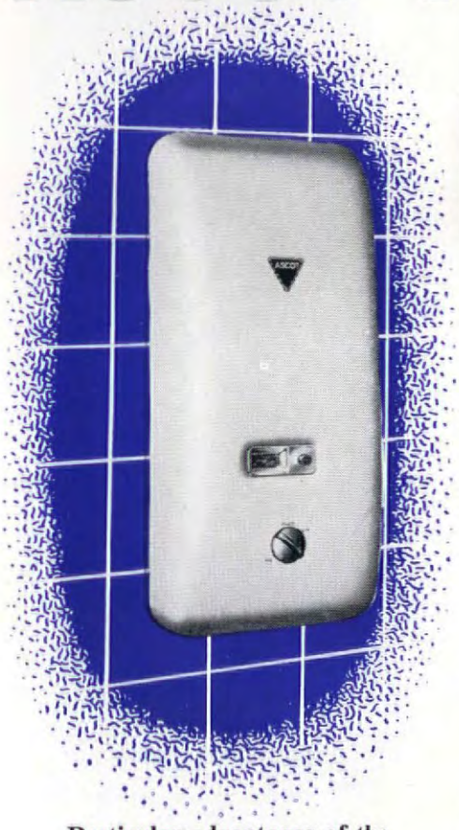

The new Ascot 715 multipoint is the first balanced flue gas water heater to go into production anywhere in the world. Once again Ascot leads the way! Once again Ascot helps the gas industry to maintain the position of gas as the best and most economical fuel for providing an instant, endless supply of hot water!

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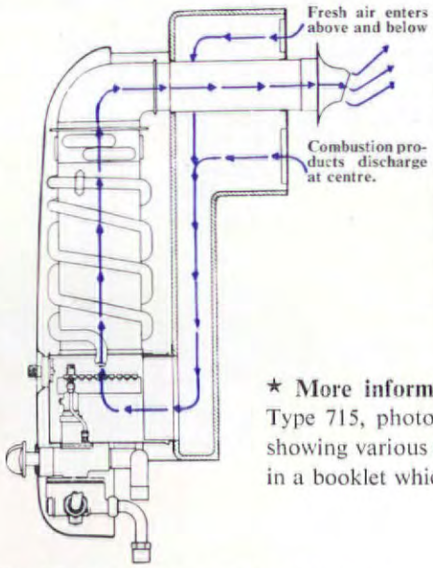

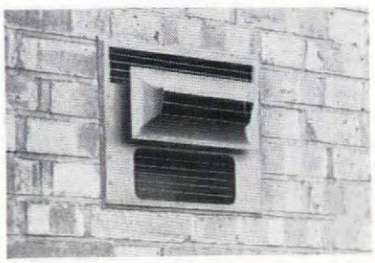

The terminal can be fitted even in proximity to overhanging, or other projections. There is no flue pipe or cowl.

★ **More information.** A detailed explanation of the Type 715, photographs, a specification and drawings showing various methods of installation, are contained in a booklet which will be sent on request.

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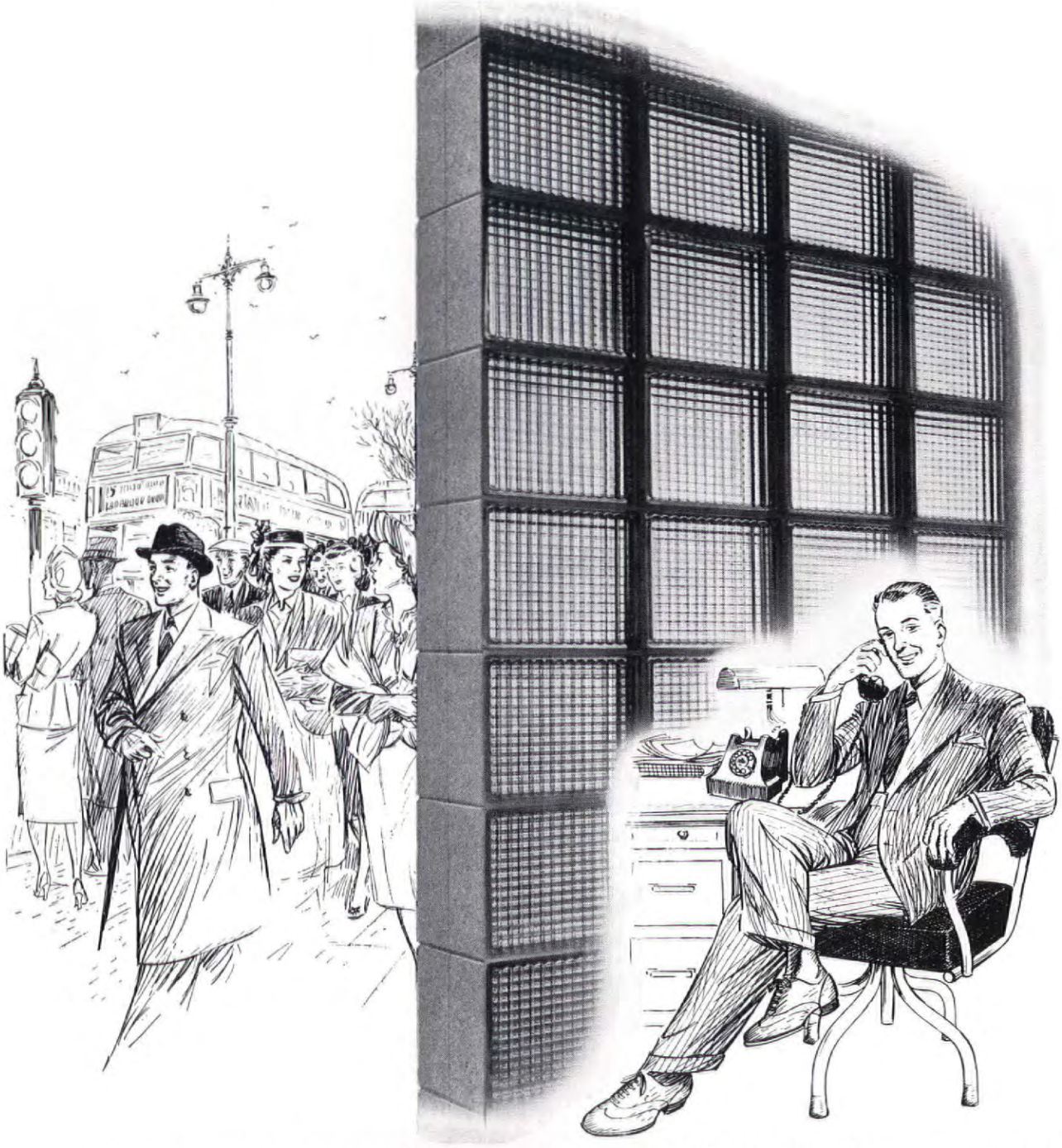

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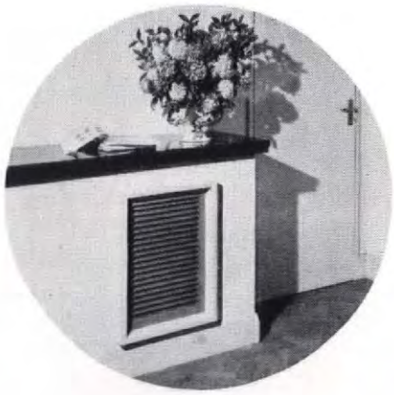

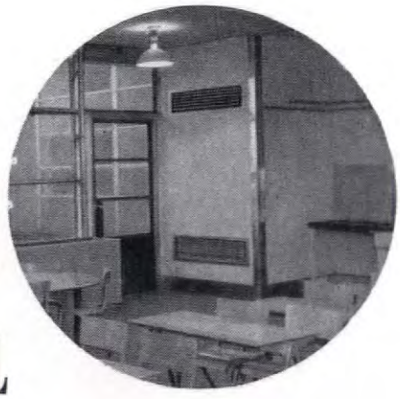

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WEATHERFOIL have specialised in the heating problems presented by buildings of light construction with large areas of glass, and can offer a comprehensive advisory service covering all aspects of the heating of such buildings.

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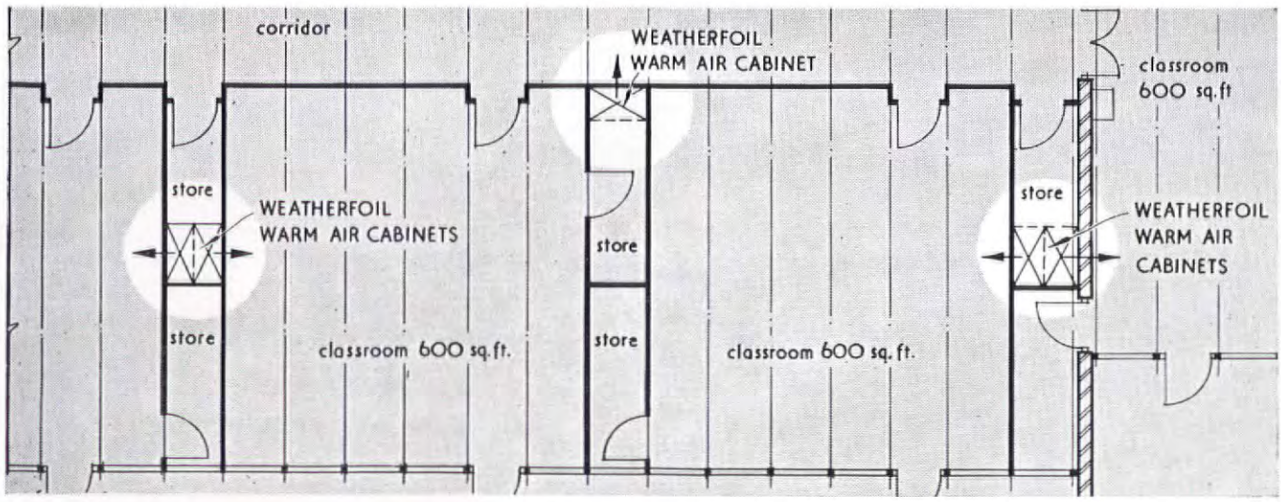

"Perpetual Daylight"

Interesting Mazda Lighting System for new Brynmawr Rubber factory

AS PART of the development scheme for South Wales, the Board of Trade has sponsored the erection of an important new factory on behalf of Brynmawr Rubber Ltd., a subsidiary of Enfield Cables Ltd.

Daylight streams into this factory through eight circular portlights in each of the 'shell-concrete' domes, and through four glazed vertical segments in each of the nine bays. After dark, the same sort of lighting had to be provided artificially.

The solution devised by B T-H Lighting Engineers is very ingenious and extremely simple. Daylight and artificial light both come from the same direction and are of approximately the same intensity. The fall of night is almost imperceptible.

In each of the nine 'shell-concrete' domes are eight artificial lighting portlights, each with its cruciform arrangement of six Mazda 5 ft., 80-watt Instant Start 'Daylight' Fluorescent Lamps. Maintenance and relamping are done from above by removing the portlight's spun aluminium lid. This lid is painted white on its underside to act as a reflector.

Daylight from the vertical glazing is simulated by continuous fluorescent troughing suspended about 6 ft. in from the periphery of each bay and at a height of 12 ft. This is supplemented by fluorescent lighting under the soffits formed between the roof spans.

The lighting system in this remarkable factory is a typical example of the way in which the B T-H Lighting Advisory Service can help the architect to solve difficult problems.

Mazda B T-H

For leadership in lighting

THE BRITISH THOMSON-HOUSTON COMPANY LIMITED
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Interior night view of one of the nine domes showing the general layout of the daylight and fluorescent portlights, and the fluorescent troughing which simulates the daylight from the vertical glazing just above it.

A model of the factory shown at the South Bank Exhibition. Of the 16 portlights in each 'shell-concrete' dome, 8 are normal windows, and 8 provide simulated daylight by means of fluorescent lamps.

Exterior view of portlight showing cruciform arrangement of 6 Mazda 80-watt Instant Start 'Daylight' Fluorescent Lamps.

Part of the English Scene . . .

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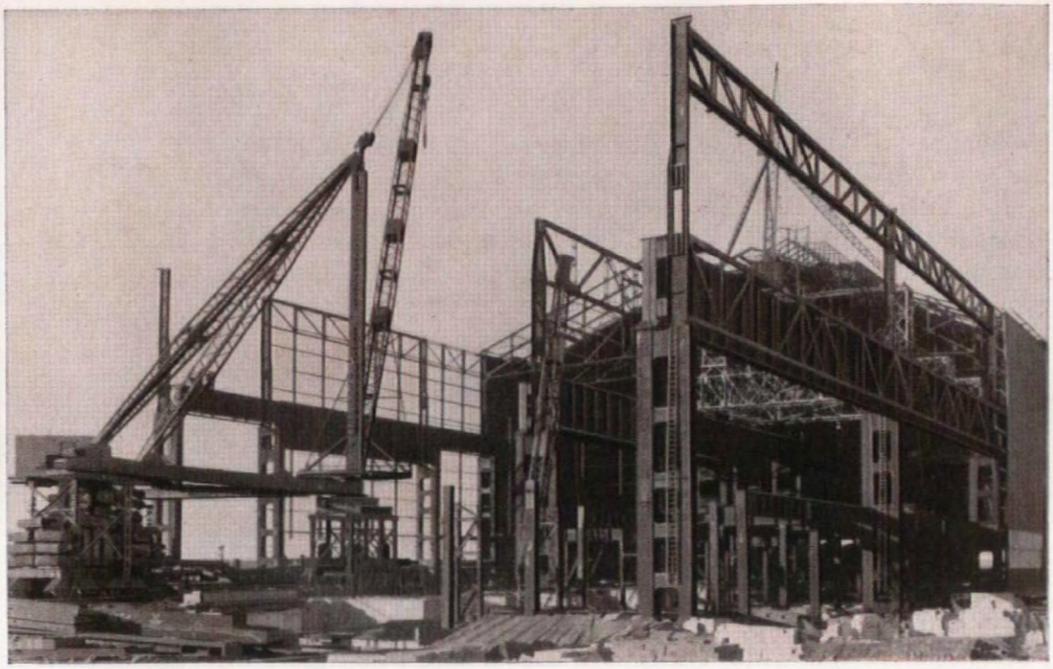
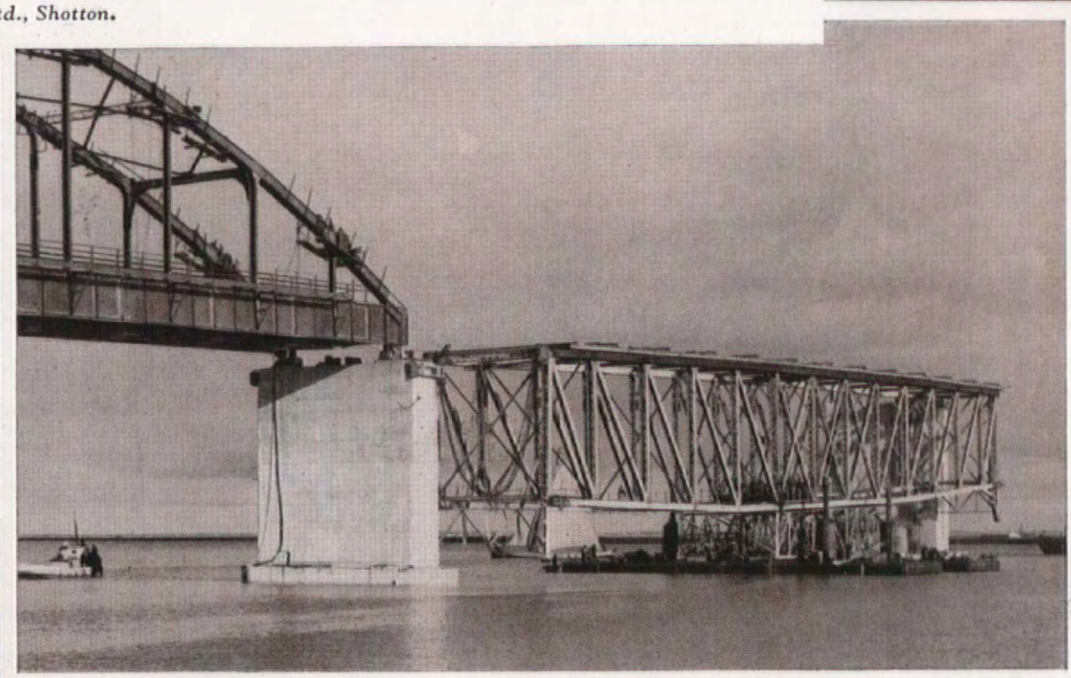


Steel plant buildings for John Summers & Sons Ltd., Shotton.



Vila Franca bridge under construction, showing (on right) the service span used as a temporary support when erecting the permanent steelwork.

Designed, fabricated and erected

by

DORMAN LONG

THE ARCHITECTURAL REVIEW

Volume 111 Number 663 March 1952

The Cover is a textile design by the sculptor Eduardo Paolozzi, one of the young artists whose entrance into this field of design is discussed by Douglas Newton on pages 191 to 195. This design was originally made for Jane Drew's living room, and executed by the silk screen process; the slightly reduced version of it reproduced here is a wood block adaptation used by F. R. S. Yorke in his house at Wootton, Oxfordshire.

The Authors *Robert Furneaux Jordan*, architect. Educated at Birmingham School of Architecture, 1923-6. AA School, 1927-8. In practice with W. T. Benslyn (cinemas) and with C. C. Handisyde and G. Fairweather (houses, schools and exhibition buildings). AA School Staff: Studio Master and History Lecturer, 1934-39. Senior Design Master, 1945-48. Principal, 1948-51. *Bernard Denvir*, born 1917. Educated Liverpool, Oxford, Paris. Art critic of *Daily Herald*, 1945-51 and at present art critic of *Tribune*. Joint Editor of *Art News and Review* since 1947. Published work includes *Hogarth's Drawings* (with Michael Ayrton); *Chardin*. Now working at book on French Romantic Painting. *M. M. L. Rich*, born 1910. Educated Regent Polytechnic School of Commerce. Entered timber trade 1936, and later became publicity manager for multi-branch timber importers. In 1947 was appointed editor of the monthly technical journal *Timber News*. Has now returned to Publicity as a Consultant. Chief publicity interest—Industrial Relations; chief timber interest—Forestry. Recent articles—*Public Relations Policy of the Forestry Commission*. Is education officer for Trade and Technical branch of National Union of Journalists. *Douglas Newton*, poet. Born Malay States, 1920. Pattern of thought established on seeing the film *The Ten Commandments* in 1926. Interest in archæology then aroused led by easy stages to interests in painting, sculpture, films and textile design. Life otherwise entirely uneventful, except for nomination by magazine *Poetry Chicago* as Shelley of Chicago for 1946.

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THE ARCHITECTURAL REVIEW

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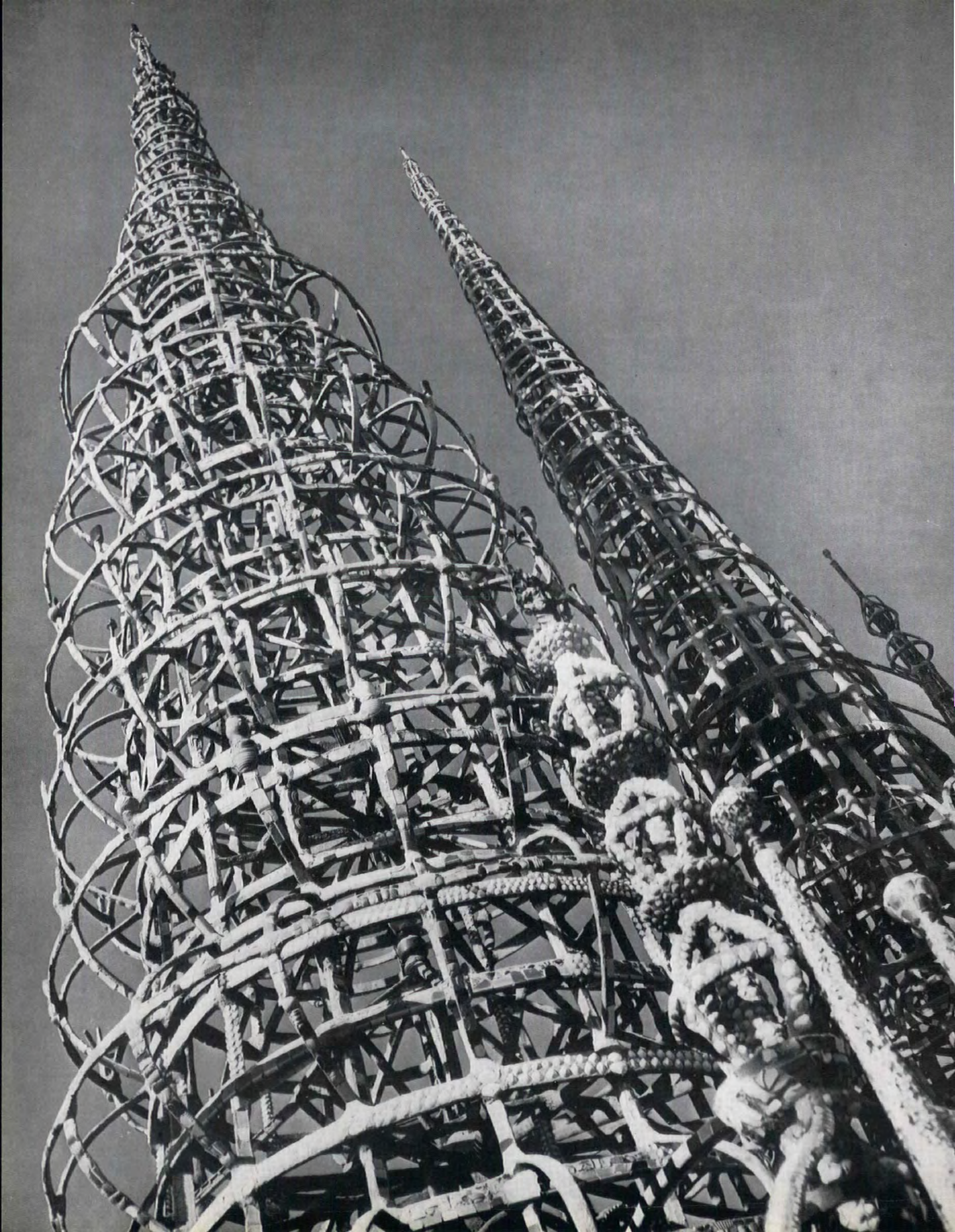
FIVE SHILLINGS



Popular art is often monumental in intention, rarely so in scale. Simon Rodilla's fantasy in steel and cement at Watts, near Los Angeles, is both at once; for its tile-setter creator was inspired by the need for self-commemoration and the tallest of the three towers here illustrated is no less than 104 feet high. More photographs of this extraordinary monument, on which Rodilla has been working single-handed since 1921, will be found on page 201, together with a brief account of its history and construction.

R. Furneaux Jordan

The technical complexity of modern buildings makes them often difficult to apprehend without knowledge of the factors determining their design. This article, which is introduced below and starts on p. 145, describes a new factory in South Wales; it is part criticism, part analysis of needs and means and part description. To equip himself to write it, Furneaux Jordan followed the building's progress from the initial stages and kept constantly in touch with the architects, the clients and the engineers.

BRYNMAWR

Nowhere in the world can the strata of social history be seen so clearly, so dramatically, as in the industrial valleys of South Wales. That, at any rate, is true of the short but very intensive period of the last two hundred years. The first act in this drama is all the more effective because—once the leisurely and unreal world of the Cotswolds, Badminton and the Berkeley Hunt has been left behind—the Severn Tunnel lifts the curtain within a few minutes upon the nonconformist squalor and hard human facts of Newport and its hinterland.

Since, in these steep and narrow valleys, man's activities must be canalized, the picture is a vivid one. Within fifteen miles of the sea the mountains rise to over twelve hundred feet. Save for an occasional spoil-heap and the distant silhouette of a transporter railway or open-cast excavator, they still keep an unbroken skyline. Clinging to the mountain sides is the next human stratum: the one-storey whitewashed shepherds' cottages. There are few of them now, although sheep still eat the grass that pushes its way through colliery debris. These cottages might be any age and were certainly there a century or more before the miners' terrace-housing and the pit-heads.

It was with the Second Industrial Revolution that the deluge came. In that terrain the road plan can have changed little since it first took shape; the roads with their load of buses and lorries still twist perilously up the valleys between cottage walls and it was only with the coming of the Railway Age that the Victorian engineers, as always, worked fantastic wonders. Their outstanding monument is the high tubular iron viaduct at Crumlin, designed in 1856 by T. W. Kennard, but the whole complex of cuttings and embankments is a miracle of railway 'navigation'—Brynmawr station is one of the highest in Britain. Moreover, the railways came early here—a whole generation before rural East Anglia ever saw a train. The earliest railways were, after all, little more than glorified mineral lines and here, in South Wales, they were needed if only to get the coal down from the pits to the sea and to Brunel's Great Western. And with the railways, of course, came the next human stratum: the iron and steel towns and the mining villages.

Everywhere in this tangle of smoky valleys the familiar names proclaim a history of

industrial achievement, and of social tragedy. Blaenavon, Ebbw Vale, Merthyr Tydfil, The Rhondda and Brynmawr: they have all meant something—at one time or another—in the history both of investment and starvation, and—in one way or another—they still bear the scars. At Pontypool in 1697 they rolled the first iron sheet, and Bessemer steel and tinplate were coming out of Wales before any other part of the country tried to make them. When this 'workshop of the world' ceased to be needed by the world, its ill-balanced economy collapsed and—hidden under the euphemism of 'Special Areas'—men rotted.

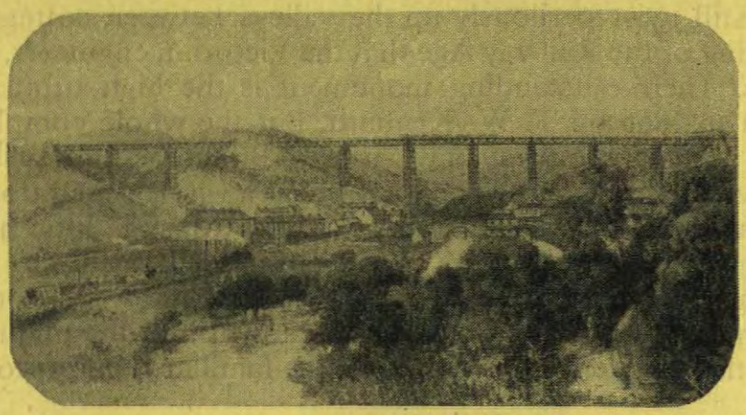
In 1935 Sir P. Malcolm Stewart, as Commissioner for the Special Areas, published his First Report. He said: 'The problem must not be allowed to drift into the category of those that are insoluble . . . the problem of the Special Areas cannot be successfully solved without the application of some unconventional principles.' In the end those unconventional principles were the Barlow Report and the 1945 Distribution of Industries Act.

The Welsh Development Areas include only one-fifth of the area of Wales, but contain 70 per cent of the population. Wales & Monmouthshire Industrial Estates Ltd. was given statutory powers to carry out on behalf of the Board of Trade schemes which the Board had sponsored or approved. Not all the planning in the Development Area has been wise; sometimes the original objective seems to have been forgotten. New industries at Pontypridd, Swansea and elsewhere—which draw off commuting labour from the chain-stores of the big cities—have not been of much help to the derelict villages at the head of the valleys.

It was only when schemes were put in hand at Merthyr Tydfil, Dowlais, Brynmawr and elsewhere above the 1,000-foot level, that hope returned to the bleak mountain tops. At least ten factories have been built mainly to provide new trades for ex-miners now unfit for heavier industry. There is also, however, the younger generation who have come through a childhood of malnutrition and a great war to play their part in any industry available. This means that the valleys as well as the coastal plain can be given a balanced economy. Can they also be given a decent environment?

In the Development Area as a whole the necessary unity—not of control but of aim—is absent. It is deplorable that in this quite genuine renaissance of the South Wales worker, the basic fact about modern architecture should have been so little understood, i.e. that though still a technical art it is today mainly an applied social science. One may like or dislike this fact but, since a living and evolving architecture must always respond to the 'climate' of its age, it remains a fact. In structure, in scientific layout and services, in the psychology of environment (sound, light, form and colour), in the imaginative and economic treatment of amenities and in planning for a new set-up between employee and employer—in all this only the younger architect seems to be aware of the *architectural* potentialities. That architecture is a social science is something that the average industrialist has not yet grasped, and that the older architects are reluctant to admit.

If the Development Areas, as a contribution to civilization, are a failure, in this factory at Brynmawr an enlightened industrialist has given some expression to his ideals and ideas; from his architects and engineers he had not only professional service but full co-operation at the highest level. They have created not only a good factory but an idea for a factory.



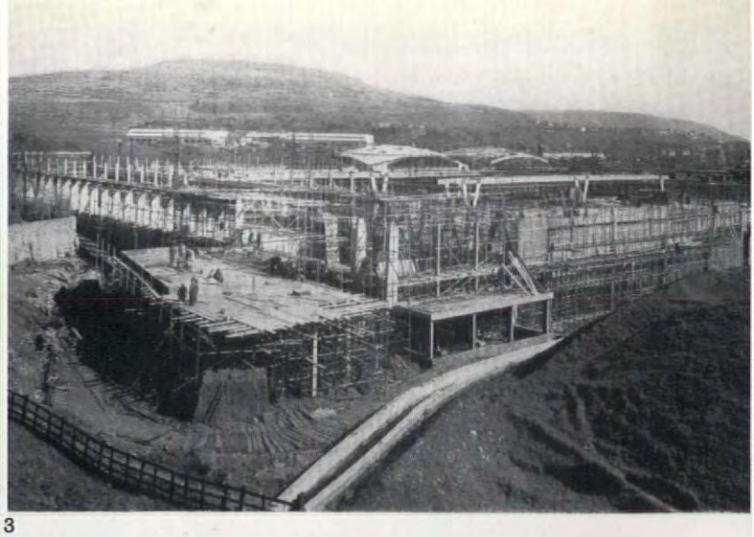
The Crumlin Viaduct, South Wales, mentioned on the previous page, from a lithograph published in 1862.

FACTORY AT BRYNMAWR SOUTH WALES

ARCHITECTS CO-OPERATIVE PARTNERSHIP: ARCHITECTS *Ove N. Arup & Partners:* CONSULTING ENGINEERS. *J. Varming & Partners:* HEATING CONSULTANTS. *Couzens & Brown:* ELECTRICAL CONSULTANTS. *A. P. I. Cotterell & Sons:* DRAINAGE CONSULTANTS. *Davis, Belfield & Everest:* QUANTITY SURVEYORS. *G. P. Youngman:* LANDSCAPE ARCHITECT. *Building Research Station:* COLOUR AND LIGHTING.

1, the south block, looking over the reservoir, contains cloakrooms, lavatories, offices, clinic, café, etc. On the right is the entrance hall, on the left the spreading shop. In the left foreground is the pump house.

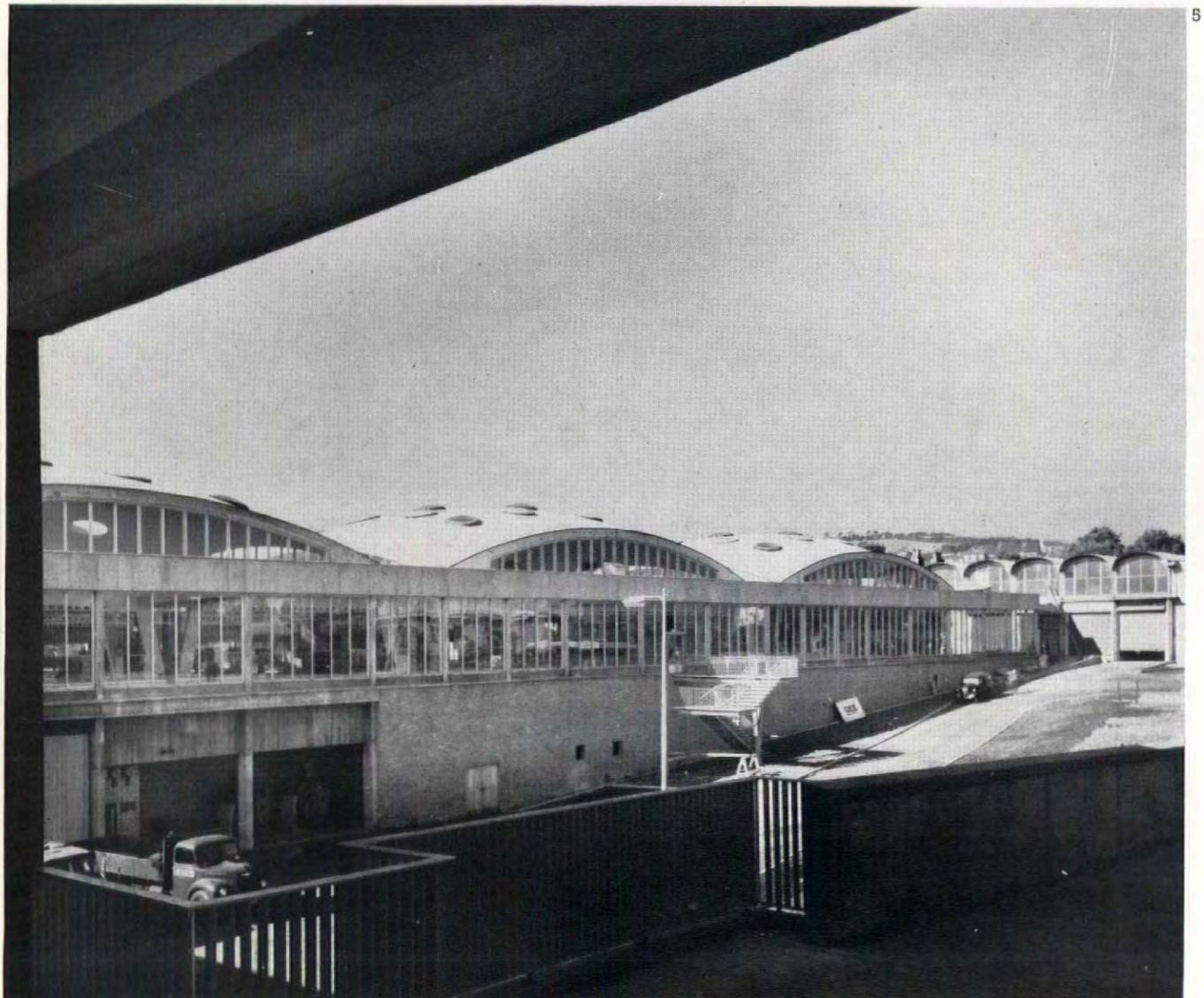
2



3

2, the factory in the landscape showing its low lines and general scale related to the mountain scenery. Beyond is the small town of Brynmawr. When this photograph was taken the reservoir had been drained. 3, a progress photograph. In the immediate foreground is the carbon black store and beyond is the 'Banbury Corner' at the junction of drug room and mill room. One of the domes of the main production area can be seen with shuttering struck, one being poured. 4, an air view showing the general disposition of the main units of accommodation. This may be read in conjunction with the notes on the main factory. The shore of the reservoir is to be developed and planted. 5, the forecourt seen from the top of the ramp up to the entrance hall. The main production area forms an upper ground floor on a 'platform' formed by the unlit storage space. On the far side of the forecourt is the unloading dock at one end of the drug room.

4



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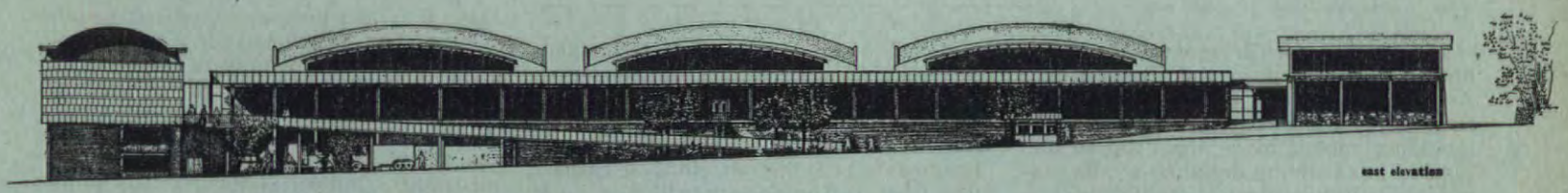


east elevation

The Architects

At the Architectural Association in the 'thirties, under the guidance of E. A. A. Rowse and with the encouragement of Sir Raymond Unwin, a group of young men formed a working partnership. Even then they were regarded by Professor Goodhart-Rendel as rather troublesome boys—which was at least promising. Their architectural philosophy was that of their generation; to some it seemed rather arid but, despite its sophistication, it was not unemotional about its own idealism and intellectual honesty. In that decade Le Corbusier and Frank Lloyd Wright were still twin gods; the Fry-Gropius combination played its part; Mies van der Rohe, as an influence, came later. Functionalism had to be basic although, with those gods, it was necessarily functionalism tempered by romanticism. If ultimately empiricism was also an ingredient it was only because empiricism is, by definition, a response to unprecedented circumstances.

However, the real cornerstones of this philosophy were: *First*—that the rationalisation through science of nineteenth century progress (i.e., Patrick Geddes' and Lewis Mumford's neo-technic era growing out of the paleotechnic) must not only revolutionise æsthetics but must open to the architect a new field in which he could serve not a patron but society as a whole, and an industrialised society in particular. Architecture itself—like, say, diesel engines, aircraft or alloys—must evolve as a neo-technic phenomenon: façade and 'style' were dead. *Second*—that the old professional 'partnership' must evolve into the working group or team if the full demands of this new era—with its social and technical complexities—were to be met. There was nothing very new about this; a kind of racial memory of the guild had always haunted the 'mediæval wing' of the Modern Movement; as long ago as the 'sixties E. W. Godwin had tried to form such a group. Anyway, it was clear that in a changing world the 'profession' alone could not remain unchanged. *Third*—that the true dynamic of structure—lost to us at the Renaissance—must be recaptured in the context of new materials and techniques. In effect, the engineer must be a member of the team.

The working group, as originally formed in the AA, had eleven members. It had called itself the Architects' Co-operative Partnership.* Dispersed by war, it was not until May, 1945, that the present Lord Verulam, now chairman of Enfield Cables, and of what was then its new subsidiary, Brynmawr Rubber, saw that the group, if re-formed, could provide the kind of architecture that the post-war industrial world ought to have.

Has this organisation of a team, with only student and wartime experience as its warrant, really worked when faced with a big job? Certain concessions have had to be made. One was the employment—only recently—of assistants in the drawing office. If literally everything in a modern building is related to everything else—as in fact it is—then this dilution of the team must be regarded as a departure from the purity of the ideal. A second concession, so far as Brynmawr was concerned, was a certain organised subdivision of work; not of course that it had ever been supposed that all the partners would actually put their hands to every drawing. The basic design for the Brynmawr factory was largely the work of three partners—the first to be free from the war—and thereafter almost all the working drawings were executed by them personally, with a fourth partner as co-ordinator.

With the drafting work of engineers and sub-contractors added there were some 1,600 drawings for the job. The main drawings were to 1/16 in. scale and all basic working drawings to 1/4 in. scale. For ease of reference the original 1/16 in. scale drawings were covered with a grid 6 ft. 4½ in. square (related to the structural bay) which was used like an Ordnance Survey grid, being reproduced on all larger scale drawings. This grid enabled very quick reference to be made—especially on the telephone—to various parts of the building on the drawings, and from one drawing to another. It was, however, difficult to make other people—especially the contractors—work the scheme. On the other hand the contractors paid high tribute to all the documents they received.

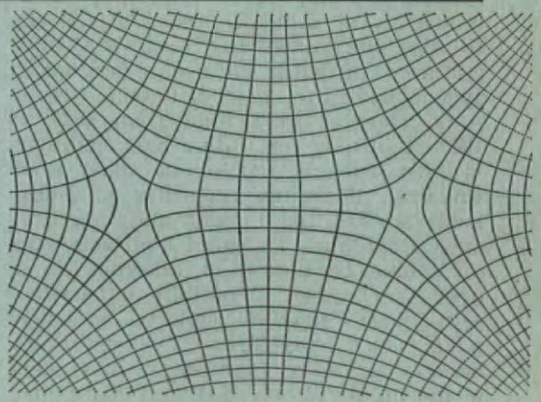
* The Boston equivalent—TAC (The Architects' Collaborative)—believes that 'a team can raise its integrated work to higher potentials than the sum of the work of just so many individuals.' That is a fair explanation of Gropius's intention and of what is meant by a 'team' as opposed to a formal partnership.

The Engineers

The structural engineers were Ove N. Arup & Partners. Much of the merit of the Brynmawr factory—in design and execution—is due to the extraordinarily close co-ordination between engineering and architecture—so close that both engineers and architects, looking back, often find it difficult to sort out their respective contributions.

There was never any question of the architects preparing a 'design' for the engineers to 'construct'. The architects submitted planning requirements in diagrammatic form (with tentative ideas on structure) and these were then discussed—to be rejected or developed—structural possibilities often modifying planning conception. This interchange might affect anything from the curvature of the main domes to the chamfer of a cill.

The architects brought in the engineers at all stages; what was more unusual was that the engineers understood throughout the æsthetic aims of the architects, and themselves made an æsthetic as well as structural contribution.



stress trajectory diagram *for a dome: Effecting a transformation by projection to a horizontal plane, the horizontal equations of equilibrium are satisfied by a definition of stress according to Airy's stress function, and the third equation of equilibrium becomes the generalized harmonic type of differential equation:*

$$\frac{d^2f}{dx^2}\cdot\frac{d^2z}{dy^2} - 2\frac{d^2f}{dxdy}\cdot\frac{d^2z}{dxdy} + \frac{d^2f}{dy^2}\cdot\frac{d^2z}{dx^2} = Z$$

where z *is the ordinate of the surface and* Z *the intensity of vertical load.*

The Client

The factory for Brynmawr Rubber is one of the largest in this Development Area. Its function is to produce from the raw rubber many kinds of rubber goods, including rubber made from dipped and foamed latex. Being designed for its purpose, it is unlike most of the factories in the area. The architects were instructed by the tenants, Brynmawr Rubber, but were commissioned by Wales & Monmouthshire Industrial Estates Ltd., acting as agents for the Board of Trade. They have, therefore, been acting virtually for two clients, and it might be thought that this arrangement would mean bureaucratic delays and even confusion but, once preliminary approvals had been given, this was not so. The building owners were perhaps uncertain about the unconventional and 'progressive' nature of the scheme and about the relative youthfulness of the architects, but these mists soon dispersed. Instructions were given to the architects by Brynmawr Rubber, but the plans had to be approved by all concerned. The sketch scheme was accepted but there were changes and modifications at a later stage which again had to be approved by all concerned, including the Board of Trade and the Treasury itself. The only major departure from the original sketch arose from a request by the building owner that the office block should be part of the main factory and not a separate building. This was for economic reasons, but is not, I think, to be regretted. The whole democratic relationship between manual and managerial staff—which was in effect a tenant's requirement—would have been less realistic if the original idea of a separate office block had been adhered to.

One advantageous factor was the welcome which the Board of Trade was able to give to the rubber industry at Brynmawr; a policy of building for 'basic industries in difficult areas' was being fulfilled. Brynmawr was certainly a 'difficult area' in that it had been a very black spot indeed in the days of unemployment —the blackest in Britain from 1923 to 1940. Rubber is certainly a basic industry in that rubber articles of some kind (medical, domestic, scientific or industrial) are wanted in war and in peace, even in slumps. Different emphasis may of course be placed at different times upon the production of different articles —gas masks may be replaced by baby-pants or baby-pants by children's bootees, and so on; but this in itself adds to the industry's stability and continuity. It also created for the architects—as we shall see—a major problem in flexibility. A further point in favour of siting the rubber industry at Brynmawr is that it provides a variation of labour: some 'sub-industrial' work or light work for women or for men who still bear the scars of unemployment, and some work of a heavier nature. These three points—Brynmawr's need, continuity of output and variation of labour—outweighed the fact that some managerial staff or technicians might find themselves in a remote or even foreign environment. This, however, has had to be remembered in planning and it was with such staff in mind that the Brynmawr and District Housing Society was formed. The Society will first build housing for these 'imported' key staff and then perhaps for the people of Brynmawr. The first section of the housing scheme is complete; it is an attractive layout incorporating district heating. The architects were Yorke, Rosenberg and Mardall.

In trading estates and flatted factories it is usual for the industrialist to be the tenant of his factory. When, however, the factory is to be designed for a specialised industry, by the tenant's own architects, and when the lease is comparatively short —in this case twenty-one years—the position is complex. Those involved have all had to use some foresight about a hypothetical future in which the factory might be put to some other use. This is not likely, but it had to be considered. For the ordinary run of factory in light and medium industry—the average workshop type—this might mean very little, but in a specialised industry, with specialised requirements regarding humidity, dust and light, or in an industry where the employer has views on amenity, beauty or social relationships, then flexibility and specialisation — theoretically opposites — have to be combined.

To some extent, therefore, one of the main problems—this combination of flexibility and specialisation—sprang from the economic relationship between building owner and tenant. Fortunately, however, one of the main specialist requirements was in itself flexibility. This eased the position. A factory, if fully functional, is after all in itself a machine for production. Now a machine may be flexible to a degree by having various tools and jigs attached to it—a problem for the mechanical engineer; the main production floor at Brynmawr is also a machine for production, also flexible to a degree since it can have a variety of plant attached to it from time to time, quickly and for various purposes—a problem for the architect. (If we continued the analogy we might add that most machines are beautiful.) Flexibility is technically essential to a general rubber factory, economically essential to the landlord-tenant relationship. The client's first instruction to the architects was therefore bound to be 'infinite flexibility'.

Once a satisfactory *modus vivendi* had been arrived at between the various bodies concerned, the architects were fortunate in their client. Brynmawr Rubber is a wholly-owned subsidiary of Enfield Cables. The chairman of both is Lord Verulam. The architects have received all their instructions informally and personally from Lord Verulam, who was in agreement with them as to what the nature of a contemporary factory should be—socially, æsthetically, technically.

The architects were first approached in May, 1945, and by the end of that month the site had been fixed. Those members of the partnership who were by then free from war service worked at Enfield gathering facts about the industry and doing basic research. Negotiations with the Board of Trade and Wales & Monmouthshire Industrial Estates took some months and this gave the architects 'time to think' and to assemble technical facts. Sketch plans were submitted in January, 1946, and have been changed little since. These plans were approved within a month and the working drawings and quantities were begun. For political reasons the first building project—the boiler house—was started as soon as possible, the contract for the boiler house and underground culvert being signed in August, 1946.

The scheme as a whole was carried out in three stages with three contracts: stage 1: the boiler house; stage 2: foundations and basement columns of the main factory; stage 3: the remaining and greater part of the building. Each stage went out to competitive tender on a schedule of rates with an approximate bill of quantities. This was done so that work could start without waiting for a final bill or full working drawings. Stages 1 and 2 were carried out during 1947 and part of 1948. Stage 3 began in July, 1948, and was due to be finished in September, 1950. It was, as a building, virtually finished and partly occupied in July, 1951. It is now in production although some plant is still being installed. The main cause of delay in the building programme was the severe weather early in 1947 when some ten feet of snow made Brynmawr inaccessible for weeks on end.

In analysing the main factory it will be necessary to explain the industrial process, but at this point it may be useful to set out some of Lord Verulam's other instructions to the architects, as he has summarised them for this article. They were all subject to many discussions from 1945 to 1948.

1. *Architects' Position*: In the development of a large new industrial project the architect must expect changes in intention, as in requirements, as the job proceeds. In the rubber industry in particular this is likely because of the return of natural rubber, following the end of the war in the Far East, and on account of new plastics coming on the market and the new processes by which a wide variety of end products can be manufactured.

2. *Numbers Employed*: A maximum of 1,000 people to be employed in the factory, assuming two and, in part, three shift working. Half to be men, half women, of all age groups. It is expected that most of those employed may never have worked in a factory. It is thought that 1,000 people in one factory is the maximum which one person can efficiently and humanly control. The factory, therefore, is *not* to be planned for extension. If the rubber industry expands at Brynmawr a second and entirely self-

contained factory will be built on the other side of the Brynmawr-Newport road. The boiler house siding has been designed to serve this. Of the total complement not more than 15 per cent are to work in the offices. The offices, like the production area, are to be highly flexible.

3. *Appearance*: The appearance of the factory itself is to be such as to cause it to be remembered and spoken of as an outstanding building in an out-of-the-way place. It is thought that appearance—together with amenities and good conditions—will attract labour in the district. This is proving correct.

4. *Working Conditions*: These must be good, special attention being paid to: (a) use and storage of safety clothing; (b) full clinical services for medical examination, casualties, dental, ophthalmic and chiropodial treatment; (c) a Labour Manager's Office close to the entrance; (d) good lavatories, cloakrooms and means of drying clothes; (e) day and night café for snacks and meals.

5. *Entrances*: These to be reduced to a minimum in order to simplify organisation and to prevent heat losses and stop wind blowing into the factory. In fact there need only be two entrances: one for *people*, one for *goods*. Everyone from floor sweeper to works manager to use one entrance which is to have some architectural importance. There is no objection to all goods entering and leaving by one entrance since the cubic volume is not likely to be great at any one moment. All goods (except coal to boiler house) will arrive and leave by road.

6. *Dust*: Owing to the extensive use of French chalk and other non-poisonous powders, the industry is a very dusty one. Therefore lighting should be good by day and night, since dust is best kept down by showing it up. The roof structure should have a minimum of dust collecting trusses and ledges. Ventilation must be good.

7. *Colour*: Very special attention is to be paid to the use of the right colours inside the building.

8. *Storage*: No storage is to be external. Storage space must nearly equal production space. Some commodities must not be stored in bright daylight. In South Wales snow or strikes may isolate a district for weeks; large basic stocks of water, coal, latex, oil, process raw material and finished goods must therefore be carried so that the factory can run for at least a fortnight without contact with the outside world.

9. *Services*: Many of the machines require a wide range of services, the chief of which are: (a) steam; (b) condensate return; (c) compressed air; (d) vacuum; (e) hydraulic power; (f) hot water; (g) cold water; (h) drainage for waste water; (i) cooling water; (j) soft water; (k) AC and DC electricity. No gas will be available except from cylinders in the laboratory.

10. *Fire Risks*: Fire risks in most parts of the factory will be high and measures must be taken accordingly. This is specially so in the printing and spreading shop, which must be isolated.

11. *Snow*: Snowfalls are very heavy and occur almost every winter, with drifts of from ten to twelve feet. The roofs must carry these loads and snow clearance must be studied.

12. *Maintenance and Economy*: Maintenance costs must be kept low, also servicing costs. The architects and engineers will start by being able to advise on this matter without hindrance and drawbacks of existing installations. It is intended to start to make a nett profit at a turnover level of £1,500,000 at 1945 prices, i.e., the break-level point is to be around one-and-a-half-million pounds turnover.

All these instructions—given here in as succinct a form as possible—influenced the design almost as much as did the actual industrial process; in fact their interpretation created the architecture.

The Site

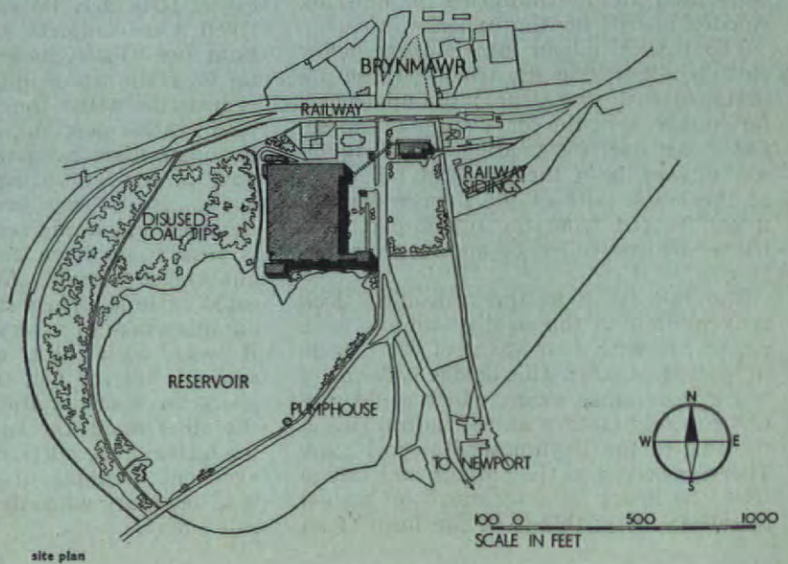
As early as May, 1945, the architects and their client inspected alternative sites at Brynmawr, but had little difficulty in making a decision.

Brynmawr itself is about 1,150 feet above sea level (9, p. 146), with a bad climate—heavy rainfall and prolonged winters of snow and cold. Almost all round, within three or four miles of the town, the land rises to over 1,800 feet. Before the war more than 80 per cent of insured adult males were unemployed for years on end. Housing conditions are as bad as anywhere in Europe—no damp courses, no water supply, no sanitation, no road access, inadequate accommodation. They are still lived in and it will be a long time before the Council can do more than touch the fringe of the problem. The town lies on the northern outcrop of the coalfield but is no longer even a colliery town, its coal measures being virtually exhausted. The first glimmer of hope came in 1938 with the establishment in Brynmawr of Brynmawr Bootmakers, and now in 1952 the latest stratum of social history is being laid down.

On the southern edge of the town, and separated from it by the railway, is a saucer-shaped hollow, backed to the north and west by the railway embankment, by spoil-heaps and natural slopes, but more or less open to the mountain landscape to south and east (3, p. 146). Here, 150 years ago, the great ironmaster Crawshay Bailey dammed a mountain stream, the Ebbw Fach, to make Waen Pond—a reservoir 18 acres in extent and 17 feet deep from which he could feed water to his ironworks at Nantyglo. The ironworks have long since become derelict, but the reservoir is part of the site for the new factory. It is surrounded by old colliery workings but has been partly dredged and will now supply Brynmawr Rubber with 1,000 gallons of water per minute for cooling purposes. The new pumphouse is a simple cylindrical structure built with old stone from a 19th century ruin further down the valley. The new dredging has deepened the reservoir to about 20 feet in the immediate area around the pumphouse, and a 12 in. supply pipe is taken round the reservoir's perimeter to the south-east corner of the main factory. To assure a controlled supply to the reservoir the Ebbw Fach has, on the western side of the factory, been canalised into a brick culvert.

The total area leased to Brynmawr Rubber, including the reservoir, is about 40 acres. The factory itself occupies about 120,000 square feet. Much of the area is honeycombed with old colliery workings with consequent foundation difficulties; these are inherent to all buildings in the district. In other ways the site was almost ideal. The factory area—between the railway and the reservoir—is sheltered to the north by the railway embankment and the rising ground on which the town is built. It is sheltered from strong western gales by the old spoil-heaps; to the south and east it has a magnificent outlook. The ground falls fairly steeply from north to south, to the reservoir shore. The Brynmawr-Newport road forms the eastern boundary of the site (3, p. 146).

The site, therefore, presented seven outstanding features for the architects' consideration: (1) Foundation problems arising from colliery riddled ground; (2) planting problems arising from the poor soil; (3) road and rail access; (4) the reservoir as an amenity and as an industrial asset; (5) prospect; (6) fall of the ground from north to south; (7) landscape setting of exceptional grandeur demanding careful study of the form and scale in relationship to it; neglect of this



site plan

last point in other factories in the area causes them, whatever their intrinsic merits, to remain as scars. The first two points were liabilities, the other five were all assets if properly handled. It was the job of the architects to exploit them so that they should ultimately be an integral part of the design.

The whole of the planting, gardening and landscape design of the 40 acre site is dealt with elsewhere in this article.

The Boiler House

The first section of the whole Brynmawr scheme to be built was the boiler house, a separate building about 230 feet from the main factory and on the other side of the Brynmawr-Newport road.

Obviously solid fuel had to be used. It is so essentially the main local product that it would have been undiplomatic as well as uneconomic not to use it. This, together with the position of the boiler house at the bottom of a 25-foot embankment carrying the railway which transports the coal, were two basic facts dictating the general design. Compared with the main factory the boiler house is a very subsidiary building, but designed as it is to contain four boilers, an incinerator and an unloading dock for coal trucks, it is technically interesting. It is a two-level scheme, about 105 ft. × 57 ft. on plan, and 46 ft. high to the top of the vault over the unloading dock.

To consider the upper level first: bottom-opening railway trucks will be run into the dock to supply the hoppers which, in turn, will gravity feed the automatic stokers at the lower level. As trucks may have to be unloaded in any weather, including the very severe Brynmawr winter, protection was essential. The unloading dock (6 and 7) is therefore covered with a semi-elliptical thin-slab vault roof comprising a 4-in. slab, nominally reinforced and stiffened by four intermediate ribs and two end ribs. The rise of the semi-elliptical vault is 26 ft. and the width of the springings is about 29 ft. The eighteen supporting columns are at about 17 ft. centres transversely, and the vault and the overhanging parts of the pyramidal hoppers are on cantilevers. Roof centring was made for one bay only, and was a trestle on rails. Steel plates were used for the shuttering of the soffit, wooden boards for the upper surface.

The trucks unload into hoppers below and on either side the track. These are designed with two slopes: the upper one, for storage, is at the coal's angle of repose; the lower one, for feeding the Hodgkinson stokers, is at the angle of fall. Thus as the lower part of the hopper empties it can be fed from the upper part. The trucks are controlled by an electric windlass.

The rail track to the unloading dock is connected to the nearby sidings by a r.c. bridge with four spans of 22 ft. each, supported on piles. This bridge is designed to carry a branch siding which could supply a second factory on the vacant site to the east of the Brynmawr-Newport road. There is access to the sidings and bridge from the lower level by means of a steel spiral stair (8); this is in the form of an extended helix supported only at the top and bottom, the strings, treads, risers and handrail all playing a structural part. Its total rise is 25 ft. 6 in. It is a nice little *tour-de-force* in design.

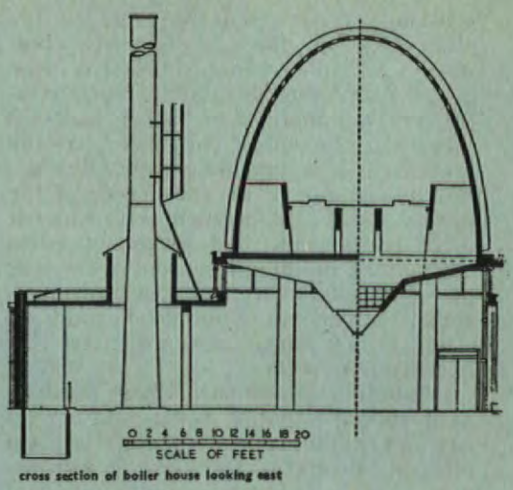
The lower level consists of the boiler room, an incinerator room and minor accommodation such as fitters' shop, lavatory and store. Over this minor accommodation are the tanks which supply the flushing system for removal of ashes from boilers to ash pits, the water channels being just below boiler room floor level.

The boiler room, with its apparatus and comparatively light form of structure, had to be completely disconnected from the vibration of the trucks at the upper level. This, again, was a basic factor which influenced simultaneously both structure and æsthetics. The upper level is supported on eighteen r.c. columns each 2 ft. 0 in. × 11 in. The boiler room is a simple brick structure built around these columns, but quite independently of them. The boiler room also has a continuous clearstory which actually and æsthetically disconnects it from the unloading dock. Opposite each boiler is a large window, completely removable for replacement of the boilers.

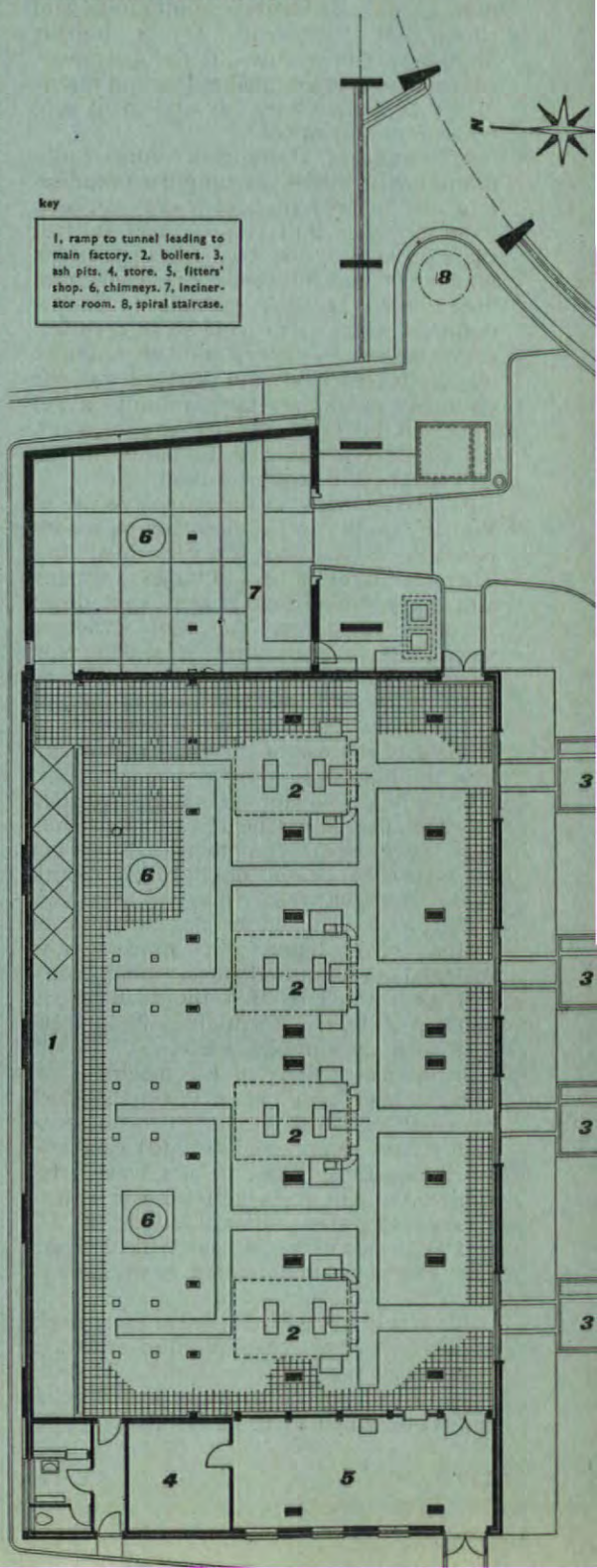
The coal is fed by gravity to the Hodgkinson stokers; these in turn serve three (eventually four) Davey Paxman 'Economic' Boilers, each with a steaming capacity of 6,580 lb. per hour at a pressure of 150 lb. per square inch.

An underground service duct from the boiler house to the main factory has been built under the road. This carries steam and other services to the factory. The duct is wide enough to form a truckway so that refuse can be passed back from the factory to the incinerator.

The boiler house as a whole is an interesting structure. Its main forms are derived with complete logic from its functions and its site. Its architectural character is on the whole appropriate and yet—compared with the main factory—it seems rather precious. Apart from the unfortunate diamond panes in the end window of the unloading dock, the boiler house is—to my mind—rather overdesigned and would seem, if such a thing is possible, to have been reasoned about almost too closely. Although a complicated little structure it is, after all, only an appendage of a very much bigger one. It was built first and this perhaps accounts for the fact that its subordinate character was not fully appreciated. On the other hand, the little weigh-house in the factory forecourt—designed last—is an excellent example of the restraint that is so necessary when designing tugs alongside liners.



cross section of boiler house looking east



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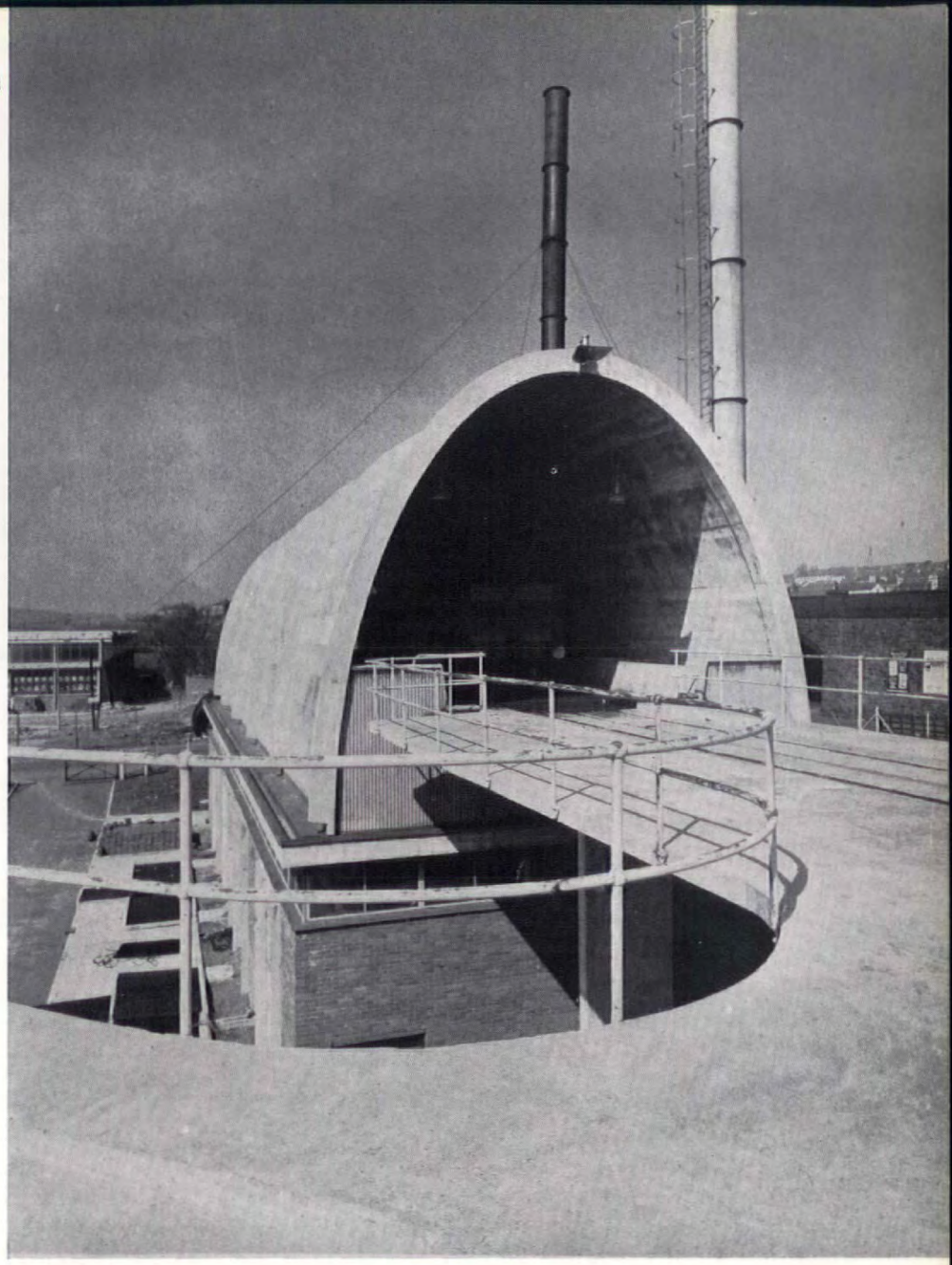
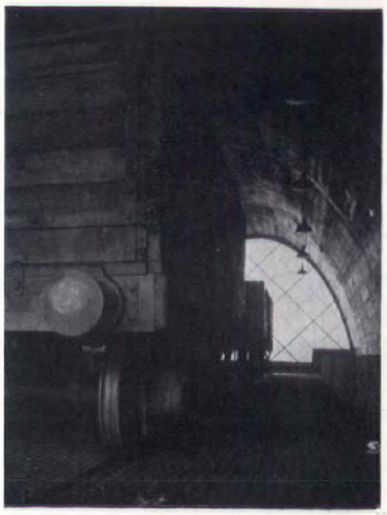




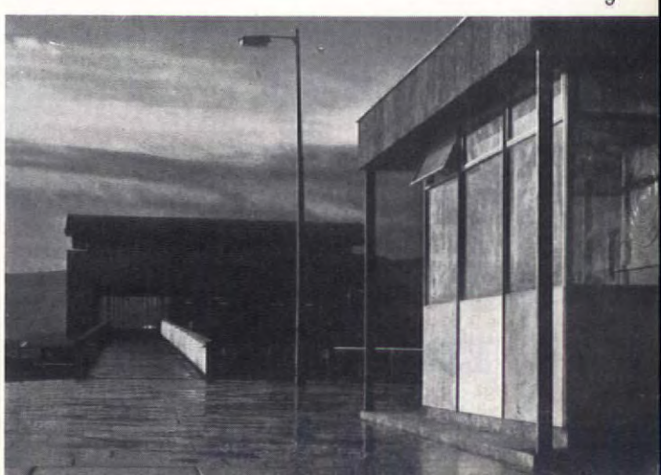
7

8

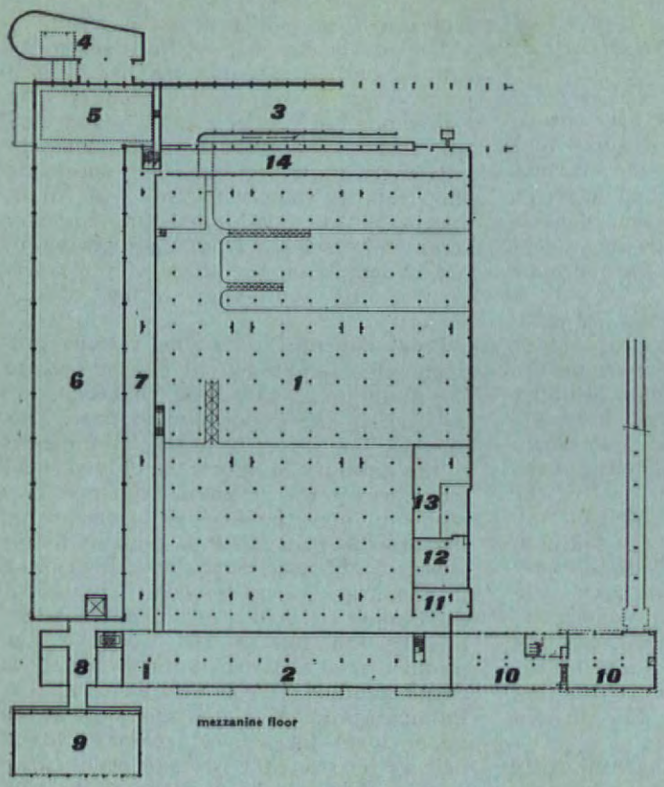
6, the upper level of the boiler house: the fuel trucks unload in the shelter of the semi-elliptical vault, into hoppers which feed the boilers at the lower level. The branch line in the left foreground is designed to serve a future factory. The architects are not responsible for the prefabricated stacks. 7, inside the upper level of the boiler house: trucks are controlled by electric windlass. 8, the spiral access stair from the lower level of the boiler house to the rail tracks on the upper level. This stair, an extended helix without newel and supported only at top and bottom, is referred to in the description of the boiler house.

9, the small weigh-house controls all entry to the factory--persons and goods. Beyond it is the ramp up to the entrance hall, which is illustrated more fully on the following page.

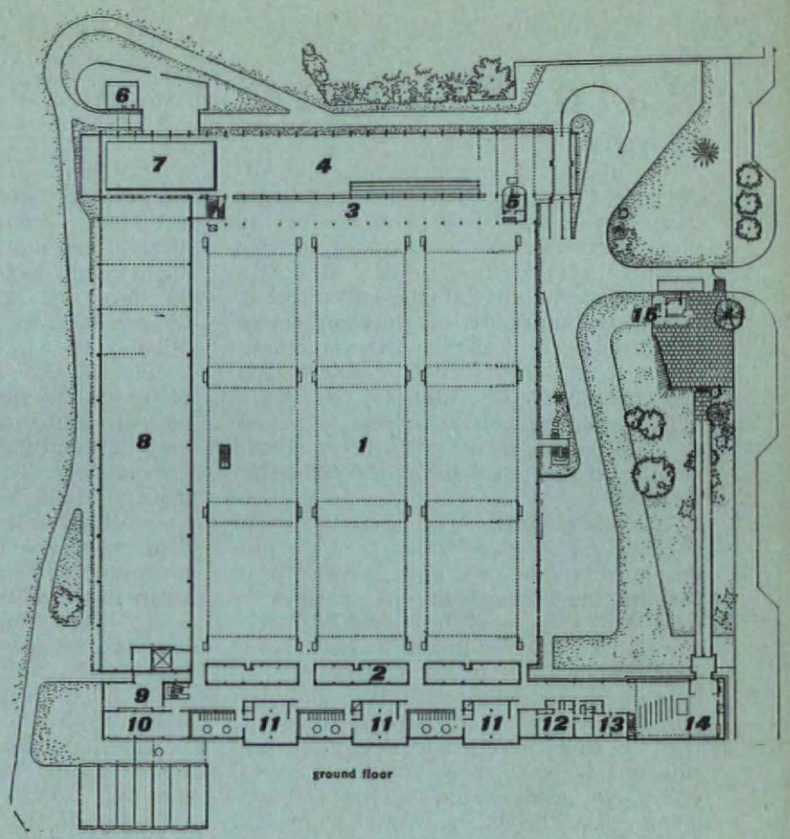
9



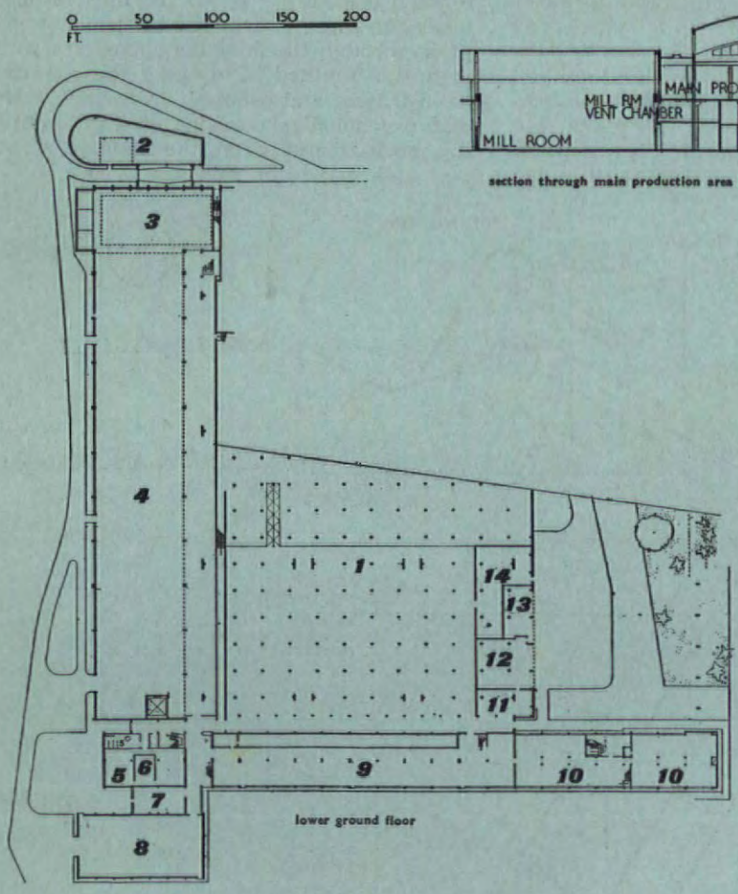
10, the end wall of the entrance hall, 11, the entrance hall used by all grades of staff and giving immediate access to almost all parts of the factory. The large double window—looking down on the forecourt—is to have planting between the two planes of glass. 12, the entrance hall showing card racks and time clocks. The painted ceiling was the work of students of the AA and Bath Academy of Art, being designed at their joint summer school. 13, the ramp to the entrance hall, 200 feet long and 12 feet wide.



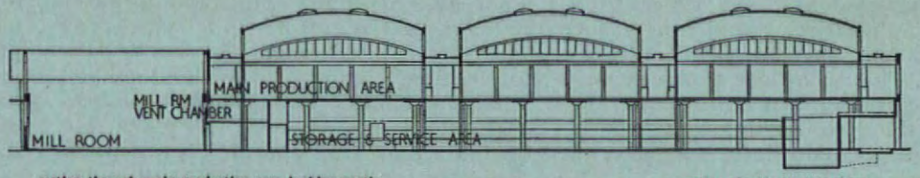
mezzanine floor



ground floor



lower ground floor



section through main production area looking north

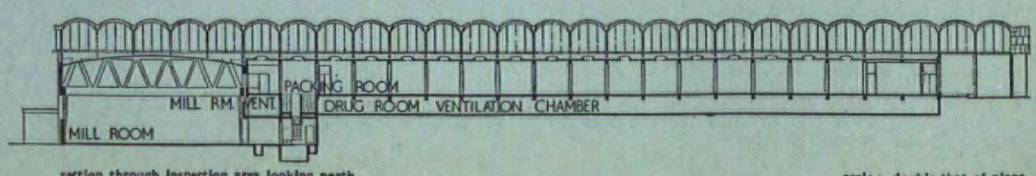
scale: double that of plans

keys

ground floor plan. 1, main production area. 2, production offices. 3, inspection area. 4, drug room. 5, receiving and dispatch office. 6, carbon black (upper part). 7, Banbury Corner. 8, mill room (upper part). 9, kitchen. 10, canteen. 11, cloakrooms. 12, medical officer. 13, labour officer. 14, entrance hall. 15, weighbridge office.

mezzanine floor plan. 1, basement store. 2, production area vent room. 3, servicing below drug room. 4, carbon black store (upper part). 5, Banbury Corner (upper part). 6, mill room (upper part). 7, mill room vent room. 8, ventilation room. 9, printing and spreading shop (upper part). 10, offices. 11, workshop (upper part). 12, garage (upper part). 13, substation (upper part). 14, drug room vent.

lower ground floor plan. 1, storage. 2, carbon black store. 3, Banbury Corner. 4, mill room. 5, changing room. 6, showers. 7, mixing room. 8, printing and spreading shop. 9, engineers' stores and fitters' shop. 10, offices. 11, workshop. 12, garage 13, transformers. 14, substation.



section through inspection area looking north

scale: double that of plans

Main Factory *industrial processes and flow* 1

Two distinct flow systems must be considered: (1) the industrial flow of goods through the factory, from the entry of raw material to the despatch of the end product; (2) the human flow from the entrance ramp through the entrance hall to the various points of work or leisure. When these are understood the accommodation can be analysed architecturally and structurally (see diagram below).

The actual industrial process—in so far as it need be dealt with here—should emerge in our analysis of the industrial flow.

All transport is by road—whether of raw material to the factory or of the product to customers and agents. Apart from fuel for the boiler house no provision is made for rail access. The industrial flow is circular, i.e., the volume of goods is never likely to be such at any one moment as to necessitate separate arrival and despatch points. This influenced the whole plan in that final production point had to coincide with raw material arrival point. All goods—both ingoing and outgoing—pass through the dual control of the weighbridge, and the loading-unloading dock in the north-east corner of the factory. This system does reduce to a minimum both checking and supervision and cuts down the area of lorry roads on the site. The main floor of the factory is the upper ground floor but owing to the contours, the loading-unloading dock, although on this main floor, is actually at ground level.

Incoming goods consist primarily of raw rubber in large cases, and the various powders and oils which have to be compounded and mixed with the rubber. This process of compounding takes place in the drug room (approximately 318 ft. × 45 ft.). Incoming goods can proceed direct from the unloading dock to the drug room, or by trolley down a ramp to storage space (beneath main production area) whence they can return by the same route to the drug room when required.

After the drug room process the resulting product enters the Banbury Mixers. These very large pieces of plant occupy a space marked on the diagram as the Banbury Corner (approximately 75 ft. × 35 ft.) and is a keypoint in the whole lay-out. It is the link between the drug room and the next main area, the mill room, and is placed at the intersection of the two. The Banbury Mixers—machines for mixing and chewing—involve an 18 foot drop in the process, and this gives the difference in level between the drug room and the mill room, the former being at upper ground floor level and the latter at lower ground floor level.†

Before coming to the mill room, however, it should be mentioned that one of the ingredients of the finished product is carbon black—a powder needing very special provision owing to its dirty nature—black and finely divided. A small and completely closed annexe—the carbon black store—has been built just north of the Banbury Corner. The carbon black is put into this in sealed bags and from there mechanically fed into the Banbury Mixers.

The mill room (approximately 334 ft. × 64 ft.) has a height of 36 ft. to the apex of its vault and thus runs right through the lower ground floor, mezzanine and upper ground floor. This means that from the main production area one can look down the mill room. It should be noted that the drug room is at the natural level of the northern part of the site and the mill room at the natural level of the southern part; this is sound since both these rooms—unlike the main production area—contain heavy plant which has to be permanently fixed on ground foundations. The 18-foot drop in the process caused by the height of the Banbury Mixer itself is thus taken up by the natural fall in the ground.

At the northern end of the mill room the compounded rubber emerges from the bottom of the Banbury Mixers as an amorphous mass. As such it goes into one or more of the 'open' mills which roll the material into rough sheets or slabs for feeding to presses, calenders and extruding machines. These convert the product into sheets or strips ready for sale or into chunks of appropriate size and gauge for feeding to the next point in the flow line—the main production area.

The spreading shop is, for reasons of fire, an entirely separate annexe at mill room level. It is concerned mainly with 'spreading' of rubber compounds on textile sheets. The solvents used mean an extremely high fire risk. The spreading shop (approximately 88 ft. × 44 ft.) is, except for the small connecting corridor, completely isolated from the main building. It stands on the shore of the reservoir at the south-west corner of the factory.

From the mill room the various products, etc., ascend by lift or conveyor to the main production area, thus bringing us back to the upper ground floor. This upward flow (apart from the fall inherent in the Banbury Mixer) is the only vertical movement in the industrial sequence. This seems to mar the smooth perfection of the process although it is difficult to see how it could have been avoided—at some point an upward movement to counteract the Banbury Mixers was inevitable. Moreover by the time the lift is reached the product has assumed a form which is easily handled. It was also essential that the main production area should be at the upper level for several reasons: (a) it had to be over the storage space since this itself had to be as large as the production area; (b) space below the production area was needed for the various leads and pipes which feed the production plant through the floor (as opposed to the primitive method of slinging these leads from trusses and beams); (c) for physical and psychological reasons of good lighting, outlook and so on, the main production area had to be raised.

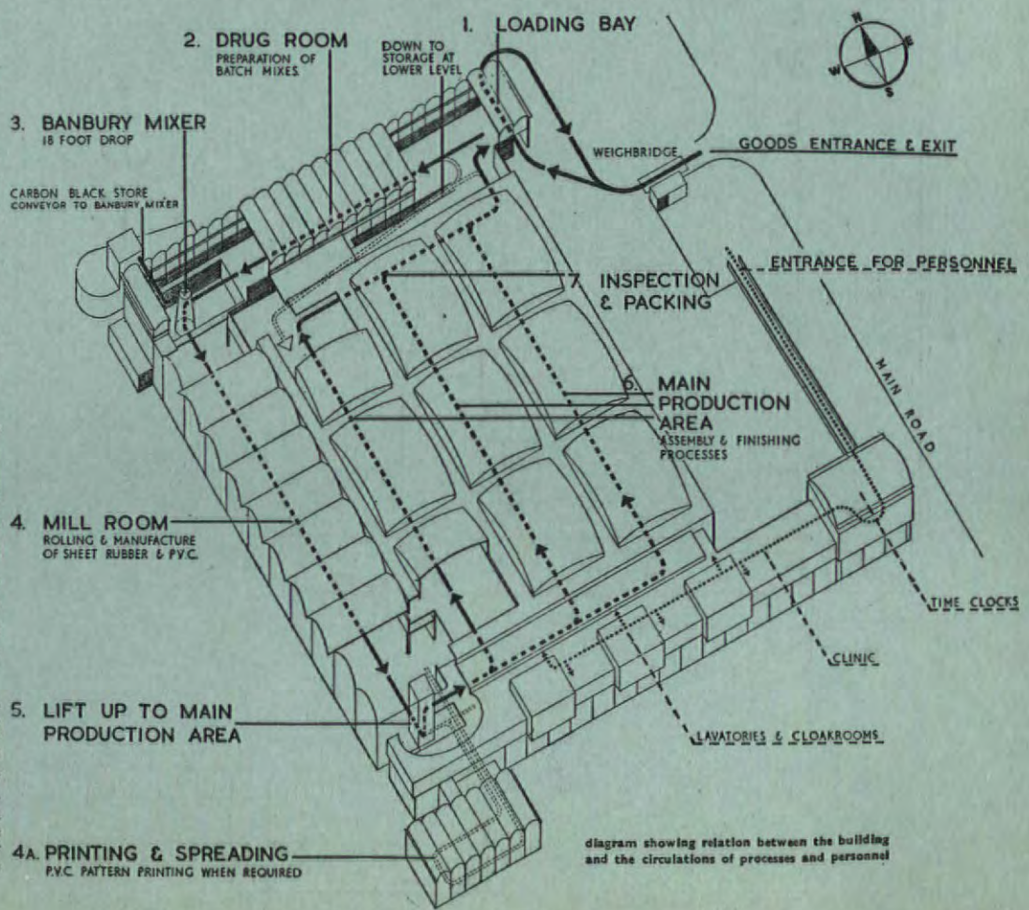
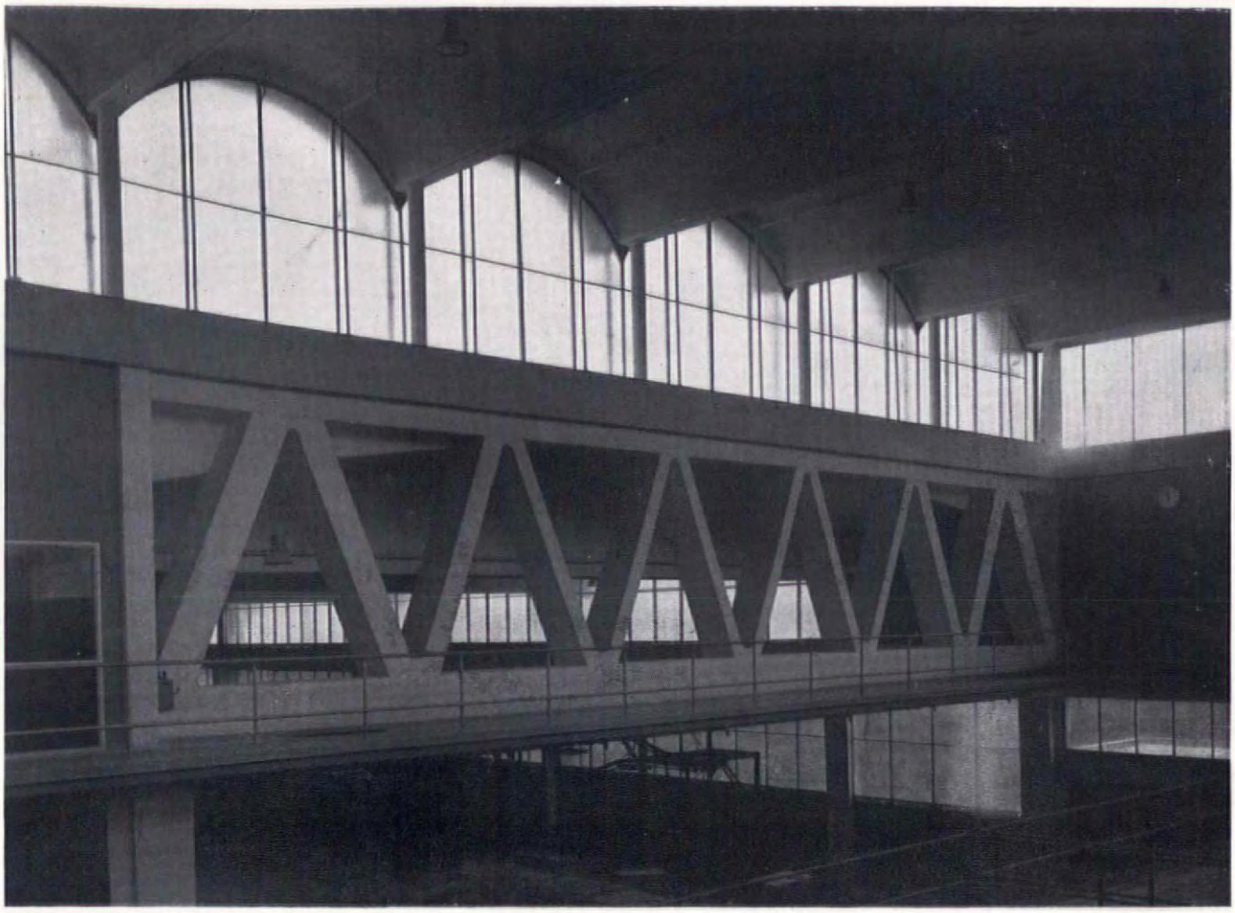


diagram showing relation between the building and the circulations of processes and personnel

† In an article in the RIBA Journal (January, 1949) this was referred to as the basement; but since its southern portion at any rate is level with the ground it is better to call it lower ground floor.

14



14, the Warren girder at the junction of mill room and drug room. 15, the Banbury mixer —a keypoint in the industrial flow—causes an 18-foot drop in the process between drug room and mill room, exploiting the change in ground level. The mixer is canary yellow against blue and grey walls. 16, the north side of the drug room. A travelling crane runs on the beams at clerestory cill level.

15

16

17

18

17, the main production area before the installation of plant, showing part of the 77,000 superficial feet of floor space and one of the nine domes of shell concrete. The vertical risers of the heating and ventilation system can be seen between the structural supports—the only exposed ducts in the building. 18, the exterior of the main production area at night, looking through the glass east wall.

The main production area is the heart and core of the factory. All other accommodation is subordinate in that it either administers to the area in some way, or supplies it with its semi-processed product. It has a working floor area of over 77,000 feet super. Its semi-processed product arrives by the lift from the mill room in its south-west corner and from there is distributed to the plant. The main production area is supervised by three production offices (glass 'boxes' each 63 ft. × 14 ft.) one of which is also equipped as a laboratory for testing materials. The floor area of 77,000 feet super had to be kept as free as possible from structural supports, and the whole production system flexible so that machinery—which is here comparatively light—can be changed frequently according to requirements of the external market. These two points—unbroken floor area and flexibility of production—were related since a normal stanchion spacing would have interfered with variations in machine arrangement on the floor.

The whole flow of the main production area is from south to north—the production offices at the south end having their counterpart in an inspection and packing area (184 ft. × 20 ft.) at the north end, where goods are examined before despatch or storage.

In the north-west corner of the main production area is the mill room foreman's office—a strategically placed 'glass box'. He can look over the Banbury Corner, along the drug room and down on to the mill room—as well as over the main production area. He has a small private stair down to the mill room.

In the north-east corner of the main production area is the roller-shutter access to the loading dock whence goods can pass from the inspection area. Here, too, we come back to the head of the ramp down to storage, whence goods not needed for immediate despatch can pass. This completes the full circle of the industrial flow. Within the process all movement of goods is, as far as possible, palletised or by conveyor.

human flow 2

Everything and everybody entering the factory passes the little weigh-house in the forecourt. Lorries with goods pass on one side. People on the other, whence they go up the concrete ramp—200 feet long and 12 feet wide—to the entrance. This ramp, since it runs parallel to the road, has great architectural value; visually it is almost equal to an additional wing on the building in that it adds to the feeling of enclosure round the forecourt. It has shoescraper grids at the top and bottom.

The placing of the main production area on the upper ground floor made it desirable to bring all workers, managerial and office staff, into the factory at this level. Apart from the loading dock this main entrance is the only entrance—any other means of access that appear on the photographs are only for escape. A light, spacious, clean and well organised entrance hall was therefore essential. If the Banbury Corner is a keypoint in the industrial flow, this entrance hall at the south-east corner of the factory is a keypoint in the human flow. It contains all notice boards, racks for clocking-in cards and a small shop.

From this entrance hall one wide corridor runs the full length of the south block. On its northern side this opens into the main production area thus dispersing workers into the factory very quickly. Its second function is to serve the south block—the one main unit of accommodation which does not come at all into the industrial flow.

The south block, on the upper ground floor, contains: (1) a labour office adjoining the entrance hall; (2) a well equipped clinic and doctor's and dentist's rooms; (3) all the main cloakrooms and lavatories, so that these are both between the entrance hall and place of work and immediately across the corridor from the main production area; (4) staircase for mill room workers to reach the lower ground floor; (5) café and kitchen. (Note: the word 'café' is used, since it is too small to be called canteen; a canteen extension is envisaged.)

The south block mezzanine contains: (1) vent room space for the main production area; (2) about 5,500 feet super of administrative office space.

The south block lower ground floor contains: (1) fitters' shop; (2) a further 5,500 feet super of administrative office space; (3) changing and shower rooms for mill room workers.

All human flow—other than people actually machine minding—is within the south block. All non-industrial rooms are also in this block, with outlook across the reservoir to the mountains.

general analysis 3

Having outlined the industrial and human flow we can now summarise the main units of accommodation. There are only five, plus two annexes and three separate buildings, two of which are very small (see 19, below, for grouping of units). Superficial areas given are approximate.

The separate buildings are:—

1. The Boiler House (already described).
2. The Weighbridge House.
3. The Pumphouse (across the reservoir).

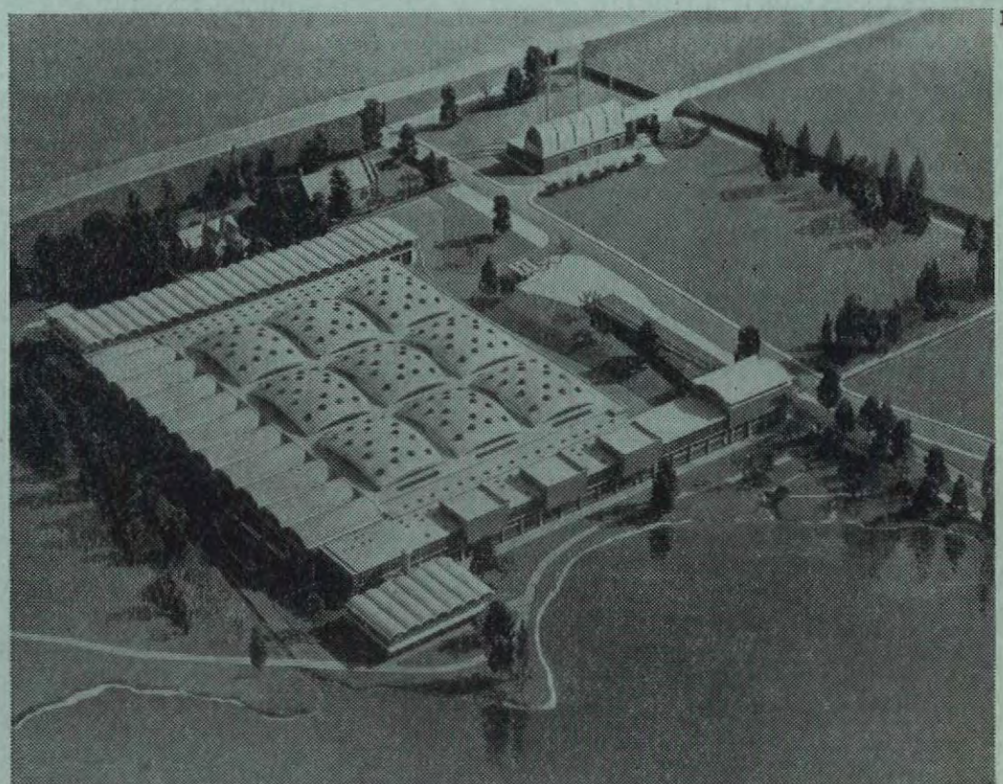
The annexes are:—

1. Carbon Black Store (2,500 ft. super).
2. Spreading Shop (3,872 ft. super).

The main units of accommodation in the factory are:—

1. Main Production Area (77,000 ft. super).
2. The Drug Room (14,420 ft. super).
3. The Mill Room (21,376 ft. super).
4. The South Block (three floors each 17,120 ft. super).
5. Storage Space (77,000 ft. super).

19

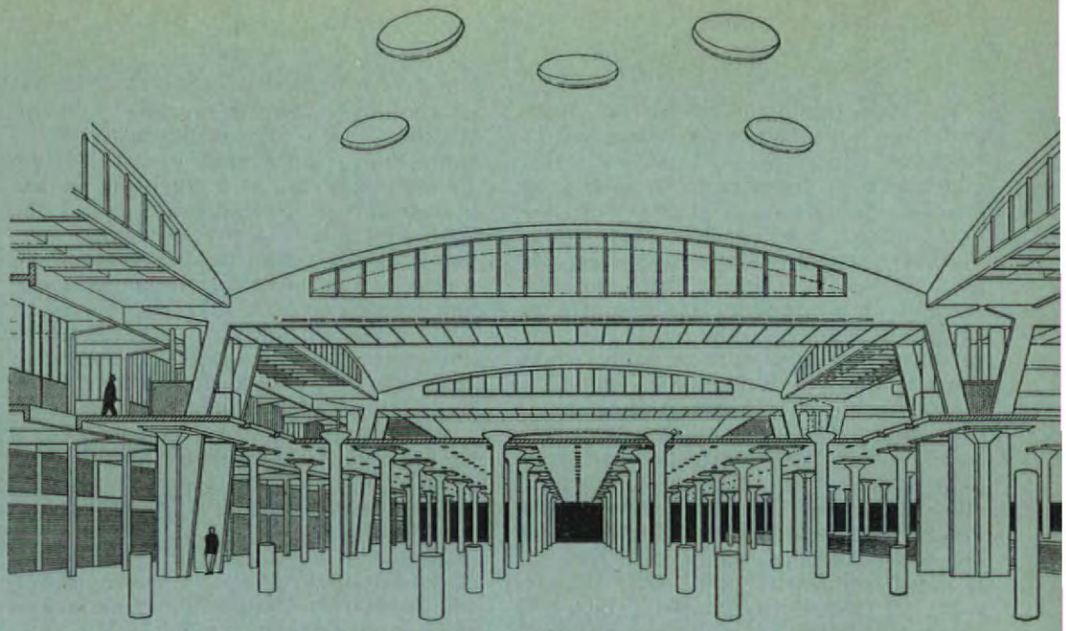


units of accommodation *making up the main factory (units 1—4 referred to in the text). The nine domes cover the main production area; the Drug Room is on the far side; the Mill Room on the left; the South Block is in the foreground on the shore of the reservoir; the Printing and Spreading Shop annexe is in the left foreground and the Boiler House in the distance. The Entrance Hall—part of the South Block—is seen with its ramp approach in the right foreground.*

These five units—with the two annexes loosely attached to them—comprise the main factory. Nos. 2, 3 and 4 (drug room, mill room and south block) surround No. 1 (main production area) on the north, west and south sides; No. 5 (storage space) is beneath and roughly equal in size to the main production area. This leaves the main production area with an outlook eastwards across the forecourt to mountains, but otherwise dependent upon clear-story and top light.

The simplicity of the layout of Units 1-4 emerges in the massing, each of the units being a defined and self-contained structure—structural form and design being derived from the function of each unit. Full use is made of the 'loose link' to give clarity to the composition, and to enable each unit to receive appropriate structural treatment. Unit 5 (storage space on the lower ground floor) does not, of course, emerge in the same way, but it does serve one of the functions of pilotis in lifting the main factory—virtually a one-storey building—above all contours, annexes and other distractions. Only on to the forecourt does the storage space emerge as a blank wall—a solid platform for the fully glazed eastern wall of the main production area. It is interesting to consider whether this blank wall might not have been kept back and the last row of columns—now inside the storage space—revealed externally as pilotis, giving shadow rather than solidity below the main production area. It would have been a more self-conscious treatment but not out of place on to the forecourt.

Two major factors led to the decision to use reinforced concrete: (1) the form of the structure as designed saved 65 per cent steel as compared with normal structural steelwork; (2) the vast amount of dust caused by the process demanded special conditions; exposed beams, trusses, ledges (even flat cills) had to be virtually



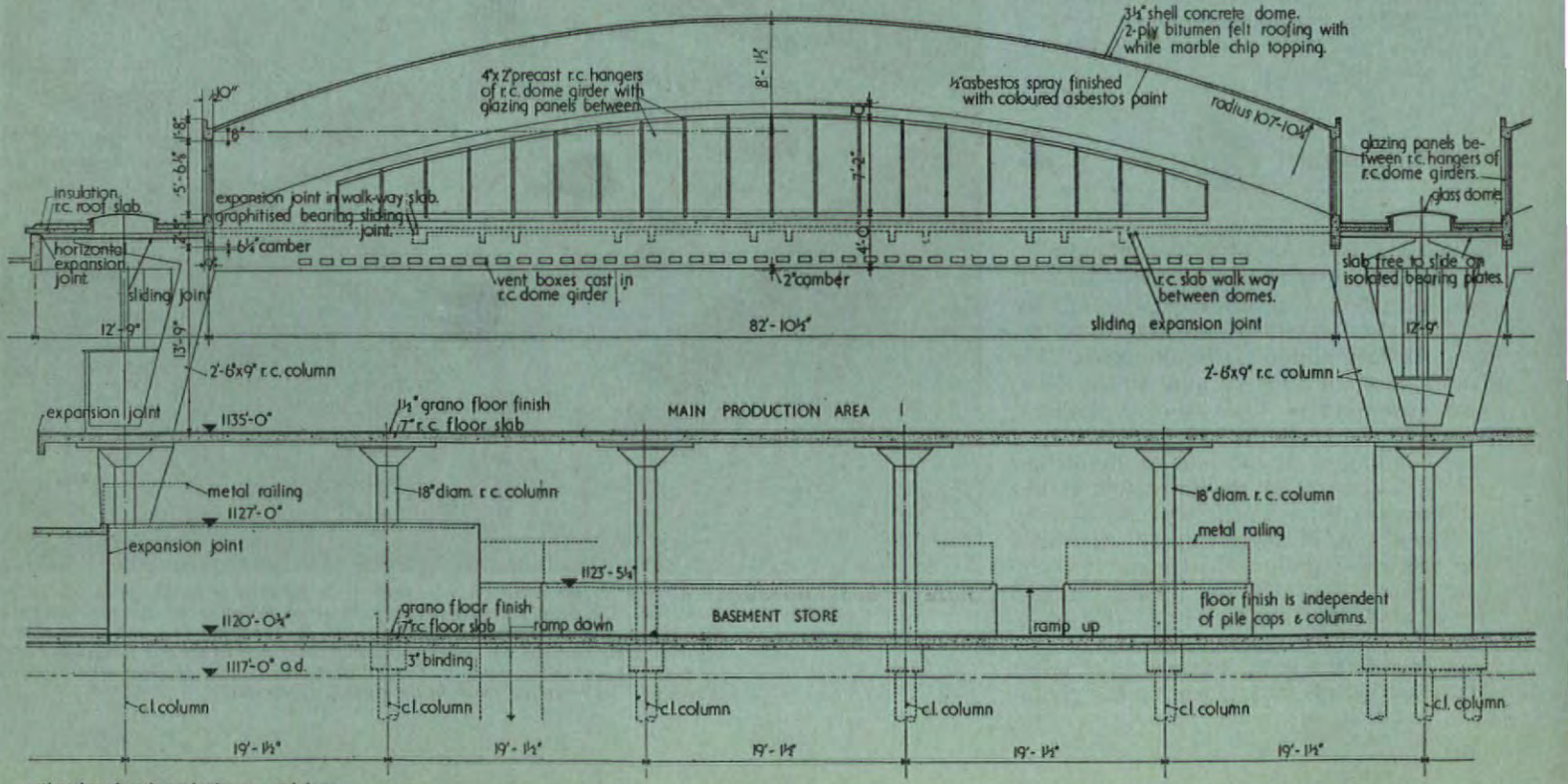
sectioned perspective of main production area with storage basement below

eliminated; also ducts, cables, pipes and other services to plant. Ideally the interior of the main production area, it was felt, should approximate to the inside of an eggshell. Generally, therefore, it was logical to exploit shell construction to the limit, whether in the form of vaults or domes, and to make ventilation and other services integral with the structure. It is with these factors in mind that we examine each unit of accommodation.

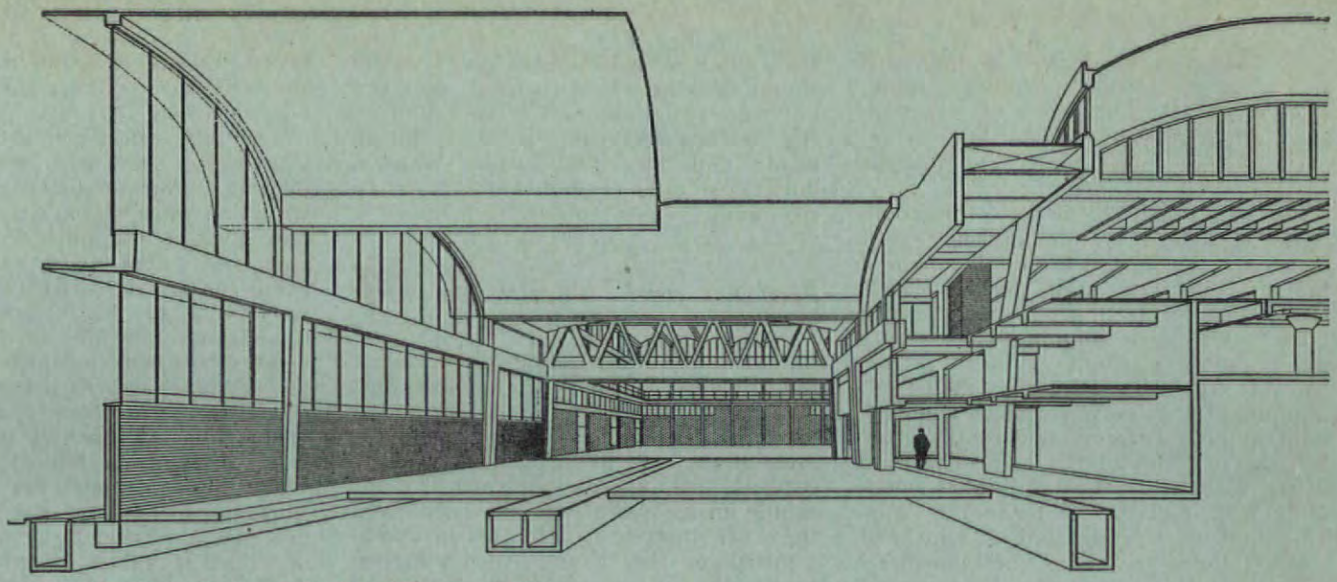
Foundations: About an acre in the north-west corner of the site was known to have been mined on the pillar and stall method about 50 years ago. About 500 tons of cement grout were pumped into the workings. The remainder of the site had 3 ft. to 4 ft. of ashes covering boulder clay on a sandstone base, the depth of which varied from 10 ft. to 12 ft. Columns and other structural supports are on piles bearing on the sandstone; these are bored cast *in situ*, of 15 in. to 19 in. diameter, with working loads of from 40 to 60 tons on each.

Lower Ground Floor: The storage space beneath the main production area has about 150 18-in. diameter columns, mushroom headed, carried on single piles. This storage space, which was required to be dimly lit, has an impressive Egypto-logical quality. It is almost equal in area to the main production area above, but—where the forecourt drops to lower ground floor level—it has spaces partitioned off for garage, sub-station and transformer, all accessible from the forecourt.

Main Production Area: This had to have as large a portion as possible of its 77,000 superficial feet unbroken by structural supports. Accordingly, it is covered with nine domes (the largest of their kind in the world) each on a rectangular plan with spans of 85 ft. and 62 ft. The crown of each dome is about 8 ft. above the springing and the curved surface is formed to two radii, one of 108 ft. and one of 82 ft. 9 in. The thickness of the concrete is 3 in. The stresses are entirely compressive except near the corners



section through main production area and dome



sectioned perspective through mill room with main production area on the right

where tensile stresses occur. Reinforcement is two layers of hard drawn steel wire fabric of 6 in. mesh; across the corners are ½ in. mild steel bars. Each dome is supported at its edge by a r.c. bowspring girder, of which the bottom boom is horizontal and the top one curved to follow the curvature of the dome; the two are connected by hangers each containing two ⅜ in. mild steel bars, which are in tension. The ends of the girders are supported on sloping columns, rectangular in cross-section, so inclined that they come together at floor level, thus taking up less floor space and concentrating the load on one group of pile caps below floor level (see drawings on facing page).

In the valleys between the domes are 12 ft. walkways; the r.c. slabs forming these are integral with the bottom boom of the girders. To prevent restriction of movement where four domes meet the intervening slab is cruciform; to the top of the supporting slabs at this bearing a phosphor bronze plate is fixed and on the underside there is a graphitised metal plate.

The shuttering for the domes was made with 2 ft. square standard steel pans on tubular scaffolding bent to the radii of the domes and supported on steel jack shores. Each dome was poured in two working days, and shuttering struck ten days later. The tops of the domes are covered with roofing felt finished with a white marble chipping. Experiments are being carried out with snow melting cables. (Note: Sections of this article dealing with ventilation and with daylight and acoustics must be read if all aspects of the design of this production area are to be appreciated.)

The production floor is a flat 7½ in. slab with dropped panels giving an 11 in. thickness at column supports. The whole of the floor area is pierced at approximately 6 ft. centres with 7 in. square holes. Through these come all the services—cables, pipes, etc., serving the plant at any point on the floor. Thus is complete flexibility achieved without the cables and pipes being exposed as dust collectors. When not in use the holes in the floor are closed with flush cast-iron covers (see section on facing page and 21, p. 163).

The main production area is impressive—big in scale and big in fact, and meeting all requirements. Lloyd Wright exclaimed that he wished he had had such an opportunity as this! The affinity with Byzantine work is not less obvious for being accidental. Unbroken floor area, smooth and continuous surfaces everywhere: these were—for very different reasons of course—requirements of both the fifth century and of this factory. Both solved the problem through an advanced technique of dome construction. The results are at least visually analogous.

The Escape Stair to the forecourt—'a reinforced ribbon, bent and doubling back on itself in its rise from the ground to the upper floor'—needs a highly technical description and must be noted here as a charming essay in abstract sculpture by Ove Arup & Partners.

The Drug Room: This has 26 three-centred thin slab vaults each 12 ft. 9 in. wide and 53 ft. long. The actual span is 45 ft. with a 4 ft. cantilever on either side. The vault slabs are 2½ in. thick at the apex. The valley beams are supported on 8 in. diameter columns strengthened to 8 in. × 12 in. oval on the north side to meet wind pressure. There are hinged expansion joints at the crown of the ninth and eighteenth vaults. A five-ton travelling crane runs the length of the drug room on beams at clearstory cill level. The sudden but logical lightening of the structure above crane level has architectural merit—emphasising the continuity of the glazing in the upper part of the walls. The 12 ft. 9 in. bays of the drug room are—for this factory—a small unit; they tend, perhaps, to make this room look over-designed, or, rather, over-constructed for its size. Externally, however, they act as a foil, set the scale for the big domes and give piquancy where they appear on the north side of the forecourt.

The Mill Room: This has ten three-centred thin slab vaults each 30 ft. wide and 68 ft. 6 in. long, cantilevered by 4 ft. 6 in. on the west side only. The slabs are 2¾ in. thick. Where the roof over the drug room joins that over the mill room there is a reinforced concrete Warren girder spanning 64 ft. and 13 ft. deep. It carries the load from the drug room roof and half the load of the crane which runs right over the Banbury Mixers at this point. This Warren girder has cantilevered off it a parabolic slab forming the connection between the drug room and the mill room. It must have been obvious from the first that where the drug room (with its north-south shell vaults) and the mill room (with its east-west shell vaults) met, there was bound to be a purely architectural and geometric problem in the creation of a good junction. The problem has not been solved. Here, surely, was a case for the 'loose link' which is used elsewhere in the building. The parabolic slab runs clumsily into the girder, and the strong geometric and angular lines of the girder are a discord in what is, otherwise, a pseudo-Byzantine symphony of vaults (see drawing above).

The mill room itself has magnificent scale. It is lit almost entirely from high up on one side—three circular apertures near the crown of each vault correcting the daylight factor on the unlit eastern side. The eastern wall is topped by the continuous glazing which forms the west wall of the main production area. The bigger machines are in the mill room and to visualise the whole scene it is necessary to refer to the section of this article which deals with colour, since the machines are the main colour note in a room which is otherwise fairly neutral in tone.

The South Block—with its various offices and welfare rooms—is mainly a normal r.c. frame structure. The cloakroom blocks, however, are monolithic structures; they are of 6 in. r.c. with permanent shuttering—the outside having 1½ in. pre-cast slabs with exposed aggregate finish, the inside 2 in. wood wool slabs plastered. These monolithic cloakroom blocks form slightly projecting 'towers' in contrast with the remainder of the façade to the reservoir which is fully fenestrated. It is in this handling of cubical masses against fenestration that the Corbusier influence is most evident. Certainly this side of the building is the most self-conscious architecturally, pos-

sibly because there was here no industrial process to dictate the forms. The composition, as one sees it across the reservoir, is excellent, but the whole thing brings one back, somehow, to current æsthetic controversy.

Entrance Hall: This is part of the south block but also an architectural unit in its own right. Again it is more self-conscious than the factory itself, but did have an 'architectural' function to perform in punctuating the termination of the south block and in proclaiming itself as the entrance. It is covered with a shell vault spanning 57 ft. between the supporting solid walls and frames, and cantilevering 5 ft. beyond this at the ends. The radii of the vault is 28 ft. 8½ in., chord width 37 ft. 7 in. and the total rise 7 ft. 2 in. The vault is decorated with a 'mural' of abstract forms (reflecting the lines of reinforcement) and of masks: designed by students ('Group E') at the Bath Academy—AA Corsham Summer School in 1950. This is the only applied 'decoration' on the job. The entrance hall has a double window, 37 ft. wide, with an 'indoor garden' between the two areas of glazing; this window looks down on to the forecourt (see section below).

Materials: 1. *Walls*: Non-structural walls are either of 11 in. cavity brick or 9 in. stone with a 2 in. cavity and 4½ in. brick lining. Where concrete has been used as a facing material on walls the surface has been given a pattern—in most cases by means of 1½ in. wide battens nailed to plywood shuttering, giving a ribbed concrete finish. Random rubble is sometimes used as a base below ground floor level; but from ground floor up to the clearstory cill walling is usually in brickwork, sometimes masking the structural members but more often recessed to reveal them. Brick is thus used mainly for what Ruskin would call the 'veil' (wall between buttresses) and never becomes truly structural.

heating and ventilation 4

To avoid all projecting pipes, ducts, radiators, etc., which would collect dust was a major factor. The whole system has therefore been designed as an absolutely integral part of the structure. The only exposed ducts are the big vertical risers in the main production area and even these are incorporated in the structural supports of the domes. All production rooms, the storage space on the lower ground floor, the cloakrooms and the showers are all heated by warm air and are mechanically ventilated (see diagram at top of facing page).

The big storage space under the main production area is, generally, 18 feet high. This gave room for storage and for a mezzanine planned around its north, west and south sides as a series of ventilation chambers. This mezzanine contains all the ventilation machinery, filters, fans and steam heater coils for the drug room, mill room, main production area, storage space and cloakrooms. There is another small ventilation chamber to the south-west serving the spreading shop. Each chamber acts as the intake duct and air mixing room for the area which it serves. The ventilation chambers are intercommunicating and are accessible to the maintenance engineers without entering the production areas.

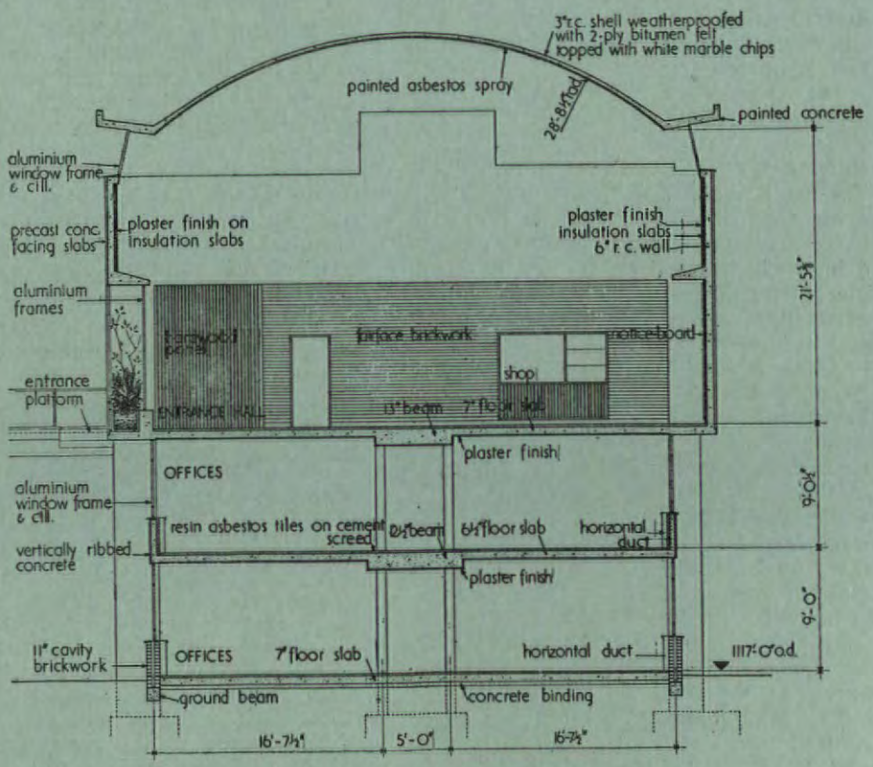
Fresh air is drawn into the ventilation chamber of the main production area through automatic louvres in the south wall. It is warmed and circulated through four ducts in the storage space immediately below the main production area. From the storage space the air is taken up through the big vertical risers mentioned above, to horizontal ducts in the valleys between the domes, and is fed at high level into each bay of the main production area through slots in the side of the dome girders. It is extracted at lower level at the foot of the structural supports, into the lower ground floor storage space and returns to the ventilation chamber using the storage space itself as a duct. It is then either recirculated or discharged through vertical exhaust funnels.

The mill room and drug room are warmed and ventilated by a similar system but without long horizontal distributing ducts. The air is projected across these rooms, which are comparatively narrow, at high level, directly from the ventilation chamber in the case of the mill room, and from short vertical ducts in the case of the drug room. It returns at low level directly to the ventilation chambers.

The spreading shop is heated by warm air in the same way, but a naphtha recovery plant is included and no air is recirculated.

Small fans and heater batteries in the main production area ventilation chamber feed warm air to the cloakrooms. This air enters directly below the coat racks and is extracted through fans in the roof. It is never recirculated. This system can be controlled by the cloakroom attendant so that coats can be quickly dried in wet weather. The main lavatories have a forced extract system with hot water radiant floor panel heating.

The offices, their lavatories, café and fitters' shop (all in the south block) are heated by hot water radiant floor panels, and ventilation is by windows.

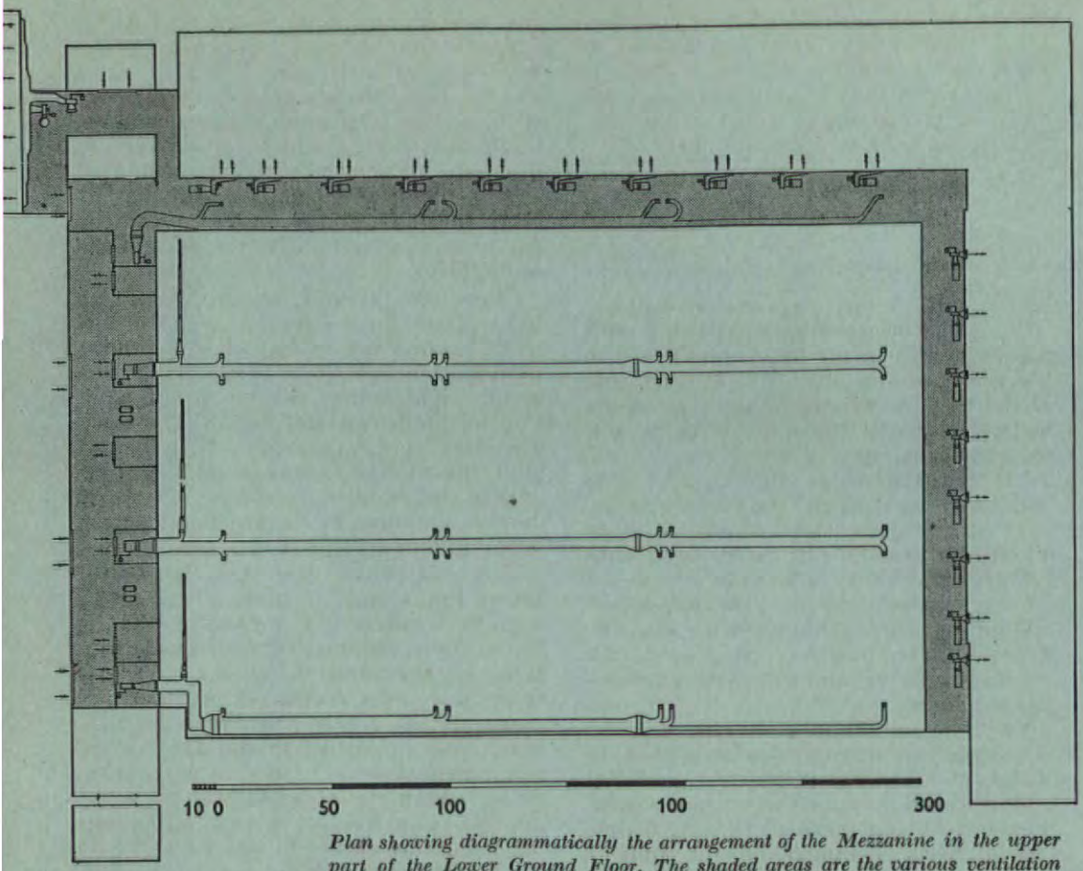


section of entrance hall

lighting and acoustics 5

There has been full co-operation between the architects and the Building Research Station, and this note is based partly upon information supplied by W. A. Allen, of the Building Research Station.

One of the most striking features of the main production area is the series of eight circular apertures (approximately 6 feet diameter) in each of the shell concrete domes. The preliminary designs did not include these, the main production area depending upon the clearstory which runs round the base of each dome. This clearstory gave sky factors of from 1.5 per cent to 5 per cent which was unsatisfactory both in the range of variation and because 5 per cent was considered a minimum. The apertures were therefore designed to bring the daylight factor to a



Plan showing diagrammatically the arrangement of the Mezzanine in the upper part of the Lower Ground Floor. The shaded areas are the various ventilation chambers: on the left the one for the Main Production Area; on the right for the Drug Room, and at the top of the plan the one for the Mill Room. In the top left-hand corner is the ventilation chamber for the Printing and Spreading Shop, which also has a naphtha recovery plant.

minimum of 5 per cent over the whole area. The BRS comment is that without the apertures this arrangement of a series of domes does not lead to good lighting since they tend to obstruct each other's clearstories in spite of the 12 foot wide trough or gutter between them.

The BRS also thought that the large east window would introduce a real risk of glare, both directly and by overlighting the eastern as against the western side of the main production area. In fact the mountain in the middle distance reduces direct sky glare through this window. My own view is that it would have been a pity to have denied the main production area this fine outlook. In the event glare is not evident even when machines are seen in silhouette against the window. It is, however, interesting to note that the final decision to glaze the east wall of the main production area—a decision involving a window 336 feet long by 13 feet high—was not made until the structure was complete and the lighting could be studied *in situ*.

No attempt has been made to get north light as such into the main production area. Some sunlight was thought desirable and in the event of it causing discomfort it may be necessary to screen working areas 'locally'.

In production areas artificial lighting reproduces, as far as possible, daylight conditions. In the main production area, for example, artificial lighting is placed (a) below the sills of the clearstories, and (b) in the eight large circular fittings which alternate with the eight circular apertures on the dome soffits. These fittings are accessible from above.

In a factory with so many vaults and domes in shell concrete there was bound to be both a noise and an echo problem. During the progress of work the echo in the main production area was most marked as had been expected. All the vault and dome soffits were sprayed with asbestos which reduced echo and gave a satisfactory finish.

internal colour **6**

The Brynmawr factory, with its large areas of unbroken surface, its vaults and domes, was bound to be an interesting and tempting colour project. For this very reason a rational approach and considerable restraint were necessary. Generally, the light and neutral tints of the structural material (especially in the production areas) have been left as they are to emphasise the cool and clean feeling of being—ideally—inside an eggshell. Positive colour has been concentrated upon certain points and more particularly upon machinery. These notes are based on information supplied by H. L. Gloag, of the Building Research Station. As with the structure, practical problems arising from dust were considerable and affected the choice of colours. Objectives were: creation of a stimulating background to work, visual comfort during work, encouragement to cleaners. It will be convenient to consider the machines and structure separately.

Machines: Study of the actual industrial processes was the first step so that colour could be used to increase efficiency. On some equipment (e.g., vulcanising pans and the Banbury) no visual strain was involved, but on mills, crackers and extruding machines study led to the choice of a very light colour for the main body of each machine (B.S. No. 697 Light Admiralty Grey). Also the chalk used in the process disfigures dark paintwork and discourages cleaning. Moreover many of the larger machines are seen from certain angles against clearstory windows and so here again a light colour was wanted. Adjusting levers and guard rails to these machines are picked out in white; the metal ladders and surrounding railings are in black.

The focal position of the first big Banbury led to its treatment as a major decorative feature. It is seen from the drug room and the mill room and is constantly glimpsed through the glass wall on the west side of the main production area. It is painted a strong yellow (B.S. No. 309 Canary Yellow) with a high reflecting factor. The mills below the Banbury are in the light grey already mentioned and the stillage in a darker grey (B.S. No. 632 Dark Admiralty Grey) with white on the underside of the platform; ductings and extract are in aluminium. The yellow of the Banbury is enhanced by the blue and grey of the walls behind it.

In the main production area most machines will be close to neutral grey (B.S. Nos. 697 and 630 French Grey) with some positive colours yet to be decided.

Structure: Any colours used on the main surfaces of the interior had to avoid excessive contrast of light and dark leading to glare. Structural members crossing or bordering upon windows had to be kept very light. White was used, with pale grey on the face of lateral beams in the domed area, so as to provide definition. The domes and barrel vaults which, for acoustic reasons, have a sprayed asbestos finish, are sprayed white. All window frames are also white.

Since both the east and west walls of the main production area, and the domes themselves, are fenestrated they were kept very light in colour; this left the north and south walls for colours of lower reflecting factor—dark red and scarlet with yellow on the gangway soffits. Apart from the machines these are the only areas of positive colour in the whole of the main production area.

Similar restraint had to be used in the mill room and drug room where the longitudinal walls are either seen against

windows or (as in the east wall of the mill room) reflect strong lighting from the opposite wall. Dove grey (B.S. No. 694) and mixed fawn were used. On the other hand small features are decoratively treated with positive colour. For instance, the face of the mill room lift shaft is leaf green (special mix) with return faces in white and the main wall dark grey.

The use of colour externally is even more restrained and is noted in the captions to some of the photographs.

Landscape

G. P. Youngman has been responsible for the whole of the landscape work. He has been able to co-operate with the architects from the inception of the job and there has, consequently, been full collaboration about treatment of the levels, roadways, etc., and proper supervision, five years ago, about the dumping of top soil. The landscape work at Brynmawr has hardly begun to show, let alone mature, but in imagination all photographs of the buildings must be qualified by the information given here. The photograph of the model will also give some idea of the building as it will appear in relation to landscape (see page 157).

There were in fact two landscapes and each on a different scale. The first centred round the factory approach; the second included the reservoir and the view across it from the offices and canteen. (The view from the main production area could look after itself—as fine a mountainside as one could wish for). Two main factors to be overcome were (a) poor soil—often coal debris, and much of it made worse by five years' building work; (b) destruction of plants by sheep.

Factory Approach: The boundary fence of the forecourt is set well back behind the ramp up to the main entrance. The client has not insisted upon this fence being an unclimbable barrier—now so fashionable among industrialists (as if they were all engaged upon top-secret atomic production) and so unnecessarily cage-like in appearance. If the light fence used at Brynmawr has to be filled in with mesh it will be only to keep out sheep. This setting back of the fence means that both sides of the Brynmawr-Newport road can be brought into the garden scheme to be treated as a unit. The whole of this area (i.e., the forecourt and the two road verges) were planned in careful collaboration with Mr. Youngman. Car parking, weigh-house, lorry access and the considerable fall from north to south were the main ingredients of the problem.

The planting in this area is subordinate to the buildings and very much part of the architectural whole. It is to be broad and simple with no spattering of flower beds or colour. Trees will be a foil to the building and a protection against weather. They have been chosen because of: (a) suitability to soil and climate, and (b) visual effect and foliage pattern against the buildings. Mountain elms—tall, with branches open and drooping at the ends—will overhang the landing at the top of the ramp. Yews will, even in winter, give colour contrast against brick and concrete, and solidarity against light structure. Ashes will provide clusters of delicate stems and Norway maples will link with the sycamores in the little churchyard to the north of the site. On the east side of the road, to fill the void between the boiler house and the railway, there will be a small spinney.

In this region of the site only two large and fairly level areas are to be grassed, with 12 in. stone slab as edging. Elsewhere the ground is to be covered with low-growing plants to provide a 'mat' of foliage needing little maintenance—mainly ivy, hypericum, periwinkle, etc. These will contrast in colour with the main areas of turf and will avoid all mowing on slopes.

Reservoir and Landscape: The reservoir is a fine semi-natural feature, good in scale and with most of its more artificial lines softened by time. Only minor adjustments are being made to the shore line. One of these is immediately in front of the factory, where a garden for leisure and a sailing club may be established. Here builder's rubbish and excavated subsoil have been dumped and spread by bulldozers. The same was done to the west of the factory at the foot of the old coal tips, but here the dumping was inadequate and the result, when the reservoir was refilled, was found to be a swamp. This is to be exploited by planting with swamp vegetation—alder, willows, birch, buckthorn, guelder rose, reeds, wild iris and meadowsweet. This group of swamp plants will compose with the factory, specially if the proposed canteen extension is ever built to the west of the south block.

Elsewhere around the reservoir we touch upon the vaster landscape of the world beyond and ecology must determine the planting—the scale being that of the great eighteenth century schemes of Capability Brown and others. The western shore of the reservoir will be woodland, the southern shore grass and gorse with some woodland to screen the semi-derelict buildings at Nantyglo and certain new buildings.

The cold, bleak and wet climate set severe limits upon all horticultural planting. Fortunately the forecourt will be rather more sheltered. Trees of woodland type, on the other hand, may do well (especially ash, sycamore, beech, alder, mountain ash, rowan and yew) since they must have flourished in the days before iron smelting reduced the natural forest. Soil, or complete lack of it, was the worst problem and has set severe limitations upon planting except in small areas, such as the forecourt, where it has been possible to concentrate such top soil as there was. All smaller plants, such as juniper, berberis and periwinkle, have had to be of kinds distasteful to sheep, and many of the trees will have to be protected.

Costs

It is necessary, in the interests of industrialists themselves as well as in the interests of improved architecture and efficiency in the industrial areas, that a specific statement should be made about the cost of this factory.

Statements which are anything but specific have been made in the profession, and publicity in exhibitions and elsewhere deliberately discouraged on the grounds that it would not help the cause of architecture to present the 'extravagant' factory to industrialists as an example of the kind of services that they might expect from the architect.

This Brynmawr factory (apart from rises in cost common to all building between 1945 and 1951) did not cost more than the final approved expenditure granted by the Board of Trade with Treasury consent. Lord Verulam always had certain views on the social aspects of industrial organisation—in this he may be unusual but is not unique—and these views, in building terms, imply certain standards and equipment. These account for rather more than the difference between the cost of the ordinary Board of Trade factory in the area and the cost of this Brynmawr factory. The building—owing to compact and efficient planning and the strict integration of that planning with advanced engineering techniques—is in fact a highly economical structure. In other words if the special standards—most of which are found individually in a number of up-to-date factories to-day—were removed, the Brynmawr factory would not cost any more than the ordinary Board of Trade factory.

That these standards will in fact increase efficiency and are already attracting labour is another matter—obvious enough although not yet susceptible of proof.

The figures of cost given here exclude the purchase of the land, certain landscape work yet to be carried out and professional charges; also certain extras (e.g., some equipment in clinic and kitchen) which are a tenant's liability.

1. Main factory: £630,000 at £2 8s. 1d. per superficial foot.
2. Boiler house: £50,000 at £3 16s. 11d. per superficial foot.
3. Total: £680,000 at £2 9s. 5½d. per superficial foot.

Comparison between one building and another is always difficult, but it is interesting to note that the ordinary Board of Trade factory in the Development Area is costing about £2 per superficial foot.

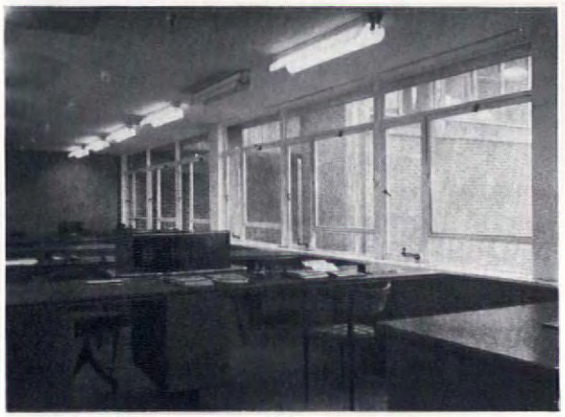
20

21

20, the window, 336 feet long, on the east side of the main production area. 21, the lower ground floor, beneath the

22

main production area, is for storage in a subdued light of raw materials and semi-processed goods. The holes in the ceiling penetrate the production floor



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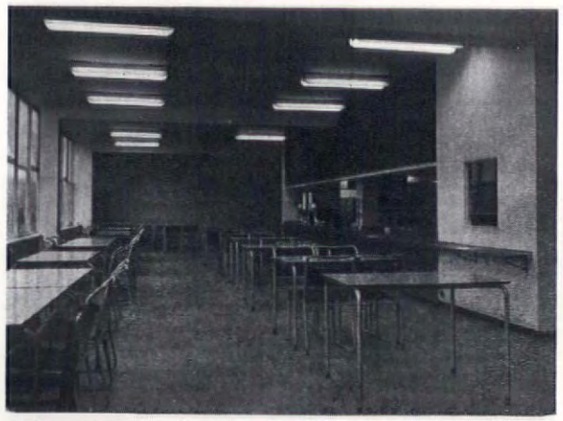
and all leads, cables and other services to production plant pass through them. This gives production flexibility and avoids a clutter of dust-gathering



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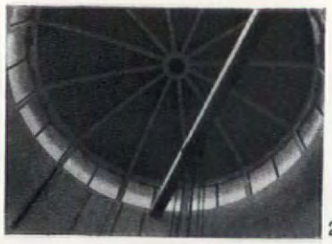
cables, etc., in the production area itself. 22, office waiting space. 23, general office. 24, café, with self-service counter. 25, the clinic.

25

26, looking up inside the pump house which is on the shore of the reservoir and supplies cooling water to the factory. 27, staircase in the south block. 28, cloakroom doorway. 29, arrangement of card racks and time clocks in the entrance hall; these had to be planned to give easy circulation at peak hours, specially as the entrance hall, with its notice boards, enquiry desk and shop, is a general circulation area for visitors as well as for all grades of staff.



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27, 28

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Bernard Denvir

DAUMIER: *Battle of the Schools: Classic Idealism versus Realism. Caricature published in* Le Charivari, *1855.*

POMPIER

THE ART OF THE FIREMEN

note by the editors *To describe the sort of academic narrative painting which the term 'art' still suggests to many people, Mr. Denvir here revives the useful term 'pompier.' The word, as he says, lacks an English counterpart, and if it is to be adopted as English currency its origin and proper connotation need to be understood. Mr. Clive Bell, the most distinguished of living art critics (who has himself made use of it, notably in his* Landmarks in Nineteenth Century Painting, 1927), *has therefore been asked by the editors to elucidate the term. This is his reply:*

'As you know, the young Romantics in the "twenties" and "thirties" took to calling pictures in the manner of David or Ingres "pompier," because they said that the helmeted heroes, dear especially to followers of David, reminded them of nothing so much as firemen. Other explanations have been offered but I feel sure this is the correct one.

'During the nineteenth century the term came to be applied to painters rather than pictures. Any painter who produced, as a rule, large, frigid, academic pieces was pompier—irrespective of the subject of his picture. *I think that is so. Cormon was pompier and so was Hippolyte Flandrin. Perhaps by attraction some part of the meaning of "pompeux" was drawn into "pompier." Anyhow, when I reached Paris in* 1904 *or thereabouts, the word was still current as a rather vague term of abuse. Bouguereau was pompier; so was Poynter. Today I think the word is falling into disuse: and if I were to tell a back-bencher at the Café de Flore that Gunn was*

"pompier" or Sir Gerald Kelly (though I don't think he is) I doubt whether the young man or woman would know quite what I meant.'

Pompier might perhaps profitably be extended to embrace architecture as well as painting. The architectural equivalent of academic narrative painting surrounds us on all sides. Its authors are still given gold medals and if its hey-day is past, the reason is economic as much as anything else; a pompier painting does not cost much more to produce than, say, a post-impressionist painting, but pompier architecture can be very expensive indeed. The term thus becomes largely an historical one. Its use would make the architecture of the era of Sir Edwin Cooper and Sir Aston Webb, of the new Regent Street and Australia House, easier to classify. The link with the sappeur-pompier *might be rather puzzlingly remote and the connection with the word 'pompeux' perhaps misleadingly obvious, but since the newly coined term would be used to describe a style of architecture that relied for its effect largely on the display of classical architectural furniture, it would still be closely related to the sense in which it was originally used, as Clive Bell recalls, by the romantics of a century and a quarter ago.*

Bernard Denvir

One of the minor tragedies of the English language is that there is no accurate translation of the French word 'pompier,' and so we are prevented from savouring the implications of Degas' remark about a painter that he was a 'pompier qui a prit feu.' 'Pompier' comes close to 'academic,' and all pompier paintings are academic; but the reverse is not true. Today, for instance, the majority of typical academic paintings derive stylistically from impressionism, or from some of the tamer versions of post-impressionism. The works of those purveyors of pink-robed Cardinals and white-hatted chefs which enliven some Bond Street windows are almost anonymous, and the only authentic practitioner of the style today whose works reach a wide audience in England is Fortuno Mantania.

The mere fact, however, that the pompier style is almost generally considered to be æsthetically inferior, should not blind us to its immense influence, which is still felt today in the visual clichés of the cinema, and the work of many commercial artists. Indeed it is more than probable that when a very large number of people hear the word art, the image which is summoned to their mind is of a painting in the pompier tradition, and to examine and analyse the stylistic mannerisms of that tradition is to help, in however slight a way, to an elucidation of those visual idiosyncrasies which extend far beyond the realms of pure painting.

Pompier art has two main characteristics which have frequently escaped the notice of the historians of taste. For more than a century it was a real international style—one of the few Europe has known—immediately recognizable from Belgrade to San Francisco, and showing remarkably few regional derivations, except occasionally in differences of costume. In many countries it still dominates the æsthetic scene, and pompier is the only word which could still be used to describe in a general way official Soviet painting. What is even more remarkable is that during this period it was the one art form which was in complete and close accord with the tastes and inclinations of at least one—and that the most influential —section of society. The certain hall-mark of a pompier painter is that he is never economically unsuccessful. Indeed his rewards are almost invariably quite disproportionate.

The implications of these two facts are great and far reaching. There is indeed room for an æsthetic Tawney to write a thesis on 'Pompier art and the decline of capitalism.' Its connections with bourgeois society, industrialism, and the complicated tensions of nineteenth century morality would require more extensive treatment than an essay. In this context they will be invoked only in so far as they help to throw light on the nature of pompier art.

In the first place it is more surprising than we normally think that there should be two main kinds of art—true and false. Until the nineteenth century there had been good art, and bad art, but the standards of criticism were uniform. A painting was good or bad according to its proximity to a unique standard. The duality began with the Romantic Movement, and that great vindication of artistic individualism, which has produced contemporary living art, has also produced contemporary dead art. The romantics depended on an intense excitement of the spectator's emotions, they flirted with other forms of expression, they were deeply concerned with nationalism, and they tended to look upon art as a means to an end rather than an end in itself.

All these qualities were possessed by the pompiers, who, however, gave many of them a different emphasis. They were concerned with emotion, but not with their own; their ambition was to 'play' on the feelings of the spectator. Hence their themes were invariably stock ones, dealing with generalized sentiments—love, pity, hate, patriotism—but never disgust. They missed altogether the complexity of the emotions aroused by a great work of art.

In a way they were the victims of the eighteenth century conception of the categories of art. When they painted portraits or 'unimportant' pieces, they often showed great freshness of treatment. Ary

Faithful Unto Death (*Sir Edwin Poynter, Walker Art Gallery, Liverpool*). *Nearly half a century after Bulwer Lytton's 'The Last Days of Pompei' the Roman sense of civic duty found its vindication.*

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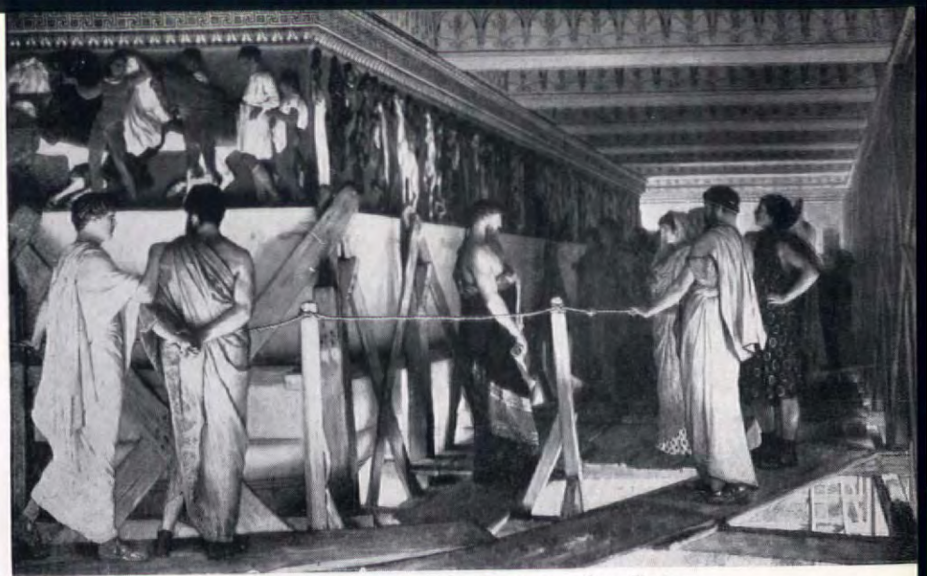
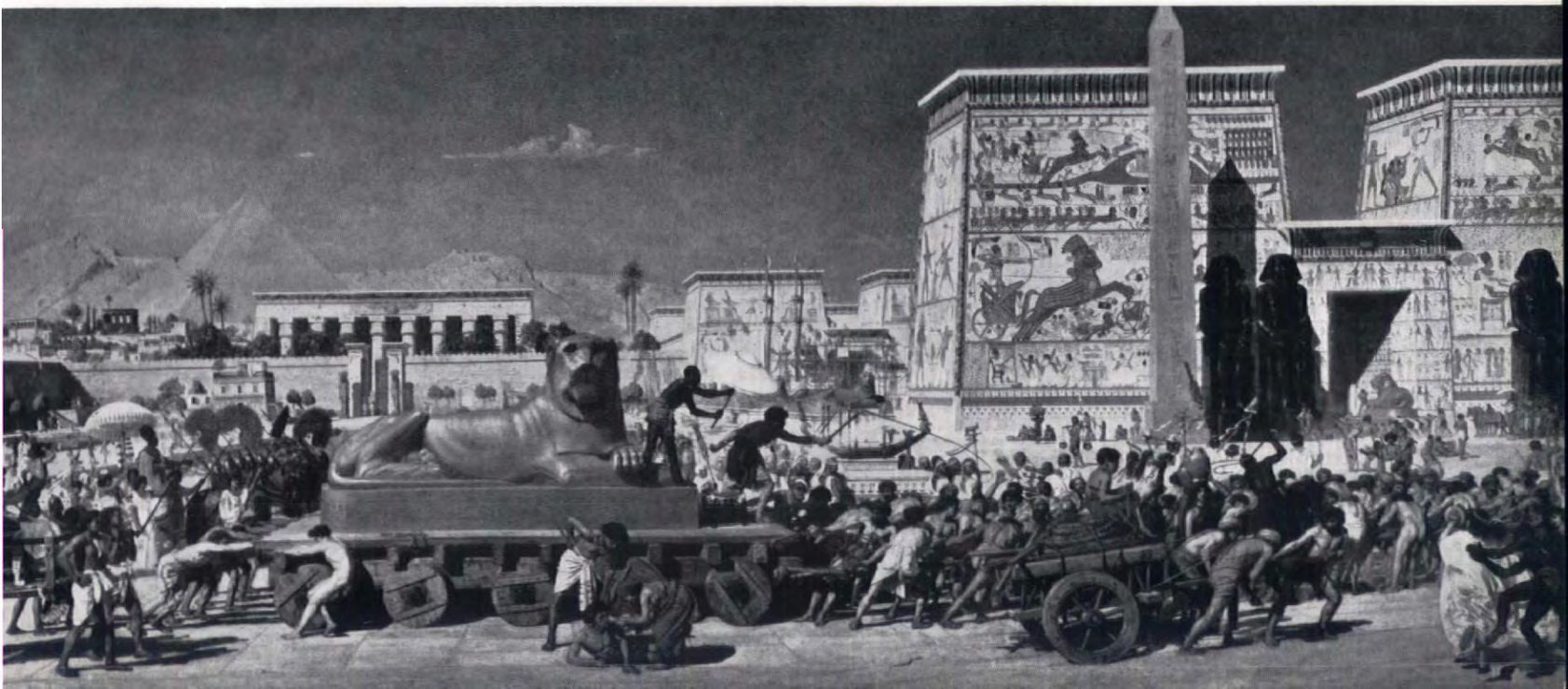


2, Phidias and the Frieze of the Parthenon (*Sir Lawrence Alma-Tadema, Birmingham Art Gallery*). *Trompe L'Oeil classicism is here combined with the atmosphere of a mid-Victorian academy private view.*

3, The Sleeping Model (*W. P. Frith*), *the artist's diploma work at the Royal Academy, it is the kind of painting in which one thinks naturally of an 'audience,' the visual element having been pushed very far into the background.*

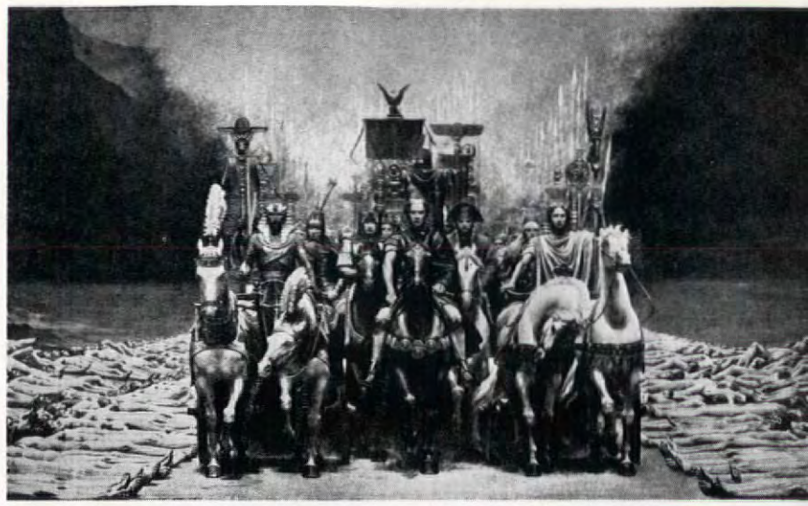
4, A Wounded Cavalier (*William Shakespeare Burton, Guildhall Art Gallery*). *Problems and puritans—a story and a breastplate. The landscape is worthy of an artist: the story of a cheap novelist.*

5, Israel in Egypt (*Sir Edwin Poynter, Guildhall, London*). *The Bible occupied a place in pompier iconography somewhere midway between Homer and Ouida. The story was always straightforward, the emotions easily aroused, the material full of metallic detail.*



6, Next Sunday's Sermon (*Brispot*) *in which the Cardinal succeeds the centurion, the sheen of the soutane succeeds the glint of the fireman's helmet.*

7, Le Triomphe de la Sirene (*Wertheimer*). *The siren is salacious: the sailor dead. Wertheimer's triumph of the salon of* 1874.



8, Les Conquerants (*Fritel*). *Power and glory, pomp and circumstance: the last act of a super-spectacle or the forerunner of the art of Hitler's Germany. Genuine feeling is lost amongst the bric-à-brac.*

9, *a detail from* Cimabue's celebrated madonna being carried in Procession through the streets of Florence (*Lord Leighton, by permission of H.M. The King*), *bought by Queen Victoria in* 1855, *would have surprised the artists whom it sought to emulate. One of the more fascinating aspects of the case history is that the Madonna in question (not shown in this detail) is now ascribed to Duccio.*

10, Voltaire (*W. Q. Orchardson, National Gallery of Scotland*) *needs about four hundred words of description in the catalogue of the National Gallery of Scotland to which it was presented by the late Ramsay Macdonald. The frozen gestures, the stylistic stance are reminiscent of the early work of Madame Tussaud.*

11, Zaphorozhye Cossacks (*I. Repin*). *Cossacks with spears or highlanders with claymores, the pattern of nationalism is consistent from the Don to Dundee. History has been the prime inspiration of false and authentic romanticism.*

12, Ivan the Terrible's murder of his Son (*I. Repin*). *The painter moves through tragedy to melodrama without in any way reaching the heights of feeling.*

Scheffer's portrait of Talleyrand (Musée de Chantilly), for instance, is excellent, and it is difficult to believe that it was the work of the artist whose more famous pieces include 'Saint Augustine and Saint Monica,' 'The Return of the Conscript' and the 'Bourgeois of Calais.' Haydon, who though not a pompier often came near to having the soul of one, was happier in his portrait of Wordsworth than in his 'Entry of Christ into Jerusalem,' and Augustus Egg, in the moments of relaxation from creating such *grandes machines* as 'Past and Present' could produce so charming a record of mid-Victorian femininity as that in the National Portrait Gallery, which is thought to be of Florence Nightingale.

Never did a pompier think that he was pandering to the public. On the contrary, by carrying on the tradition of the primacy of the 'history' picture into a softer age, he was refining and elevating the minds and emotions of the masses. But it is impossible to analyse pompier art historically. The eclectic academicism of the Bolognese school, handed on through Reynolds in England and David in France, the moist sensuous sentimentality of a Greuze or a Reverend Matthew Peters, the lascivious dalliance of Boucher or Etty, the rhetorical flamboyance of West, Lawrence and the Napoleonic painters all contained elements of the style. But it was not till romanticism postulated the need for ecstasy that they all fused together. Pompier art may indeed be defined as the attempt to find a formula for romantic art. Like all such attempts it involved compromise, and the affection with which that virtue is regarded in England was in itself enough to make us a nation of pompiers, and explain, perhaps as convincingly as anything else, that breakdown in our attempts to rejoin the main stream of European art which occurred in the first half of the nineteenth century.

For if economic success is one mark of a pompier, the other is complete lack of technical empiricism. He is not concerned with expressing a purely personal view of life, and moulding line, colour and form to suit it. He accepts the language of expression as he finds it, and puts as his sole artistic aim the development of ingenuity and virtuosity.

The basic necessity of a pompier painting is apparent intelligibility. No nuance of interpretation, no devotion to the demands of medium, no admission that all that glitters is not gold must be allowed to confuse, nor even intrigue, the spectator's eye. Line, therefore, is more important than colour. Raphael, if the profanity be not too gross, rather than Rembrandt, is the Master. This implies also a rejection of that dominant quest of European art in our time, for the recording of movement. There must be no kind of motion, neither of objects in space, nor of light, nor of atmosphere. If motion is implied—the galloping horse, the breathless runner—it must be frozen motion, suggesting neither stress nor tension.

Emotional atmosphere, in so far as it exists, and it must always be remembered that the pompier arouses emotion not by his painting but by what he is painting, is created by the arrangement of objects rather than by the selection of colours, manipulation of textures, or exercise of the language of painting itself. Tragedy, sorrow or defeat are suggested by dark colours, severity of dress, and a general asceticism of accessories. Joy and triumph are conveyed by the multiplication of brightly coloured objects, shining surfaces, and smiling faces. The actual number of people in the painting is, in itself, highly significant. Happy pictures have lots of people; sad pictures only a few.

The composition must be emphatic, so clearly marked that even the most visually sluggish can perceive it immediately, but it must be accompanied by a tendency towards extravagant gesture, emptier than the declamatory frenzy of rococo, and never quite reaching to its emotional intensity. No single emotion must be hinted at which does not possess its anatomical equivalent. The motions of the drama seem cramped and inhibited in comparison with those of a really good 'picture of the year.' Always there is this approximation to excess, but never excess itself, and the desire for a well-groomed immoderation applies also to technique which must always be 'finished,' but never completely expressed. Neither by proximity nor by contrast must tones or colours ever offend, and the very emotions must each have their counterweight. If the subject be tragic, a little light relief must be added, some touch of whimsy, some hint of the 'quaint.' If the subject be a merry one, then some motif must suggest the more serious side of life.

Delicacy of sentiment and expression dictate the approach to the subject matter. Ugliness may exist, but in a modulated form, and applied only to that which is clearly evil. The things which really terrify the soul must be made innocuous. If a painting of this kind depict an earthquake one is only frightened because one knows that an earthquake is a frightening thing. There is no naked immediacy of perception, but rather a feeling of relief that things aren't as bad as they're made out to be, that one is, after all, insulated from the worst assaults of reality. But it is in the documentation of human types that the pompier achieves his most typical compromise with reality. Real human beings proliferate, indeed the pompier's painting is the catalogue-annotator's heaven, for even in a crowd scene it is possible to pick out the notabilities. For the most part the people chosen are actresses or athletes, conforming as far as possible to a standardized criterion of second-rate idealism, and providing the obvious prototypes of the imagery of the contemporary film star, or cover girl. Even the slightest element of the creative weakness of living humanity is abstracted from them.

The anecdotal element in pompier art is the one which is most generally accepted as its obvious characteristic. To put a story across to appeal to the spectator needs more than figures. Paint a man and a woman, and they can be studies in humanity, or exercises in plasticity, but to give them 'appeal' it is either necessary to suggest a story or to state that they represent historical persons. The spectator's emotions must be stirred, and this can best be done by the use of an evocative title—the problem picture, or by reference to some historical or exotic* cliché.

England has specialized in the problem picture. It appeals to our moral instincts, for the problem is

* The Orient is especially popular.

nearly always an improving one. That the reward of sin is death, that long hours and low wages, though depressing, are conducive to moral stamina, that undue indulgence in alcohol leads to economic insecurity, or even that the introduction of food rationing is a dangerous political expedient, are all moving themes, likely to reinforce the charms of art. And if these themes are suggested with just a hint of anecdotal complexity, so that their meaning can form the basis of conversation, and enliven the post-prandial silences, so much the better. In this form they provide even the dullest with the gratifying suspicion that he may, after all, have some claims to be considered a critic or a connoisseur.

Historical and literary themes have the same advantage. They have overtones of meaning apparent to the reasonably intelligent, and to entitle a painting 'When did you last see your father?' is to set in motion trains of thought, and provoke emotions which have nothing to do with form, colour, plasticity, or any of the duller shibboleths so beloved by æstheticians. Of the twenty Early Victorian paintings illustrated in the Victoria and Albert's picture book on the subject, more than a third have literary subjects, ranging from Cervantes, through Shakespeare to Sterne and Dickens.

Classical, or ancient, history or literature had advantages of a more specific nature. The participants, almost inevitably, were in a state of comparative undress, emotional violence frequently occurred, and so miles of canvas were devoted to scenes in amphitheatres, tepidariums and other sites likely to provide the maximum amount of erotic titillation compatible with morality. It hardly needs saying, of course, that the distant prospect was more pleasing than the near one. Palermo was more piquant than Putney, and the fascination of the Orient was not due merely to the stirrings of Imperialism. Even with history that of another nation was frequently more stimulating than the native version. French painters dealt with aspects of English history which have never been recorded here, and the contemporaries of Macaulay showed a knowledge of Spanish, Italian and French history which would surprise many a professional historian of the twentieth century.

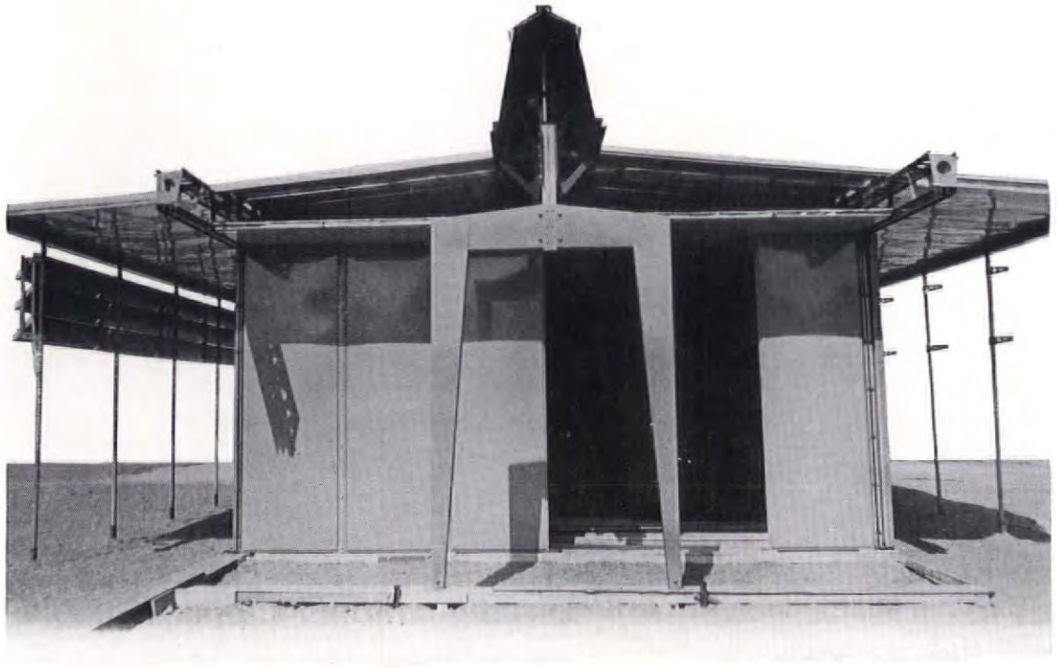
The close relationship which existed between the pompiers and their brothers of the theatre confirms the suspicions of those who saw in them nothing but playwrights' *manqués*, and helps to explain the stranglehold which their art has subsequently exerted over Hollywood. What is, however, surprising is to discover how frequently the painters came first. Perhaps it would be unfair to instance Flaubert, for his interest in painting was deep, and a writer who was driven to compose *The Temptation of St. Anthony* by his experiences in the Uffizi can hardly be said to have depended upon the pompiers, since Jerome Bosch cannot, by any stretch of the imagination, be included in that category. But it is worth mentioning that he derived the idea of Salammbo in her tent from Horace Vernet's *Judith and Holophernes*.

Casimir Delavigne, a popular dramatist of the early nineteenth century who was a kind of cross between Hugo and Dumas, with the vices of both and the virtues of neither, found in the Salon a yearly source of inspiration. From Delacroix's *Execution of the Doge Marino Falieri*, now in the Wallace Collection, he derived the theme of one play, and from the works of Paul Delaroche (*Lady Jane Grey*, *The Princes in the Tower*) two others. By the latter half of the century it became the usual thing not only for a writer to borrow the theme of a play from a successful painting, but even for a novelist to launch his reader into the sea of fiction down the slipway of art.

The most illuminating sequence of inspirational cause and effect is that provided by Pompeii. Interest in that Roman pleasure suburb originated with the zealous activities of the archæologists of the late eighteenth century. But their efforts kindled the inspiration of a Russian artist, Brullov, whose work was seen by Bulwer Lytton, who wrote a novel about it, which inspired Poynter to paint 'Faithful unto Death,' now one of the more popular pieces in the Walker Art Gallery.*

Freud, Belsen and the economic changes of our time have done a great deal to kill the art of the pompier. We are more aware of the sources of our ecstasy, more objective about the sources of our pleasure, and less given to spending large sums of money on the public demonstration of private joys. Nor are we over-anxious to strain the limits of emotional experience. But though we have rejected the claims of the pompiers to artistic pre-eminence we are still in thrall to them. Nor is it merely that we find their influence echoing in calendars, greeting cards, the films of Cecil B. de Mille, the cover girls of American journals, and the works of certain photographers and landscape gardeners. Only too often pompier art is linked to our own private past, and the æsthetic experience of some adult of an earlier age is translated into the psychological *frisson* of our own personalities. That, more than anything else explains, if it does not excuse, the lurking pleasure we often derive from works of art which, with our more conscious minds, we utterly condemn.

* It is presumably a mere coincidence that pompier art always had a penchant for incendiary subjects. The fire scenes in 'Quo Vadis' are considered most effective. See MARGINALIA, page 208.



four buildings employing

THE PROUVÉ SYSTEM

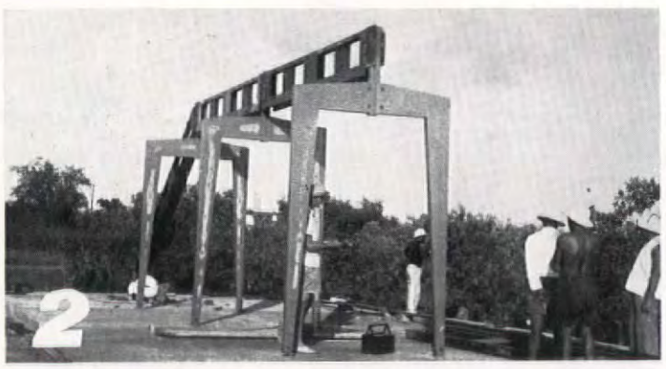
the system **The urgent post-war need in France for easily manufactured and rapidly erected houses has produced a new constructional method using mass-produced metal components. The inventor of the system is the engineer, Jean Prouvé, who is also the manufacturer. His brother, Henri Prouvé, is consultant architect. A standard metal house of their design, the Maison Metropole (see page 174) was recently erected in five days. The system consists of one or more centrally placed portal frames (see above), carrying a spine beam which is supported at either end by a gable beam on columns. Tie beams join the ends of the gable beams and longitudinal stability is provided by the rigid metal wall panels. The portal frame and beams are of steel sheet pressed to box section for rigidity and welded. Wall and roofing panels consist of double aluminium sheets separated by insulating material and supported by a light alloy frame. The system and components allow for houses varying considerably in size, function and planning as can be seen from the examples that follow. This is an ingenious and carefully-thought-out system of building, but, during a world steel shortage, there would seem to be little justification for using a steel frame (however ingenious) for a single-storey dwelling. A sounder case can certainly be made out for such a system for school buildings and offices, but, even then, rapidity of site erection means very little if it is achieved only as a result of considerable expenditure (in money and in man-hours) in the factory.**

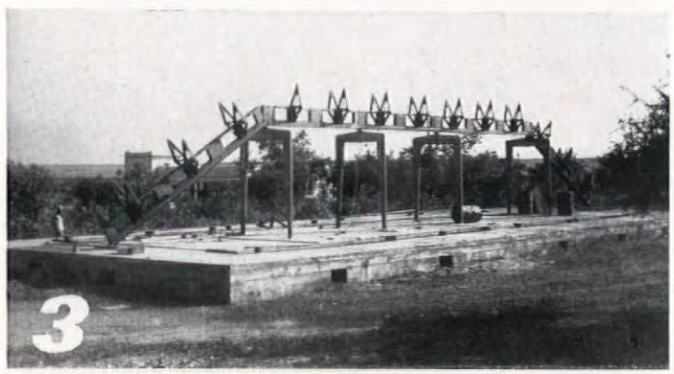
1 *tropical house*

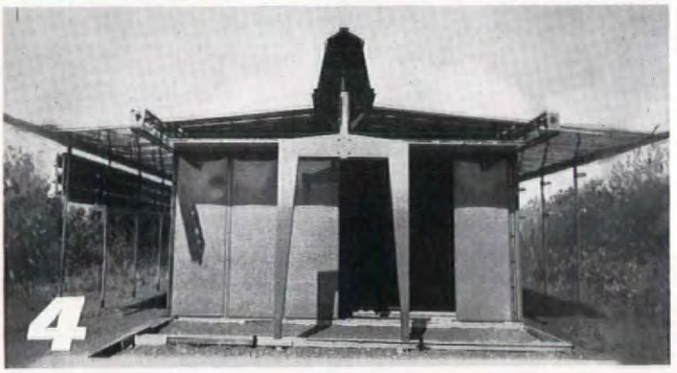
Designed for use in tropical climates, this house is entirely constructed from prefabricated metal components, the framework being the standard one described above. The double-pitched roof projects considerably to form verandahs on two sides and the roofing panels are joined by overlapping their lateral edges. A specially designed component fitted to the crown of the roof serves as either ventilator or chimney and can be closed by shutters from within the house. The cladding panels, based on a module of one metre, comprising blanks, portholes, windows and doors, are all interchangeable and their joints are made airtight by use of a plastic sealing

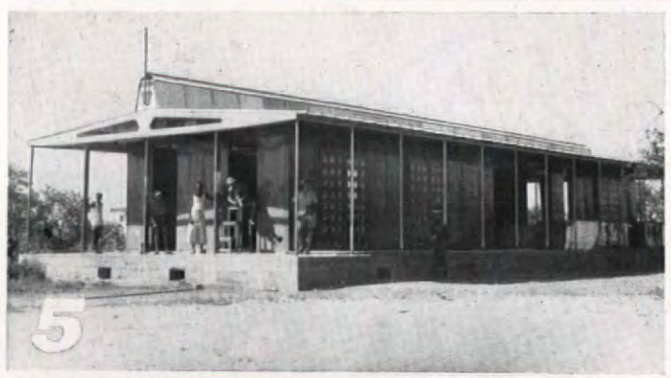
medium. Interior finishes can be of aluminium, varnished plywood or plasterboard. Porthole panels are similar to blanks but pierced with three rows of double glazed round windows. Window panels have patented windows of the balanced sash type protected by a hood which houses a venetian blind of light alloy. Glass can be replaced by metal mosquito nettings where desired. Exterior doors are of similar construction to panel blanks: internal doors are timber framed and covered with varnished plywood. All door frames are of steel and can be supplied sliding or hinged. Beams and gables are perforated to assist ventilation and closable vents protected by mosquito netting are located in the ceilings of all rooms. Flooring is of steel sections which are covered either with rot-proof material impervious to insects or are tiled. Houses can also be erected on a concrete base without steel flooring. Brise-soleil of sheet aluminium, bent and given rigidity by boxing, are assembled in groups of three and swivel freely. Houses are delivered painted and wired for electricity.

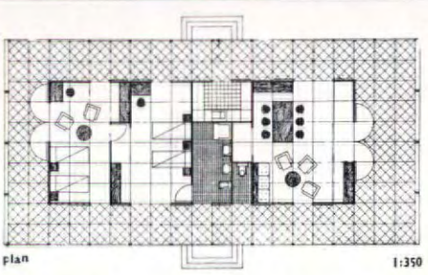
erection of the tropical house



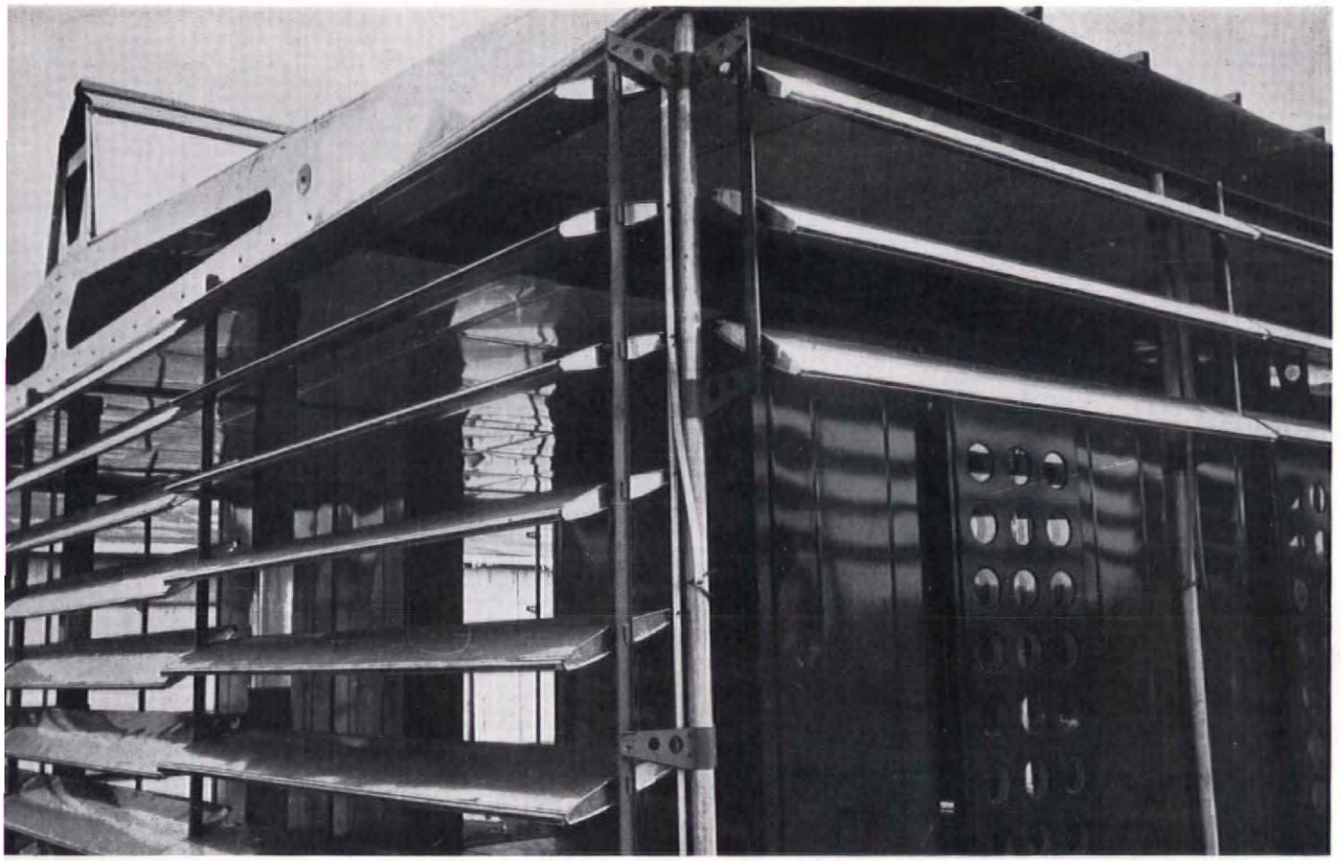








***1**, assembly of tie beams on the prepared concrete foundation; **2**, erection of portal frames and sectional roofing beam; **3**, portal frames and roofing beam completed; **4**, assembly of roofing and wall panels; **5**, panelling completely assembled and gable beam in position; **6**, the adding of the brise-soleil; **7**, the completed house.*



8

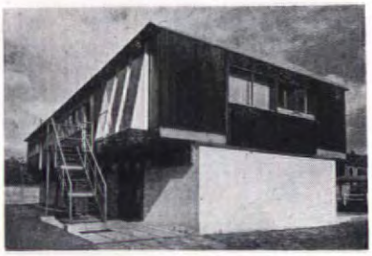
detail of the tropical house showing brise-soleil control attached to corner column.

2 factory office at Nancy

This office, also completely prefabricated, was built for an existing factory. The sheet steel portal frame and beam construction is as before. But unlike the tropical house, this office is raised from the ground. The lower floor is divided by hollow plaster partitions to make a garage, boiler house, paper store and sample room. The first floor consists of an entrance hall, a large general office, and offices for the manager, director and accountants. The portal frame which supports the roofing beam carries a large show case for displaying samples. The walls have independent framing of sheet steel, faced both sides with panels of varnished wood. Glass wool is used for thermal insulation and sound proofing. The furniture was specially designed by the architect and made by Jean Prouvé, who was also the general contractor.

9

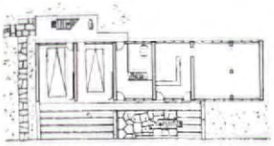
10



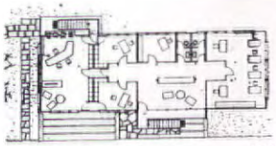
11

12

9, a general view of the office building and 10, the main entrance, with canvas porch supported by steel rods. 11, the rear of the building with separate staircase. 12, the interior showing the waiting room with showcase supported between two of the portal frames and the individual offices beyond.



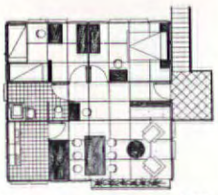
ground floor plan



first floor plan 1:700

3 maison metropole

This application of the Prouvé system was first shown at a housing exhibition in 1950. It was erected on the prepared concrete foundation in five days. The structural frame is the standard one, the aluminium cladding panels being heat-enamelled. Glass wool is used for insulation and the furniture was designed for mass production along with other components. This type of house is designed to allow for future extension or modification after erection. The example illustrated here is the minimum size and consists of two bedrooms, living room, kitchen and bathroom.



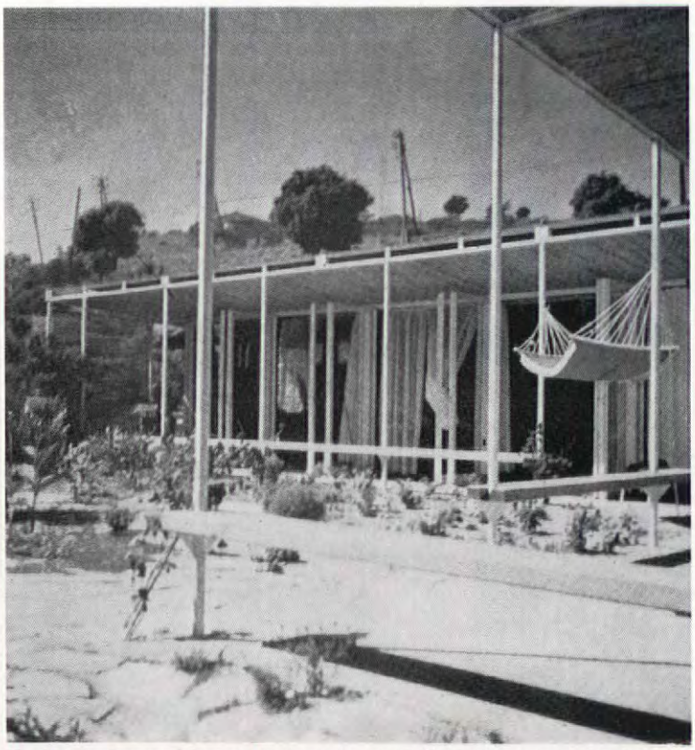
plan 1:350

13

14

13, the exterior of the house. The window is delivered complete and ready for assembly. 14, the interior showing the portal frame. The furniture is also designed by Jean Prouvé.

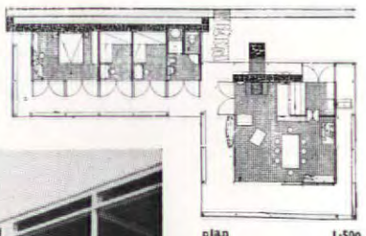
4 villa at St. Clair



15

15, the bedroom wing seen from beyond the living room. 16, detail of the living room exterior, showing the standard portal frame.

The Prouvé system is used here to provide a more luxurious type of house. It stands close to the beach on the outskirts of Le Lavendou on the Riviera. The metal construction, though basically the same as in the other examples, is more freely handled and considerable use is made of stone and timber instead of the standard metal panelling. Along the inside of the L-shaped plan the verandah is continuous and the wall beneath it is composed of fully glazed panels hinged like doors. This design brings the garden almost into the house while the L-shaped plan gives a corner of the garden the intimacy of a room.



plan 1:500

16

M. M. L. Rich

TIMBER

Even in so old a material as wood, new techniques are continually being developed, from which arise new architectural possibilities. In this article Mr. Rich, former editor of the monthly technical journal Timber News, *discusses some recent innovations in the use of timber as a building material, the result of scientific research or of the response of industry to economic demands, and indicates their probable influence on design. Other materials will be similarly treated in future articles.*

It was on the third day that God created the trees, and it was not until late on the sixth that Man appeared on the scene. Goats, deer, rabbits, locusts, bark-beetles and numerous other tree-lovers also arrived on the sixth. There were thus little more than two clear days for the forests to grow unmolested, before Man and his birthday friends began that systematic exploitation of trees which has brought their supply and distribution to the point where the price of softwood in the United Kingdom is seven times the price it was pre-war, and heaven knows how many times the price it was to the local Adam.

Allowing for the fact that Adam did not receive his softwood sawn, square-edged and partially seasoned, the price is still high enough to indicate Man's gross extravagance from the sixth day to the present one. A sane forest policy within the last 100 years—within the last fifty—would have made an appreciable difference to our present supplies. The extent of Man's negligence is seen in the fact that the price of timber in this and many other countries includes a heavy charge for sea freights, dock dues and export levies, while Adam's did not. Trees can live where Man can live. There was no need for an inhabited country to be without a nearly sufficient quantity of timber.

It is important to bear in mind that though the new techniques of timber may have been born of pure scientific enquiry or war-time compulsion, their recent industrial development has been the result of economic pressure: higher prices, competing materials, lower supplies proportionate to the world's rising population. The new techniques are directed to making timber cheaper in use, to finding new uses for less usable pieces of the tree (which were a deadweight on costs), and to putting two small trees together to replace the very large tree this world will never see again. It is incidental that these techniques offer new æsthetic possibilities.

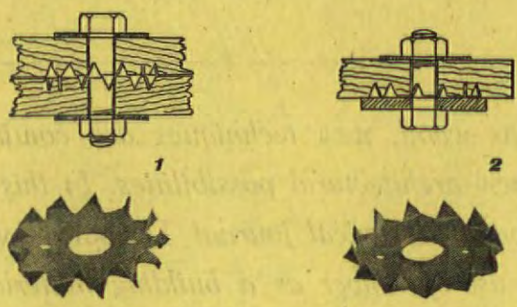
In this article the term 'new techniques' means new or recent to industry, not necessarily to the laboratory.

The five most important new techniques are: structural grading, timber connectors, bonding with synthetic adhesives, high frequency heating, and stressed skin construction in plywood. They influence design collectively by their effect on shape, size, output and location. The following chart can be taken as a broad analysis of the æsthetic possibilities—it would be impossible to give an exact one. The overall meaning of the chart is not that a number of entirely new æsthetic concepts have been created in every case, but that

the new techniques *and their influence on design*

	Makes a better joint or bond	Member easier to shape	Elevation not economically possible before	Structure larger	Member smaller	Exposed position	Off-site fabrication
Structural grading					/		
Timber connectors	/		/	/			/
Synthetic adhesives ... (resin or casein)							
used in supports	/	/					/
used in plywood	/	/				/	
wood/non-wood	/					/	
High frequency heating ...		/					/
Stressed skin construction ...		/	/				/

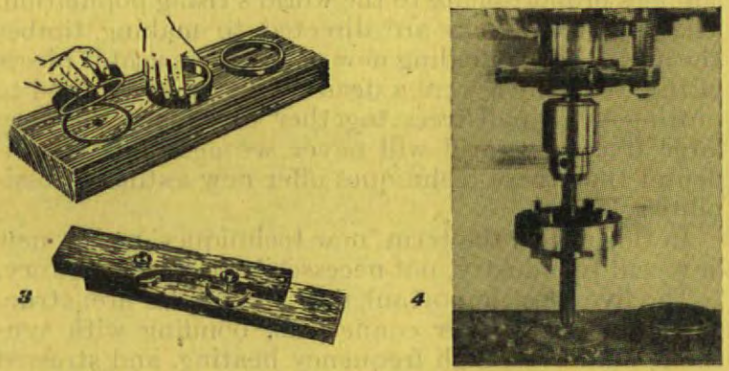
timber connectors *in use today are of three main types:*



1 2

1 *shows the double-niched toothed connector for use between two wood members. Bolt-holes are drilled in both members, and the connector is generally embedded by tightening the nut. Note the large washers top and bottom.*

2 *is the single-sided toothed connector, for joining wood and metal or wood and concrete. The small raised collar round the bolt-hole is for transmission of load through the bolt to the connector.*



3 4

3 *is the split-ring connector. The split is in the form of a tongue and slot, and is meant to provide for slight dimensional changes in the timber. Ring-grooves are made by the tool shown in* ***4****, and can be equipped to bore the bolt-hole at the same time. Connectors are manufactured in 2 in. to 3¼ in. diameters, and design and load data are available.*

certain usages are economically possible now which were right out of the market before.

It is occasionally possible to combine two of the techniques to produce a design influence not inherent in either of them. For instance, stressed skin construction in resin-bonded plywood will permit of the new elevation being presented in exposed positions.

Structural grading has a two-fold purpose. With the accent on 'structural' its purpose is to make more efficient use of the material structurally, and reduce it to reasonably low dimensions to meet the known or estimated stresses it will have to bear. For structural purposes, the strength of timber is broadly determined by the density, the slope of grain, the moisture content, wane, and size and position of knots. Knots are characteristics of wood which require careful consideration, and are not necessarily the weak points many people think they are. They are that part of the branch which grew inside the tree, and the normal run of the grain was deflected round them. It is only in the highly stressed portions of the timber that they have a significant weakening effect, always relative to their size and location.

With the accent on 'grading,' structural grading is a means of sorting timber by quick inspection into grades which have definite strength values. The grader learns to recognize on sight the doubtful slope of grain, tests the pieces for number of annual rings per inch, and quickly measures the larger knots within the significant area. B.S. No. 940 (parts 1 and 2) lists the rules for grading many of the popular building species. At the time of writing it is under revision.

Structural grading brings jetties, bridges and other heavy structures once more into the field of timber construction, where otherwise it would have been uneconomic. It thus permits of timber being used in cases where the architect prefers it, in order to achieve harmony with the environment.

Structurally graded timber is not generally required for housing, although war-time and post-war practice which reduced the sizes of timbers used in the average house was developed with all the relevant stress data at hand. Grading needs a well-trained eye, but it is certainly not difficult to put into practice. Mainly for commercial reasons there are not yet very many timber firms in a position to undertake it. In any event, the demand will always be a limited one.

From the æsthetic point of view, timber connectors are a development of considerable importance. Since the shape and size of any assembly must depend on the efficacy of the joints, it is obvious that the production of a new or better connecting device can have far-reaching consequences. Essentially, a timber connector is a small, round, metal plate—or a ring—which is used in combination with a bolt to join two timbers. Embedded in the inter-faces of the adjoining members, it spreads the load and helps to transmit it from one member to the other. The connector can be provided with teeth one or both sides to bite into the wood; or it may be simply a collar to fit into prepared grooves. Toothed one side instead of both, it can also be used between wood and metal or between wood and concrete.

Since connectors used in conjunction with bolts (as well as with nails and screws) provide much more

efficient joints, much larger structures can be made with them. Bridges, hangars, cooling towers and radio masts are some of these structures. Bigger spans are possible too. The well-known T.D.A. forms of roof construction result from the effective use of connectors. Connectors allow of a wide measure of preassembly, and the design considerations most affected are, therefore, size and output.

So far we have been concerned only with the physical development of wood. The material itself has not been altered—it has simply been used to greater effect. With synthetic (resin and casein) adhesives we enter the field of chemistry.

Timber in the tree is composed of a large number of minute cells which are naturally bonded to one another. The use of a synthetic adhesive to bond wood is, therefore, a development of the method already employed by Nature, although the synthetics are not necessarily of the same chemical composition as the natural adhesives. These are the outstanding points in the application of synthetic adhesives to wood:

(1) in joining piece to piece the joint can be made stronger than the wood itself;
(2) the resin glues are weatherproof: plywood made with them does not delaminate under exposure, nor does the joint in a structural assembly deteriorate;
(3) since the synthetic glue can be stronger than the wood, it facilitates the shaping of veneer-plywood assemblies which may in some degree be contrary to the nature of the wood;
(4) synthetic resins can be produced to bond wood to metal, glass or fabric, and the setting time can be controlled to suit the process.

The advent of synthetic resins has made the applications for wood—particularly plywood—much more numerous than in the pre-resin period. To give the proper balance to this account it should be stated that some of the resins are expensive, as well as in somewhat restricted supply.

It is commonly known that many types of air and under-water propellers have for a long time been built of laminated wood, but it is important to realize that this was due to the use of synthetic resins. These assemblies demonstrate that the wood/resin combination is able to withstand tremendous dynamic as well as static forces, with the advantage of being lighter in weight than material previously used. It is now possible to use plywood in exposed locations, as well as in water itself; yachts and speed-boats are examples of the latter application.

The difference between exterior grade timbers, which we have always had (for example oak and Western red cedar) and exterior plywood is that (*a*) the plywood is dimensionally more stable than the wood, and (*b*) exterior oak is costly oak throughout, while exterior plywood may be simply oak-faced and have a cheaper, non-exterior core.

So much for plywood. The more recent and outstanding use of synthetic adhesives has been in the manufacture by lamination* of much larger structural members. By assembling a large number of pieces of wood (not, in this case, veneers) it has been possible to produce pillars, beams and other supports incorporating a curvature which has never been possible in wood of this size before. Such components are habitually used in America and on the Continent, and were used here on the South Bank (made with casein, and heavily varnished for moisture-resistance) and in glass-house construction. They are probably seen more frequently in public than in industrial building, and are unlikely to appear at all in domestic, at any rate for the time being. It is as well to bear in mind that the very large trees, which have grown for hundreds of years, are getting scarcer, and timber on the whole must tend to get smaller. While the general run of tree will always provide a board big enough for house-building, the architect looking for a larger size for industrial construction will find it more and more difficult to get. At the same time, the rising cost of timber will make it necessary for the merchant to find a profitable outlet for the smaller pieces. He will find it, if the pieces are not too short, in the manufacture of the large, laminated members.

High frequency heating is to gluing as the vacuum cleaner is to the carpet. Just as it is no longer socially possible to own a carpet without a cleaner, so it is no longer economically possible to produce certain types of glued assemblies without using high frequency. The two-part principle is: (*a*) that the glue is set or 'cured' by the application of heat, and (*b*) that high frequency heating can produce in a matter of seconds or minutes the results that might otherwise take minutes or hours. The process is sometimes called radio frequency, and was earlier called dielectric heating.

A 'dielectric' is anything that resists (but does not block) the passage of an electric current, thereby creating heat. Wood is a dielectric. When it is placed in a high frequency field and a current is passed through it from an electrode on one side to an electrode on the other, *a uniform heat is created throughout the thickness of the wood.* The significant words are 'uniform . . . throughout.' In the traditional forms of heating—from the surface inwards—the outer parts are heated before the innermost. To treat wood by surface heat without damaging the cell structure it is necessary to heat it slowly, otherwise dimensional changes will take place in one part and not in the other, resulting in warping or splitting. Readers acquainted with the kiln seasoning process will know that drying is begun in humid air, so that the moisture is not driven out of the wood by the intense heat as quickly as it would be in dry air.

The most important thing to bear in mind about high frequency heating is that it does not penetrate from the surface to the inside. It is created by the wood itself, by every cell wall—no matter where placed in relation to the surface—as the current passes instantaneously through. If there is any dimensional change it is uniform. In those fields of manufacture where it is possible to use high frequency currents on timber, heat can be applied quickly instead of gradually. This exceptional speed results in economy of space as well as of time, since large sheds or long benches are no longer needed to house assemblies while the glue lines are setting.

In practice, a special high frequency generator is installed, and a jig is made to house the wood/glue

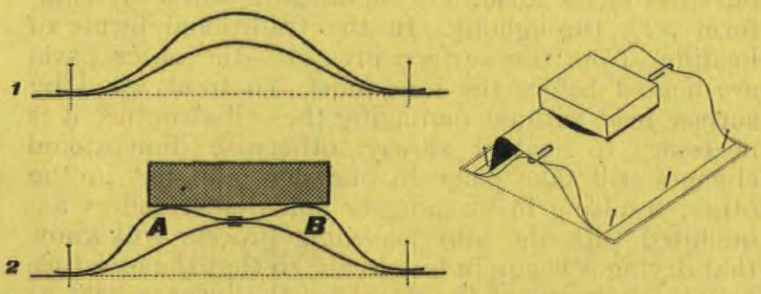
* Lamination means bonding the veneers or laminæ with the grain running the same way. In plywood the veneers are cross-grained.

assembly. The thickness of the wood may vary from a veneer to a plank. The jig is suitably wired—a job needing considerable skill and experience—so that electrical fields are created where they are needed. The jig with the assembly is connected to the generator, and the current is applied for the requisite time. The cured assembly is removed, and a second jig with the assembly already clamped into position is connected immediately; and so the process goes on.

In its present stage of development high frequency heating is more a process for medium-sized articles, especially for furniture. But larger articles have been produced—including components of railway carriages —which are within the sphere of architectural interest. Its æsthetic significance is that it makes it possible to produce unusual shapes in wood without laborious bending operations, and these can, of course, be manufactured in bulk.

The last important technique of architectural interest is the stressed skin method of using plywood. It is possibly not so recent as the others described, but it is certainly not widely used in this country. The object is to produce a lightweight, load-bearing member from relatively thin components, which would otherwise be impracticable for the job or require considerable support. The result is achieved by utilizing the characteristic, compression strength of wood. The technique can easily be demonstrated by a quick, drawing-board experiment.

Take an uncreased sheet of thickish paper, preferably foolscap, and halve it lengthwise. Place the two halves one on top of the other, and pin them to the drawing-board at one end. Now arch the sheets, the top one more than the bottom, and pin the other ends to the board (1). Fasten the two arches in the middle with a paper clip on each side (2). This makes the two side arches A and B. Shorten the base



by further pinning at the base of each arch, and thereby strengthen the arches.

Now put your carton full of paper clips, drawing pins or what you will *across* the arches A and B, and you have a curved member bearing a load which, clearly, these two thin components could not bear in a simpler form of construction. Remember that paper is a pulped tree, and retains some of the characteristics of wood. Like the wood, it has borne a load in compression which it could not in tension. It will be seen that the compressive strength is in the two side arches A and B, and if the load is placed in between, instead of across them, your paper structure is liable to failure.

In practice, the sheets of plywood need not be joined face to face in the centre or at any other point. It is sufficient to use internal supports to which each face is rigidly joined. The most recent example of stressed skin construction in this country is the acoustics panel at the Royal Festival Hall.

A technique of minor interest is the use of 'densified' wood, sometimes known as 'compressed' wood. The method of manufacture is to interleave a number of veneers with resin film, and subject them to heavy pressure under heat, until they bond into a material much denser than the original wood. The air in the cells has been eliminated in the process, but the cell walls themselves are intact. The resultant material is very heavy and dimensionally almost stable, since most of the moisture has also been removed. Of course this material is on the expensive side, and its uses (in architecture) are mainly decorative—door knobs, handrail, nosing and trims. It is also an exceptionally good electrical insulator.

Although the preserving technique is well over 100 years old—it grew with the need to preserve wooden sleepers on the railway tracks—there are one or two aspects of it which should be considered here. There never was in this country as much preserving capacity as there is today. This is a result of the war. Preservation never entered into building considerations as much as it does today, and this, too, is a result of the war. Before then, railways, shipbuilding, harbour and other public works provided the main uses for treated timber. Now that softwood is seven times its pre-war price (while preserving is not), more and more thought is being given to lengthening its life by one of the several preserving treatments. As a result, the habit has grown—but only lately—of using timber in exposed positions where previously it was not considered practicable. Among the uses are wireless masts, hangars, cooling towers and one of the largest 'roller coasters' ('Big Dipper' to us) in America.

It is a fair summary of the evidence to say that the exploitation of timber is passing from the craftsman to the engineer and the chemist, and this is not happening imperceptibly. Many timber engineers see the future of timber—in plywood. It is a fact that plywood was known to the Pharaohs, but it needed twentieth century machinery to make it a commercial proposition. There are others who see its future in 'reinforced timber.' The Director of the Lumber Division of America's National Production Authority told the leading wood science society in the US in May, 1951: 'It is my firm conviction that the use of steel in reinforcement of wood is in its infancy. I believe that structural members can be developed where wood is combined with steel which will save not only wood but also steel. When concrete became reinforced it ushered in a new day in that industry. Reinforced concrete was actually a new product. Reinforced lumber may be a dream, but if it is to come true you men of research are the ones who will develop it.'

The timber protagonists have already claimed the Future as 'The Coming Age of Wood'—a wood part physical, part chemical. But an Age lives in its outline, and its materials in their shapes. It falls to the architect and the artist to create the shapes, and only they can give the Age its name.

Douglas Newton

PRINTED TEXTILES

a selection from the work of the younger English designers

Every year thousands of designed textiles roll on to the market. Their number is amazing; but it is the claim that anyone has designed them which really rouses one's incredulity. Allowing for the public's general lack of taste—or more accurately its lack of active interest in the best modern standards of taste—this state of affairs is perhaps inevitable. The textile designer is faced with almost as acute a problem of communication as any other modern artist.

Of course the quality of the average, anonymous designs varies enormously. Most of them are turned out by studio workers attached to manufacturing firms, very often in the form of modifications of designs bought in Paris. A hope for the improvement of this kind of work is prompted by the policy of a major London art school, which plans for its students, on completing their courses, to have a sort of year's apprenticeship with a manufacturer, and assists them in obtaining it. The school further encourages them to take up full-time industrial work as a career, and puts them through training in a wide variety of styles in order to equip them to do so.

In the nature of things, however, it is clear that really outstanding designs will be the work of free-lance designers. Over the last forty years or so this has meant, for the most part, of painters. It has been a rather artificial situation; in captions to illustrations of the between-wars there is often a note of chi-chi, a tone of happy congratulation. When Duncan Grant or Vanessa Bell or Paul Nash achieved some fragment of decoration, it was apt to be greeted with a pleased surprise, as though he had pulled off a strenuous, difficult, and graceful trick.

This reflected perhaps the public's attitude rather than the manufacturer's. Cresta Silks, for example to the contrary, have for many years made a principle of using designs by contemporary painters, and the products of this policy have had considerable success both in England and abroad. Before 1939 they commissioned designs by Paul Nash, Cedric Morris, and Bruce Turner; since 1945 they have produced fabrics designed by Graham Sutherland and Patrick Heron. In their case the policy of sticking to painters, as expert æsthetic specialists, in order to obtain a high standard of quality, has a flavour of William Morris's sort of integrity and individualism.

This one-man-band effect is also characteristic of Ascher's products. He has, of course, used a distinguished array of French as well as English painters for his most spectacular line—the silk squares; and has, from 1943, used Moore and Sutherland—since their years of fame began—to design piece materials.

In all these cases then the manufacturer's tendency has been to use artists not primarily textile designers but having an established degree of prestige, to work on what are, after all, luxurious materials: silks, fine cottons and fine linens. In some cases at least their products were clearly intended to be what is called 'exclusive,' and they effected this in their own way.

As against this situation, one of the most striking phenomena of the last ten years has been the rise of the designer, a new animal to England, for whom in many ways the Festival of Britain has been a gigantic show-case. Now the designer's problem is a democratic one, to get his design across to as many people as possible—to people whose taste is for the most part, and at best, in a state of passivity. What this means in practice is that he must work with the cheaper materials, which the public needs and can afford. For in fact the housewife is not going to hoard her pennies to buy a rich and precious silk square by a famous artist; she might, however, as between one length and another, be persuaded to buy a few yards of a cotton in a good design rather than in a bad design.

This, of course, is where the manufacturer comes in. Does he do his duty and buy modern designs? Generally speaking, he does not. If asked why not, his answer would be the usual ones: why should he risk his shareholders' money on experiments, and why should he experiment when the designs he is using

already apparently satisfy his customers. The public seems happy with (say) floral designs, why should he spend money on expensive printing rollers for modern designs with a good chance of not getting it back? It is really a very fair question. It would be ungrateful to complain of the few manufacturers who do shame the devil by employing modern designs because they issue them in small quantities. It is not the manufacturer's job to flood the market with them and create a taste.

To judge by the published opinions of certain prominent dress-designers, they have no particular bias in favour of modern design, so it is likely that designers have little support to hope for from that quarter. They show an interesting willingness to pass modern textile design over to the furnishing department. It must be admitted, though, that their criticisms are based on technical scores about which there is more to be said.

The art schools are within limits being encouraging; the Royal College of Art is, for instance, initiating a scheme under which its textile design students will work in conjunction with the Furniture School. But on the whole it seems that a considerable amount of the younger designers' training is gained not so much in the classroom as the library, among the files of Italian and American magazines like *Domus*, *Interiors*, and *Arts and Architecture*.

If the position which used to be held by the painter is now more fittingly held by the designer, it is in order to ask who the designer is and what he does. Once again, economics come first. The pay for a textile design sold outright averages fifteen pounds, with two or three pounds extra for colour variations. Now this can be very remunerative for conventional designs with a ready sale, but where modern designs are concerned—and taking demand into consideration —this sort of fee is obviously not going to provide any free-lance with a living. This is perhaps sad, but does have its good side. It means that the textile designer has to work at something else as well. Textile designing is, after all, not a crusade, so this is no great hardship; and the practical experience of another profession is usually helpful.

On investigation one does find that some of the younger textile designers are as a matter of fact primarily painters. Patrick Heron's designs often consist of long rows of calligraphic signs which have an unmistakably Chinese quality. They can be read vertically or horizontally and, considering their basic simplicity, have a remarkable degree of interest. A few designs commissioned by the Rayon Centre from John Minton are of a pleasant directness.

A number of other young designers have an affinity which approaches a common style. Among them is Eduardo Paolozzi, one of the more talented sculptors to come up since Henry Moore. He has made a number of designs of which only a few have so far been printed, and then only in small quantities for individual orders. Intended for cottons, some are magnificent, exploiting simple, and even obvious, elements with a casual assurance. As a teacher at the Central School of Arts and Crafts, his influence has already proved considerable.

Terence Conran, who has worked under Paolozzi, has produced interiors, murals, and distinguished furniture. More of his textile designs have been put into production than most other young designers'. In colours which range from the bold to the acidly delicious, they are extraordinarily sophisticated and elegant. Extremely receptive as he is, his work often has about it a lightness and a lack of any attempt at profundity which gives it all the great charm of the ephemeral.

Perhaps the most professionally accomplished of these designers is Lucienne Day, who has worked in conjunction with her husband, Robin Day, and has exhibited textiles at the Triennale. Other woven designs of hers were used for the Festival Concert Hall.

What is noticeable about all these designers is that they approach textile designing as an art in its own right, and not as a subordinate branch of painting. Sculptor, painter, or furniture designer as he may be, each seems prepared to find himself outside the framework of his usual art for the time being and to tackle the job on its own terms.

The tendency of most of them is towards abstraction. In most cases their designs are flat, even linear. While their faults are not necessarily inseparable from abstraction, it does enhance the faultiness of unsuccessful designs in ways of its own. A number of most charming designs would be difficult to use simply because the patterns would break into meaningless confusion if they were hung as curtains; at the same time they are too large to be used for cushions or chairs. It is clear that too many have been approved on account of their effect on the drawing-board without enough consideration of their effect in use. Even so one feels that the faults of these designs are not those of unteachable incompetence but of unavoidable inexperience.

At this point we come back again to the question of audience and demand. The economics of the matter are not as forbidding as they may look. For one thing, the price of screen-printing makes it feasible to commission designs and produce small quantities of them for special jobs. This has been done several times lately for exhibition work; most notably by Jane Drew and Maxwell Fry for the curtains of the Institute of Contemporary Art's new rooms in London. It is something which could be done more often, and it looks as if anyone who wishes to use modern designs will find young designers who are more than ready to meet him halfway.

So far, it must be admitted, there are not a great number of them. Like any other kind of artist, to be good a designer needs not only talent but conviction; he may be versatile but he cannot afford to be a jack-of-all-trades. He must have an individual style, and that brings with it limitations. It is too early to speak in terms of a movement, or even a group, as far as young textile designers are concerned at the moment. Whether there will be one depends on several things: the training given students now in schools; the encouragement given those now at work, some of whom are producing what it seems are likely to remain only projects. An essentially industrial art cannot flourish if it is to go no further than the drawing-board. In the meantime there are enough designers to need and deserve encouragement.

4

Patrick Heron

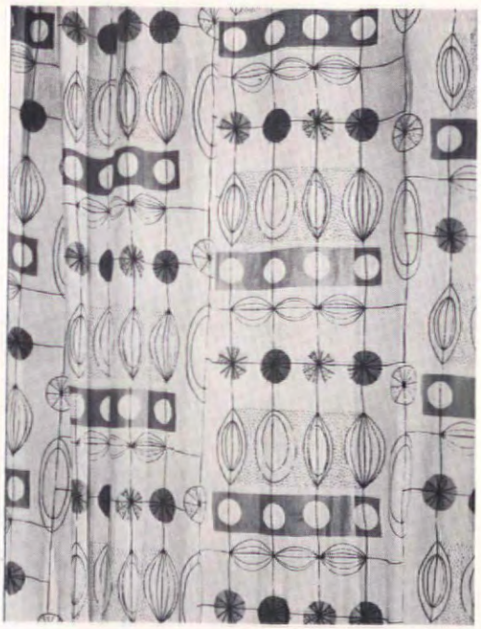
'Altamira,' on rayon, designed for Cresta Silks; 15*s.* 9*d. a yard.*

5

Graham Sutherland

'Bulrush,' designed for Cresta Silks; 18*s.* 6*d. a yard.*

6



7

Terence Conran

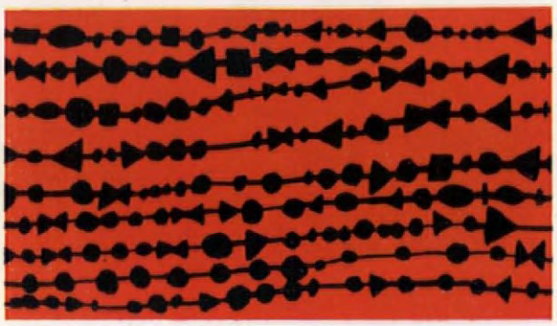
6, curtain material designed for the Institute of Contemporary Arts. Screen-printed on cotton by Gerald Holtom; available from Liberty's and Dunn's; 10*s. a yard.* 7*, privately screen-printed on cotton by the designer.* 8*, wood and metal chair by Terence Conran for Ridgeway Hotel, Lusaka, with coverings screen-printed by David Whitehead;* 30*s. a yard.* 9*, privately screen-printed on cotton by the designer.*

8

9

Eduardo Paolozzi

10, *privately produced screen-print on cotton.* 11, *curtains and chair-cover privately screen-printed for Jane Drew.*



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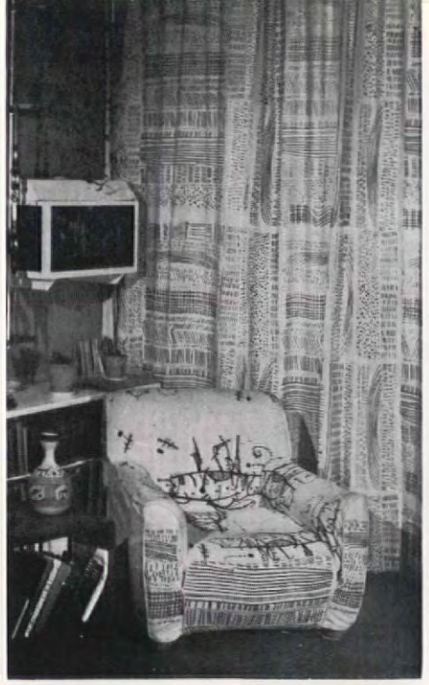
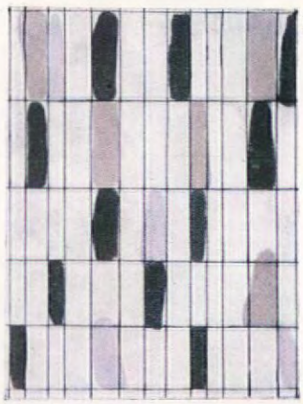


11

Lucienne Day

12, *'Calyx,' on linen, produced by Heals; 31s. 11d. a yard.* 13, *design printed on cotton for Primavera; 32s. 6d. a yard.*

12, 13



16

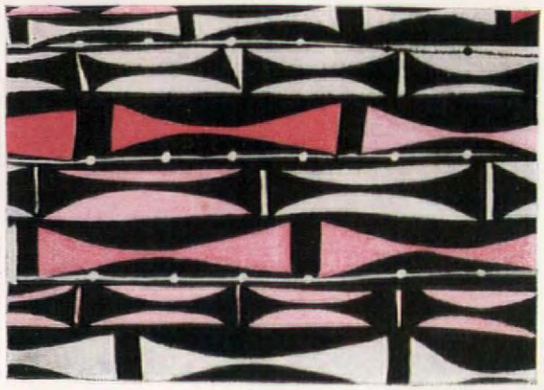
Vera Spencer

16, *design for the Rayon Design Centre.* 17, *privately screen-printed on linen by the designer.*

John Minton

Design for the Rayon Design Centre.

14

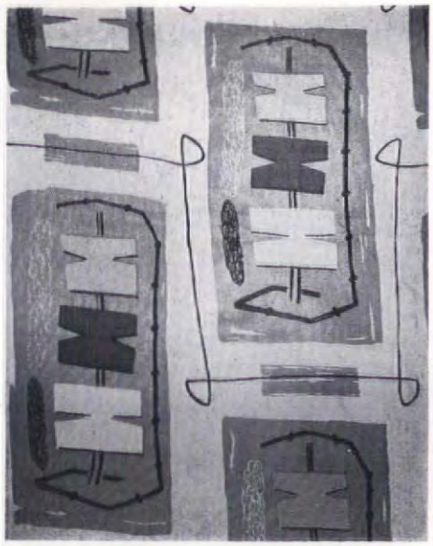


15

Jacqueline Groag

Design for the Rayon Design Centre.

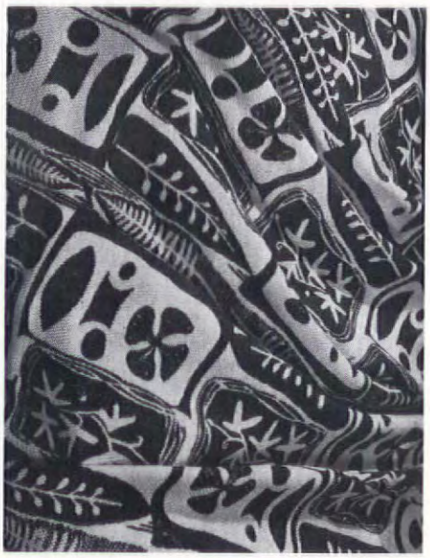
17



'Kitestring,' printed on linen; designed by Jane Edgar for Gerald Holtom; 19*s.* 1*d. a yard.*

18, 19

An Ascher fabric designed by Henry Moore.



'Totem,' printed on rayon; designed by C. Wybrants for Gayonnes; 13*s.* 9*d. a yard.*

20, 21

'Modern Hawking,' printed on rayon; designed by Hilda M. Durkin for Spence, Bryson.

'Gambia,' designed by H. Dalton Clifford for Story's; 35*s.* 4*d. a yard.*

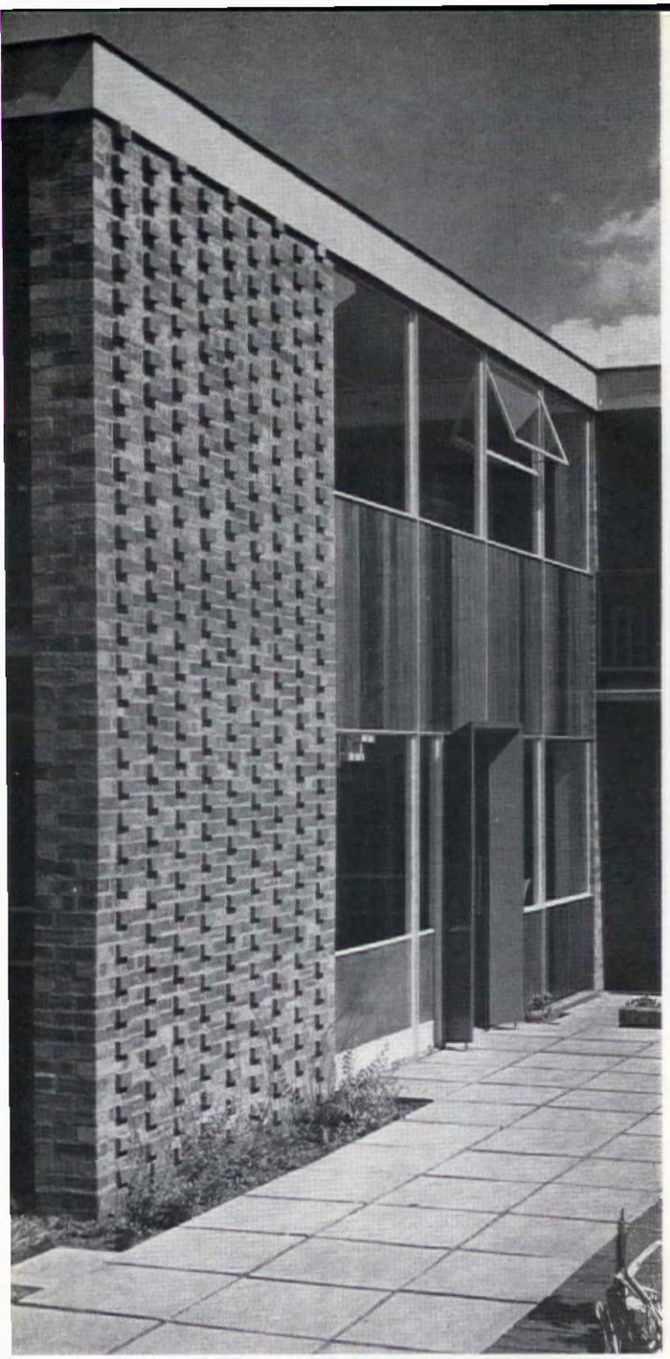
22, 23

Screen-print on cotton designed by Robert Addington for Helios.

FLATS AT TWICKENHAM, MIDDLESEX

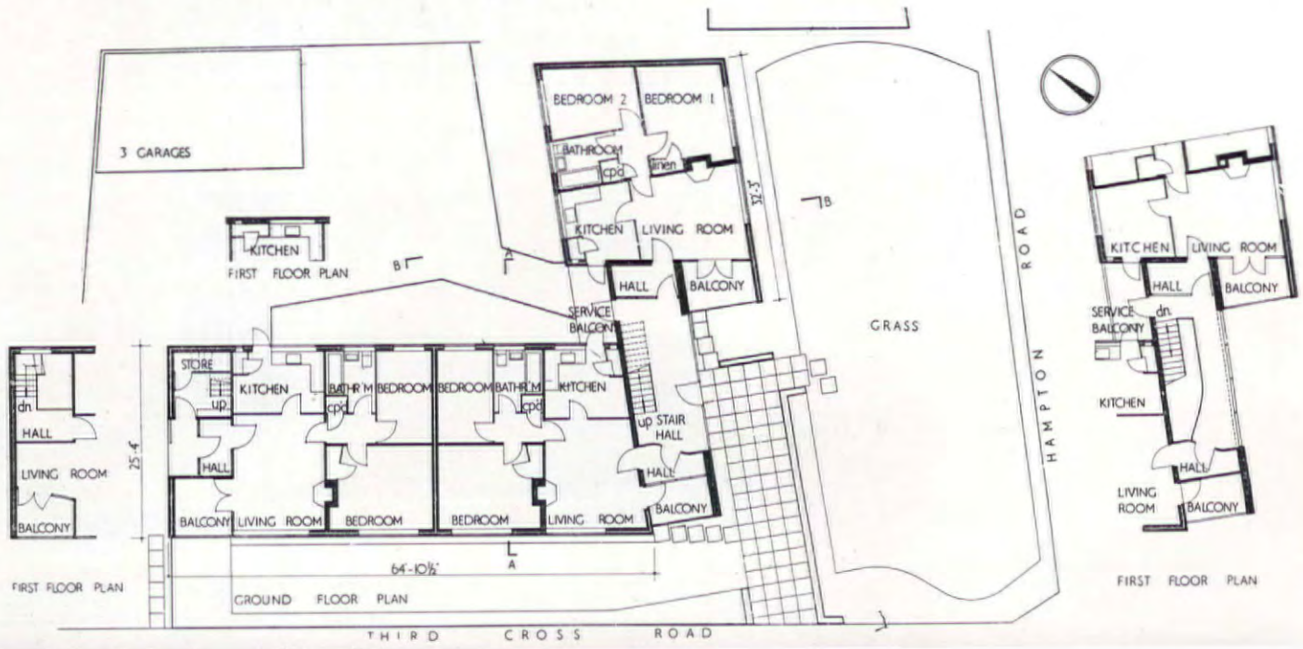
ARCHITECTS: ERIC LYONS AND G. PAULSON TOWNSEND

The flats illustrated here, although built for a private client, are for tenants from the Borough housing list. Total floor area including the balcony or garden room is 730 square feet. Construction is of load-bearing brick, supporting the reinforced concrete hollow-tile floor and roof. The main staircase is formed of precast concrete units cantilevered from the back wall of the hall. The ground floor is waterproofed with bitumen membrane and finished with linoleum, and the first floor is finished with ¾ inch boarding on battens, laid on a glass-wool blanket. Windows are painted white and cills dark blue. Internally, all flats are distempered or painted white except for a wallpaper panel on the fireplace wall of the living-room.



1, *the main entrance door has a wide projecting frame and is set in a glazed screen with panels of vertical oiled red cedar boards.*

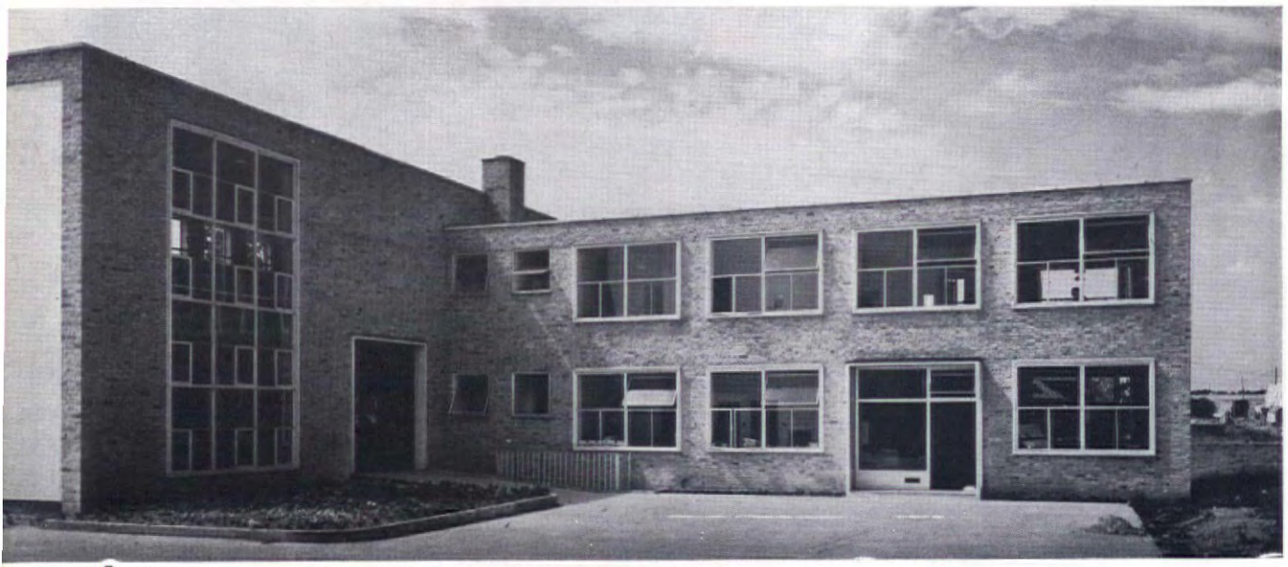
2, *the south-west facade. The drive on the left leads to lock-up garages.*



3, a typical first floor living room with open fireplace. 4, the main staircase from the entrance.

3

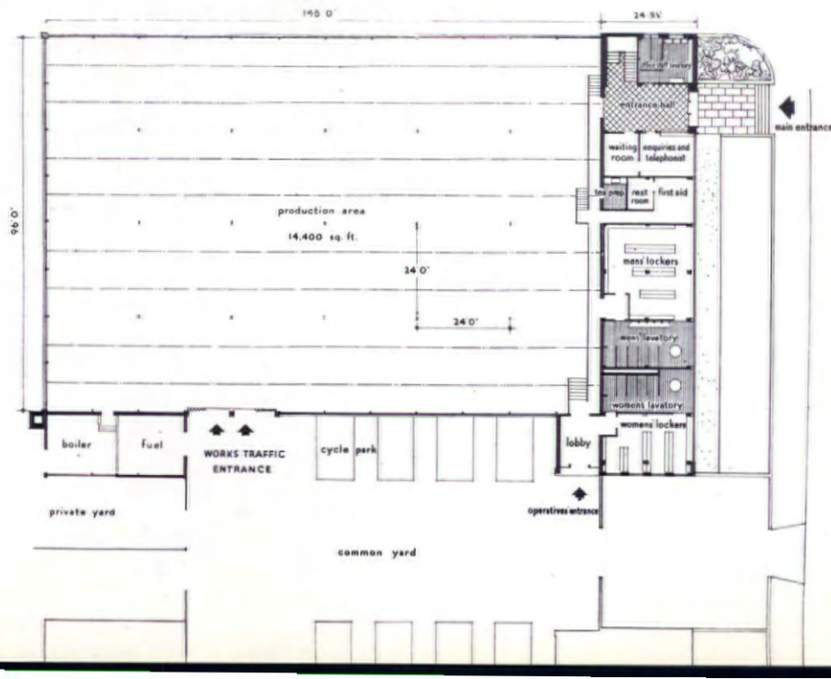
4



5

FACTORY AT HARLOW NEW TOWN

ARCHITECT : FREDERICK GIBBERD



The first factory (5) to be built for the industrial estate of Harlow New Town was a laboratory and offices for the British Hydromechanics Research Association. The building is of steel frame construction with cavity brick walls and is roofed with precast concrete units. Interior walls are light cream except for the laboratory partition wall, which is brick red. Stanchions are grey and main ceilings light blue. Shutter doors are royal blue. The plan on the right is of a standard factory unit, two of which are constructed with three more under construction. Three adapted types are under construction and one completed.

6

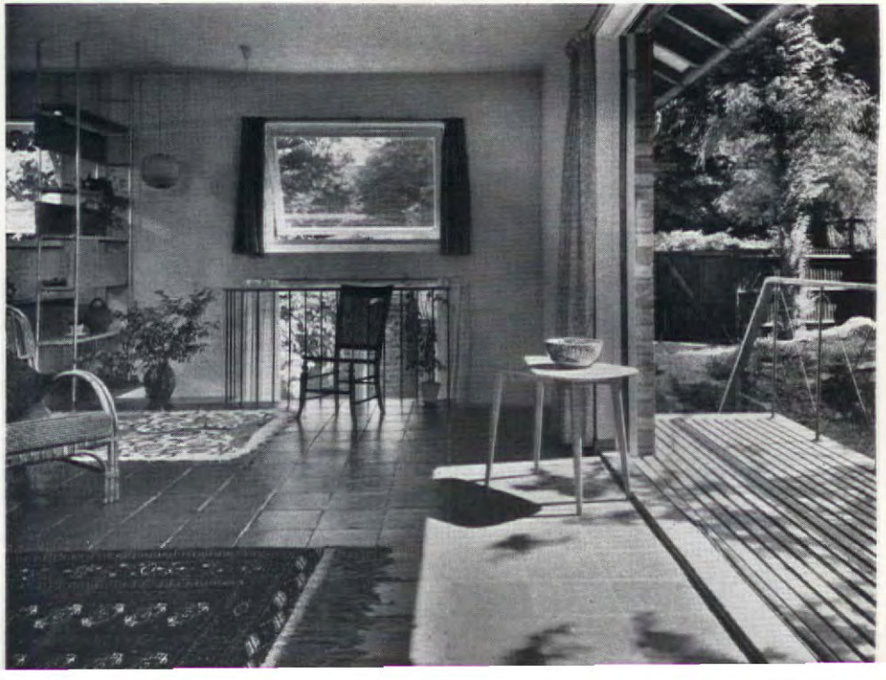
The garden front looking north-west

HOUSE AT HAMPSTEAD HEATH, LONDON

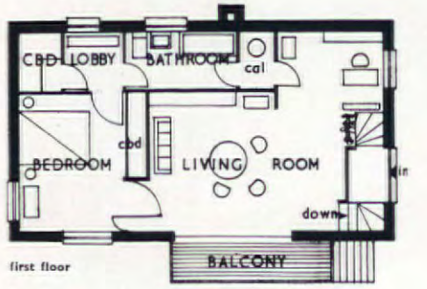
ARCHITECTS: ARCHITECTS CO-OPERATIVE PARTNERSHIP

A small house was required, designed particularly for ease of running and a feeling of spaciousness inside. The plan has reduced circulation space to less than 2 per cent of the floor area without sacrificing privacy. Construction is of cavity load-bearing walls with a first floor of lattice steel joists continued on the south-east façade to support the balcony. Partitions are of breeze blocks and the roof is of timber trusses. Corrugated iron, screed and quarry tiles are laid on the first floor lattice joists and the ground floor ceiling is of plasterboard. The roof is covered with blue-grey Penrhyn slates and the facing brickwork is buff-yellow in colour. The specially designed windows are of wood painted white. All internal walls are plastered and painted white. The ground floor is covered with deal blocks, the bathroom floor is of black and white vitreous tiles and elsewhere quarry tiles are used.

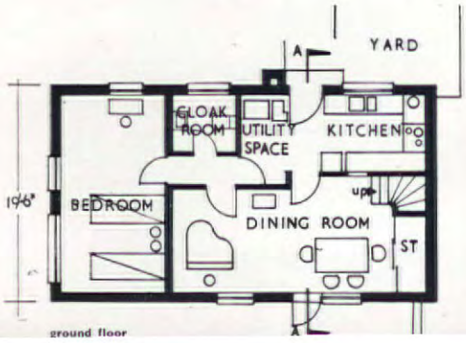
7



The first floor living room and balcony, with outside stair to the garden on the right and staircase to the ground floor in the centre.



first floor



ground floor

BOOKS

ARCHITECTURAL LABORATORY

EXHIBITION DESIGN. *Edited by Misha Black. The Architectural Press, London.* 1950. 25*s*.

This may very well be the only book on modern exhibition design to have been published in recent years; but even if it were not, it would still be quite invaluable to people concerned with this kind of visual communication. Nine contributors on subjects ranging from the practical administration of a show to the problem of where and how to display a bit of flora known as *Euonymus radicans* (Silver Queen) give this job an impressively professional flavour; and the pictures of exhibitions in many parts of the world are uniformly interesting.

Mr. Black, in his lively introduction, says that there are three different kinds of exhibitions: First, the exhibition designed to sell something. Among the things an exhibition can sell are ideas as well as manufactured products. Secondly, there is the kind of exhibition which actually shows the object to be sold—and this type of display, according to Mr. Black, is the most effective sales method of all. And, finally, there is the auxiliary exhibition, the kind of explanatory presentation that might go with a live demonstration or with the display of a particular product. Still another type—the museum show of a work of art—is not covered in this book largely, perhaps, because it is not subject to a simple set of rules or principles.

The main value of making these three rather fine distinctions in exhibition categories is twofold: To start with, these distinctions enable the designer to arrive at a cost estimate that is reasonable in terms of what the exhibitor hopes to achieve; and, secondly, they can help him determine what sort of audience he may be dealing with. Mr. Black is convinced that few people can remember facts or reasoned arguments; what they *do* remember is a conclusion, a simple idea—if that idea is expressed in one or two striking visual images, or in an effective slogan. In other words, the exhibition designer is concerned—to put it brutally—with the oversimplification of ideas.

This is not the place to discuss the obvious dangers in such an approach; but since images and symbols are the exhibition designer's stocks in trade, it seems legitimate to ask just how good these new symbols are.

Although Mr. Black's selection of illustrations is fine, one is immediately struck by the fact that the symbols in current exhibition use seem to be almost all alike, and can be interpreted to stand for almost anything the designer happens to have in mind. To be specific: The most common ingredients of a well-designed modern exhibition seem to be perforated boards (some have small *and* big holes, like Swiss cheese), stretched strings or wires, spirals in sheet metal, foliage (when in Scandinavia), and pipe frames. (Large eyes, large hands and kidney shapes seem to be getting *passé*.) Exhibitions consisting of these new ingredients may symbolize either Paints, Beer, Cardboard Boxes, Tonic, Steam, Chemistry or Czechoslovakia. To be perfectly honest, many of these compositions are exceedingly beautiful; but they are also quite interchangeable (especially, one feels, Czechoslovakia and Boxes.) It seems about time for a couple of new ideas.

There are many illustrations in *Exhibition Design* that are anything but monotonous, however; and these are encouraging proof that, just as in Paxton's time, exhibition designers today are using their field as a kind of giant sketching pad on which to jot down advanced architectural ideas for later, more permanent and more careful development. Le Corbusier's exhibition pavilions are, of course, an obvious example. Others can be found in many of the excellent exhibitions of new building materials and of new furniture. Still other advances are implied in the wide use of prefabrication and standardization in mobile exhibits and travelling shows. And if Mr. Aalto had taken a really close look at his wavy wall in the 1939 Finnish Pavilion (if not a sketch for, then certainly a premonition of his wavy dormitories in Cambridge, Mass. 10 years later), he could have spared himself a lot of trouble. . . .

Peter Blake

Shorter Notices

ENGLISH INFLUENCE IN NORWEGIAN AND SWEDISH FIGURE SCULPTURE IN WOOD, 1220-1270. *By Arne Andersson. Alec Tiranti, London.* 1949. 42*s*.

Perhaps it would be expecting too much from any but the narrowest specialist to take an interest in a book on Scandinavian sculpture in one particular material during fifty years of the Middle Ages. But the author precedes his book by an introduction which is the most up-to-date summary of an important phase in English sculpture—from the façade of Wells to the Angel Choir at Lincoln. His style is quaint: he writes in English and writes it so well that even the most cursory reading by a native might have removed all that now causes merriment. But his views are sound—for instance where he contradicts Mr. Gardner on the authenticity of the so-called Queen Margaret at Lincoln. As to the Swedish and Norwegian pieces which he presents, they are in fact also well worth an Englishman's attention, as they pose quite an interesting problem. Their dependence on England is evident, yet they have here and there a warmth and frankness of expression which is more German than English. The best figures are the Virgins from Hedal and Hove and the Christ Crucified from Mosviken. No contemporary wooden sculpture in England is either as high in quality or as eloquent in feeling. Is that due to destruction? Or was there never anything so good? Perhaps one should not be too pessimistic. The chance survival of the Synagogue at Winchester (wrongly derived by the author from antique sculpture rather than from Chartres) proves that English stone sculpture could be of a far higher quality than the Wells façade would make one expect. And as for intensity of expression, perhaps here also one should be cautious. Wood is much more easily worked than stone. Maybe the English sculptor in wood expressed himself less reticently than his fellow worker in stone, and we do not know about it simply because nothing of his work survives.

N.P.

HISTORY

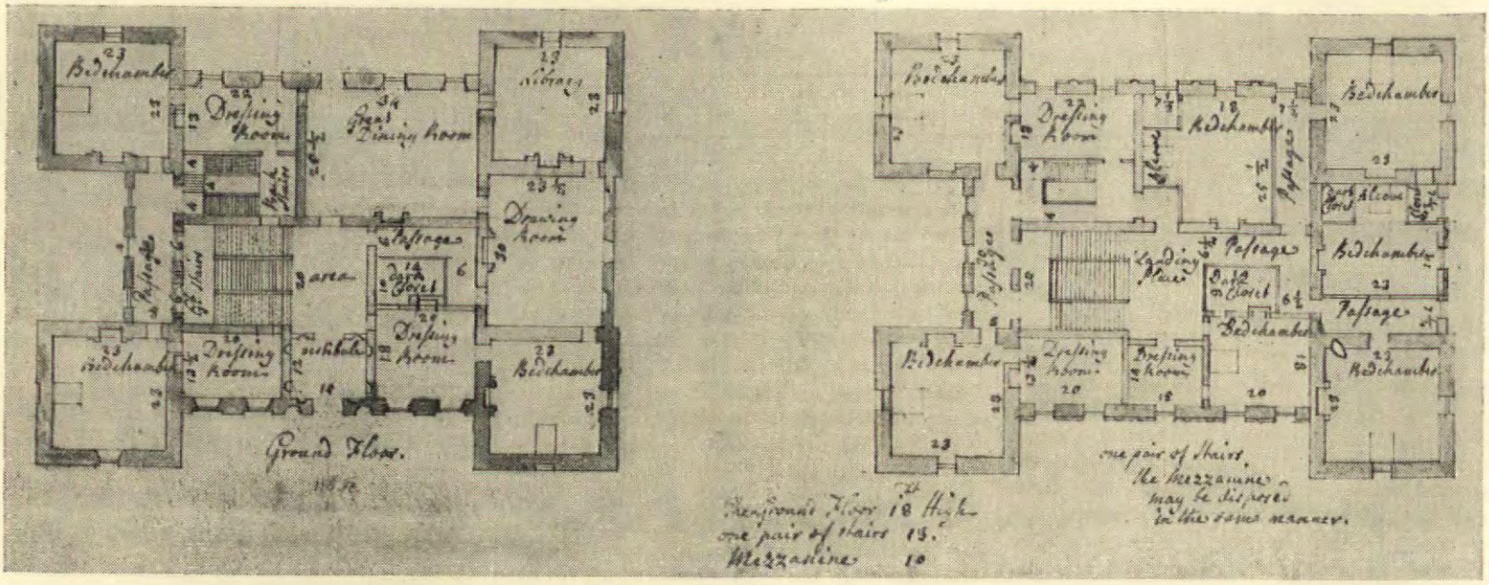
JOHN CHUTE AND HAGLEY HALL

It is generally recognized that John Chute (1701-76) *occupies a not unimportant place in the history of the eighteenth-century Gothick revival, and his work at Strawberry Hill has been partly cleared from obscurity by the publication of the Yale edition of Walpole's correspondence. It is less well known that he submitted designs to Sir George* (*later Lord*) *Lyttelton for Hagley Hall.* Some of the drawings made by Chute are in the magnificent collection assembled at Farmington, Connecticut, by Mr. Wilmarth S. Lewis, doyen of Walpole scholars, and Editor of the *Yale* edition. The drawings made by Sanderson Miller have disappeared. It is known that a set was lent to George III

Sanderson Miller, architect of Hagley Hall. Another version of this portrait is preserved at Lacock Abbey, Wiltshire.

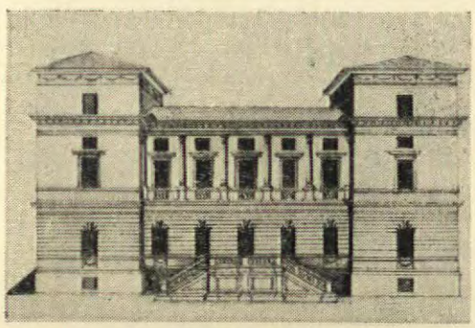
1

2



and lost. Lyttelton also asked Miller to make a set of drawings for 'Count Czernichen, whom I entertained at Hagley last Summer . . . when he was the Russian Ambassador at our Court.'* Our long search for the original Hagley plans has been without success. The nearest recorded approach we have to Miller's plans is that contained in the fifth volume of *Vitruvius Britannicus*.

The correspondence that passed between Lyttelton and Sanderson Miller (in the Warwick County Record Office) throws light on these hitherto unpublished drawings made by Chute in his efforts to please Lyttelton and his difficult wife. The letters were published under the editorship of Lilian Dickins and the late Mary Stanton in 1910 (*An Eighteenth Century Correspondence*) and show how involved is the



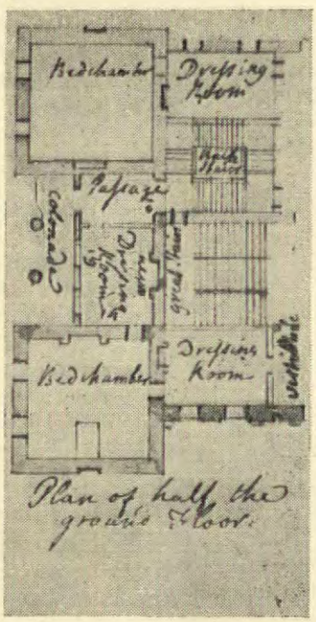
John Chute's design for Hagley Hall.

story of Chute's and Miller's connection with the design of Hagley. Lyttelton faithfully passed on his wife's requirements to the architects. In Chute's plans some desired dark closets figure large, complicating the approach to the Drawing Room from the 'area' (1). A similar closet on the upper floor creates what would certainly have been a very dark and unpleasant passage, unless Chute intended to introduce what he called on another plan a 'pavilion skylight to help out' when difficulties arose in the lighting of the principal staircase by the introduction of a Dressing Room on the outer wall (2 and 3).

In June, 1752, Lyttelton wrote to Miller to say that Lady Lyttelton insisted on dark closets and back stairs. Doubtless similar instructions went to Chute, for his plans show the back stairs prominently. A small room of separation between the Drawing Room and eating room was called for to 'hinder the ladies from hearing the talk of the men when they are left to their bottle.' Chute planned these two rooms at right angles (1) with a square apartment which was to serve as the library between them, but even this left a connecting door between the rooms and thus hardly provided the answer to the problem. Later this requirement was abandoned and we learn that Lady Lyttelton was satisfied with a thick partition between the two rooms.

After both architects had made their plans, Lyttelton sent Chute's to Miller, asking him to 'transfer some of the beauties of them into your plan.' When the compromise plans had been prepared Sir George and Lady Lyttelton—the latter had been most assiduous in her attention to detail—agreed that Chute should be passed over in favour of Miller, but it was not until June, 1754, that the foundations of the house were laid. By September, 1760, it was ready for occupation, resplendent with its Long Gallery, its Tapestry Room with Floral Zephyrs by James 'Athenian' Stuart† and a Saloon with walls marvellously decorated by Italian stuccadores.

3



Among the names of those who contributed to the decoration of the landscaped park that of John Chute does not appear. James Stuart was responsible for the Doric Temple; Sanderson Miller's ruinated castle is still to be seen. The Rotunda at the head of the 'Vale of Tempe,' formerly attributed to Miller, is the work of John Pitt‡. This fact came to light as the result of research by the present writers, with the enthusiastic collaboration of Lord Cobham, in Hagley Hall library. A note in the sprawling hand of George, Lord Lyttelton, was found on the flyleaf of a large volume of timber accounts, giving his expenses in adorning the park and purchases of land. He mentions Pitt in connection with the Rotunda and also as having designed a now vanished 'half-octagon seat.' The Palladian Bridge Richard Pococke ascribes to Thomas Pitt, Lord Camelford.§

Geoffrey W. Beard and J. Homery Folkes

* Lyttelton to Miller, December 1770. Printed in *Dickins & Stanton*, pp. 440-1.

† See *Country Life*, October 16, 1915, p. 526. The Lyttelton Bank Account is still preserved at Hoare's Bank, Fleet Street, E.C.4. In 1758 (the date of Stuart's Temple), 'James Stewart' receives £20—July 30. This we presume for the Temple and his paintings. Miller received a total of £317 17s. 10d. between 1756-1762.

‡ Presumably John Pitt of Encombe. See A.P.S. *Dictionary* and *The House of Pitt*, Sir Tresham Lever (London 1947).

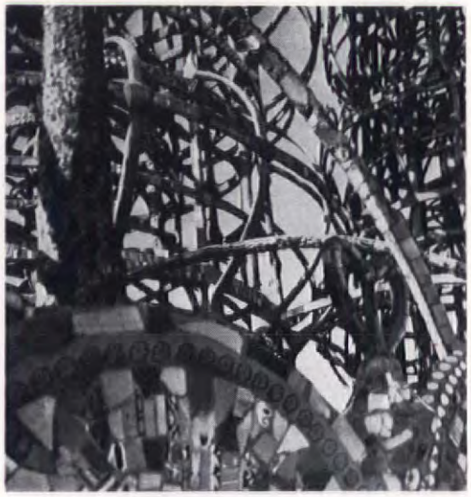
§ Richard Pococke. Unpublished tour. B.M. *Add. MSS.* 14260, f. 178. We are indebted for this reference to Mr. Howard Colvin.

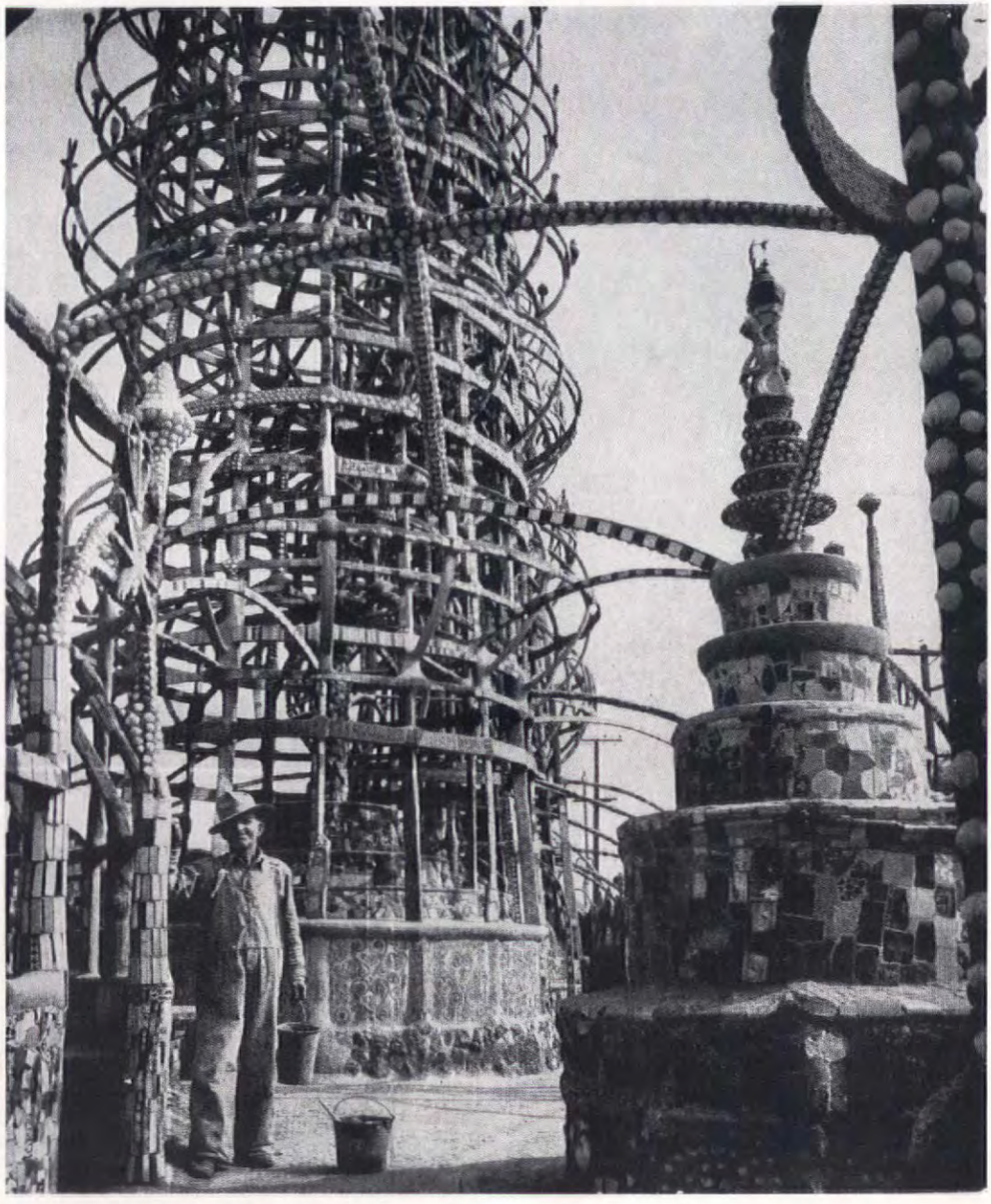
For help with illustrations we acknowledge the assistance of Mr. W. S. Lewis (Chute drawings); Mrs. W. P. Matthews, Victoria, B.C. (owner of one of the two surviving portraits of Miller); and The Viscount Cobham.

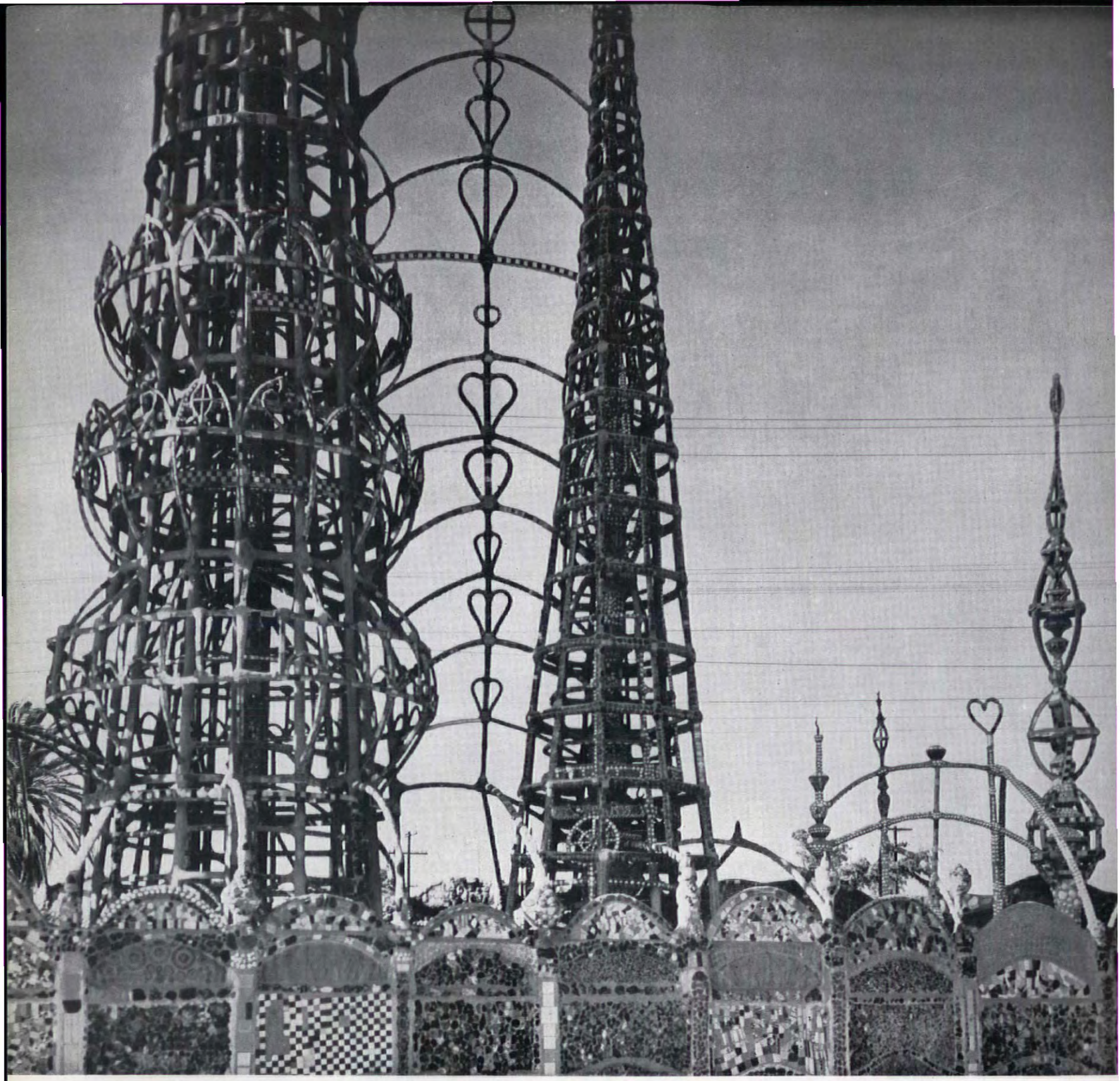
POPULAR ART

SAM OF WATTS

America may be the land of 'popular art organized'; it is also the land in which those individuals who are individual at all tend to be more individual than individuals elsewhere. Among architects there is, for example, Frank Lloyd Wright; there is also—or is he a sculptor?—Simon Rodilla, the only begetter of the prodigious work of popular art now illustrated. It stands at Watts, which is a small industrial place on the outskirts of Los Angeles. According to Jules Langsner, writing in *California Arts and Architecture*, Simon Rodilla (Sam to those who meet him) was born in 1879 in Rome, went to the United States at the age of nine, is a tile setter by trade, and began his *magnum opus*—'I had in my mind to do something big and I did'—in 1921. After thirty years it is still not completed; for Sam plans to bring the two shorter towers of the three which form its chief features up to the height of the third—104 feet. Construction is of steel reinforcing rods, which are wired together and rendered with waterproof cement on a key of wire mesh. It would appear that the tower provides its own scaffolding as it goes up. Sam has already handled 7,000 sacks of cement and 75,000 seashells, not to mention the hundreds of broken dishes,



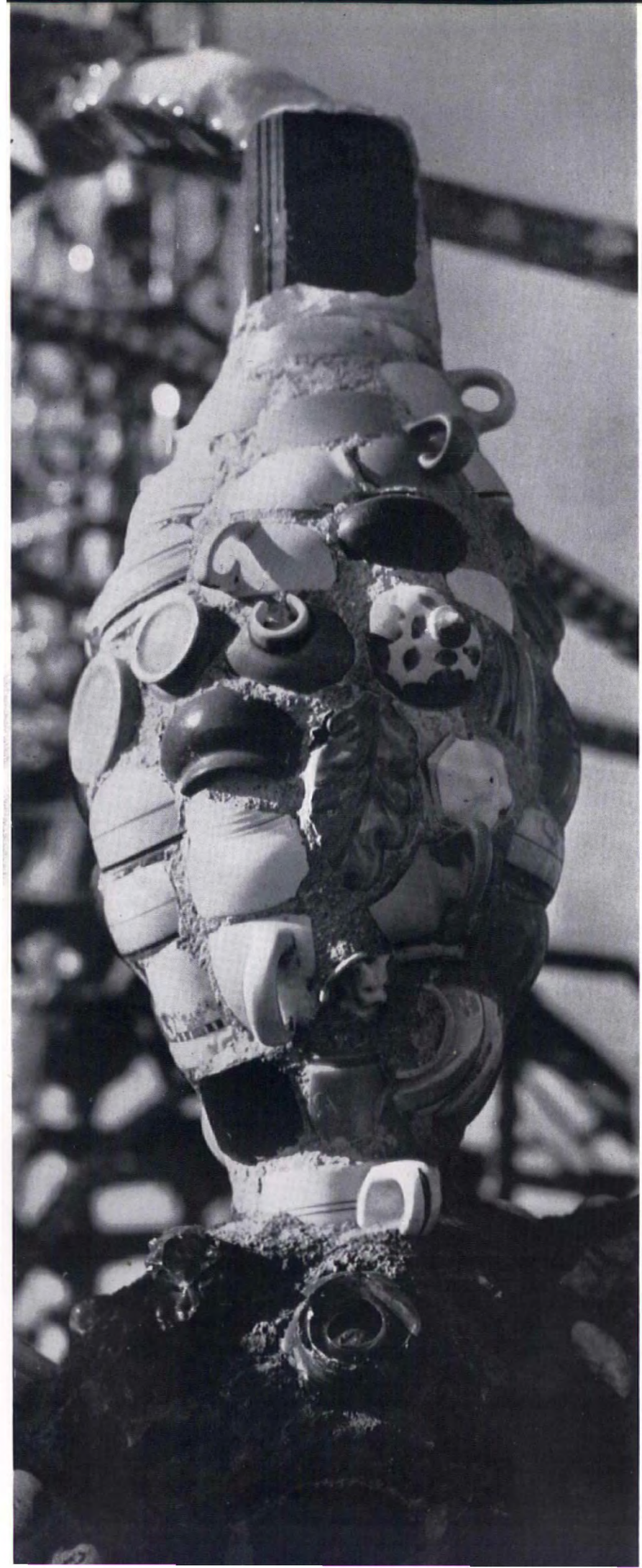




thousands of pieces of broken tile, and several truckloads of broken bottles which with the shells provide surface enrichment. His method of work on the towers is to complete them up to a certain height and then to start at the bottom and on the outside again, so that each tower is really a number of concentric towers nested like Chinese boxes. When he first presented a set of plans for the project to the local authority they were turned down on safety grounds. Undeterred, he took them to the state capital, at Sacramento, where he obtained permission to go ahead.

And the motive? Not pecuniary at all, but the motive which has inspired so many of the world's works of art—the human need to be remembered. This is Simon Rodilla's monument, his personal mark on the surface of the earth. 'A man has to be good good or bad bad to be remembered,' Mr. Langsner quotes him as saying—and the apophthegm comes from a man whose second passion in life is the study of the biographies of the great in the pages of the *Encyclopedia Britannica*. 'It, becomes apparent in talking to him that this project expresses the longing of a dignified, lonely, indomitable mite of a man who seeks the immortality of the historic figures he admires.' Surely Simon Rodilla has already won a place, next to the postman of Hauterives,* among the immortals of popular art.

* See *Palais Ideal* in THE ARCHITECTURAL REVIEW, October, 1936.



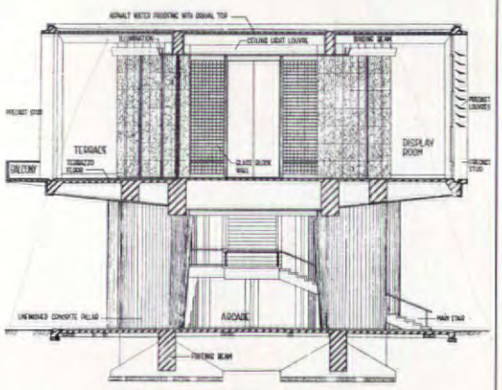
Sam of Watts

WORLD

HIROSHIMA PEACE MEMORIAL MUSEUM

This appears to be the first example in Japan of the scientific use of the brise-soleil *as originally suggested by Le Corbusier for a building at Algiers in* 1933.* On the main façade, illustrated below, the louvres are of the

egg-box type, while on the rear façade simple vertical louvres are used. Both types are made of precast concrete. The building itself is the Memorial Museum of the Hiroshima Peace Project and construction was commenced in 1951. The structural frame is of reinforced concrete



and is designed to be earthquake-proof. The section illustrated here is just under 1/64 inch scale. The architect is Kenzo Tange. **Kokusai-Kentiko, September 1951**

* See *Sun Control*, AR, January 1952.

PLANNING COMPETITION IN BRATISLAVA

Since the original designs for the Slovak Office of Planning in Bratislava were considered not to have taken sufficient account of the existing character of the town, a limited competition was held between three groups of architects and their schemes are shown here. At a conference between the jury and architects before the competition, it was agreed that the building should be of sufficient height to dominate not merely its immediate surroundings but the whole town. All three competitors submitted very similar proposals so far as siting was concerned. 1, the design by M. Kusy for the planning office block as seen from Gottwald Square with another large block, which is now under construction, on the right and 2, the design by J. Hruby and J. Pokorny seen from the same position as 1. The design by the third group, J. Havlicek and K. Filsak, is seen in 3 from Gottwald Square and 4, from Malinowski Street. After consideration the jury decided that the competitors should form a committee of five to give further consideration to the problem of a uniform vertical design (with a rectangular intersection of wings), guided by the endeavour to express progress towards socialism in architectural terms. Construction is to begin shortly. **Architect, 10-11, 1950**

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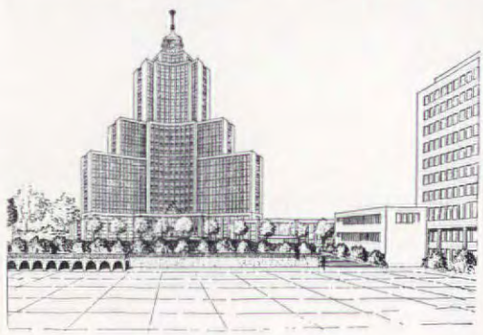

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INDOOR PLANTS

PILEA CADIEREI (Urticaceae)

PILEA is a genus of small plants growing in the West Indies whose peculiar feature is the forcible discharge of pollen when ripe and particularly if the foliage is sprayed, producing the effect of a small bombardment. It is for this reason called the Artillery Plant. *Pilea muscosa* and *Pilea serpyllifolia* are cultivated for their fanlike sprays of small ovate shiny leaves which are useful for equalizing moisture conditions in greenhouses. Their characteristics are so variable, however, that botanists find great difficulty in determining the species.

Pilea cadierei is a very recently introduced species found by a French missionary

just after the first world war in Indo-China and brought to Paris. From there it reached Denmark in 1938 and it is now being imported into this country and propagated here. It is a neat bushy plant about 9 inches high with larger leaves than normal, about 3 to 4 inches long, silver striped and silver spotted towards the tip. When watered the whole plant has an aluminium gleam. It is useful for underplanting and provides a good contrast to darker-leaved foliage plants. It requires a warm room, not strong light and plenty of water. If the leaf tips shrivel it is due to a too cold atmosphere and insufficient moisture. It will not survive escaping gas. Propagate from cuttings.

H. F. Clark

ANTHOLOGY

MOSCOW'S TIMBER PREFABS

Among the curiosities of Moscow, I must not omit the market for the sale of houses. It is held in a large open space in one of the suburbs, and exhibits a great variety of *ready-made houses*, thickly strewed upon the ground. The purchaser who wants a dwelling, repairs to this spot, mentions the number of rooms he requires, examines the different timbers, which are regularly numbered, and bargains for that which suits him. The house is sometimes paid for upon the spot, and taken away by the purchaser; or sometimes the vender contracts to transport and erect it upon the place where it is designed to stand. It may appear incredible to assert, that a dwelling may be thus bought, removed, raised, and inhabited, within the space of a week; but we shall conceive it practicable by considering that these *ready-made houses* are in general merely collections of trunks of trees, tenonned and morticed at each extremity into one another, so that nothing more is required than the labour of transporting and readjusting them.

But this summary mode of building is not peculiar to the meaner hovels; as wooden structures of very large dimensions and handsome appearance are occasionally formed in Russia with an expedition almost inconceivable to the inhabitants of other countries. A remarkable instance of this dispatch was displayed the last time the empress came to Moscow. Her majesty proposed to reside in the mansion of Prince Galitzin, which is esteemed the completest edifice in this city; but as it was not sufficiently spacious for her reception, a temporary addition of wood, larger than the original house, and containing a magnificent suite of apartments, was began [*sic*] and finished within the space of six weeks. This meteor-like fabrick was so handsome and commodious, that the materials, which were taken down at her majesty's departure, were to be reconstructed, as a kind of imperial villa, upon an eminence near the city.

WILLIAM COXE (*Travels into Poland, Russia, Sweden and Denmark, interspersed with historical relations and political inquiries*), London, 1784.

MARGINALIA

In Anthology

This month's Anthology piece was supplied by Professor George H. Hamilton, whose new book on art and architecture in Russia will be published shortly by Penguin Books. William Coxe, the author, was born in 1747 and educated at Eton and King's; ordained in 1771, he became travelling tutor to the son of the Earl of Pembroke later in the 'seventies; he travelled in Russia in 1778. When he died, in 1828, he had been Archdeacon of Wiltshire for all but a quarter of a century.

There are plenty of instances to show that in the eighteenth century the Russians fully appreciated the advantages accruing from the portability of timber buildings. One of the most memorable is the following story of Cyril Razumovsky, the brother of the Empress Elizabeth's favourite—here told in the words of Christopher Marsden from *Palmyra of the North* (Faber and Faber, 1942):

> 'He owned an enormous mansion near Kiev, consisting of seven separate buildings built of huge oak trunks. It was furnished with unheard-of luxury; he spent, for example, 400,000 rubles on painted wallpapers and hangings from abroad. A ukase was issued in 1754, imposing a tax on occupied real estate and in due course the collector knocked at Razumovsky's door to receive it. Thereupon Razumovsky became so furious that he ordered the whole house to be torn out of the ground and transported to a spot a hundred or so miles away and there re-erected. This was done in twenty-four hours.'

Unfortunately our planning laws make it difficult for those placed in similar circumstances in present-day England to emulate this feat.

Ernest Race Furniture

There is an idea, generally accepted but not yet incorporated into a proverb, so far as we know, that something one has to pay for is more valued than something one gets for nothing. The thought of paying a manufacturer for the privilege of receiving an illustrated guide to the goods which he proposes to sell one is certainly a novelty. This course has been adopted by Ernest Race, the manufacturers of contemporary furniture who supplied most of the out-of-doors furniture for the South Bank. For half-a-crown they provide a very well-produced loose-leaf booklet in which they describe and illustrate their range of furniture. The loose-leaf device is highly ingenious, practical and economical, for the inner edge of each page has a notch top and bottom with a double one in its centre, and two simple rubber bands are slipped over these notches to keep the pages in place within the cover.

A very satisfactory aspect of the booklet is that the products are described in considerable detail and in a manner that is straightforward, informative and to the point. The text is backed up with neat and simple structural drawings and diagrams in both black and white and white on colour. It is rare to find furniture dealt with in this way.

The layout is by Adrian Heath who has used the Festival extended Egyptian face on the cover. Inside he has mixed in admirable fashion Doric for main headings, Bodoni bold for the main text and some headings and Gill light for captions and incidentals.

Architects in this Issue

Architects of Factory at Brynmawr, South Wales (see pages 143-160). THE ARCHITECTS' CO-OPERATIVE PARTNERSHIP was formed in June, 1939. There were at that time eleven members all of whom trained together at the AA during the '30's. The partnership was re-formed immediately after the war by eight of the original group, seven of whom make up the present firm: Kenneth Capon, 36; Peter Cocke, 34; Michael Cooke-Yarborough, 36; Anthony Cox, 36; Michael Grice, 34; Leo de Syllas, 34; Michael Powers, 36. Their work has consisted of the Brynmawr factory, some small private houses, various alterations and additions to industrial premises, and primary schools for Coventry and Hertfordshire. They were architects for areas SB2 and SB2A of the South Bank Exhibition, which included the York Road screen, post office, Fairway café, Chicheley Street entrance, the suspended offices, Royal reception pavilion and the Natural Resources building. They were responsible in 1950 for the preparation of a report on Hospital Planning for the St. Albans and Mid-Herts Hospital.

In addition to industrial and agricultural work they are now working on secondary schools for Derbyshire, Sheffield and Hertfordshire. Since 1948 they have been teaching part-time at the AA.

None of them temperamentally inclined to prima donna architecture, they believe that good work under present conditions of practice can best be done by a working group which

1

Above, The Architects' Co-operative Partnership reading from left to right: Leo de Syllas, Michael Grice, Michael Powers, Michael Cooke-Yarborough, Peter Cocke, Anthony Cox and Kenneth Capon.

should as far as possible include the engineer and other specialists and in which they would like to be able to include the contractor. Their partnership is co-operative in the sense that all work is at the least subjected to group criticism and that there is no seniority amongst partners, who all draw equal salaries irrespective of their particular contributions.

2

Above, Ove Arup and Partners reading from left to right: Geoffrey Wood, Ove Arup and R. S. Jenkins.

Consulting Engineers of Factory at Brynmawr, South Wales (see pages 143-164). Brynmawr came into Ove Arup's office in 1945 and its construction is not unconnected with the studies which R. S. Jenkins began about this time into concrete shells in anticipation that this form would play a big part in post-war reconstruction. As a result of these he wrote the first British work on this subject called 'Theory and Design of Cylindrical Shell Structures,' published privately, 1947 now out of print. He also studied translation shells and other domed forms which made the basis of the design of the Brynmawr domes. This material is as yet unpublished.

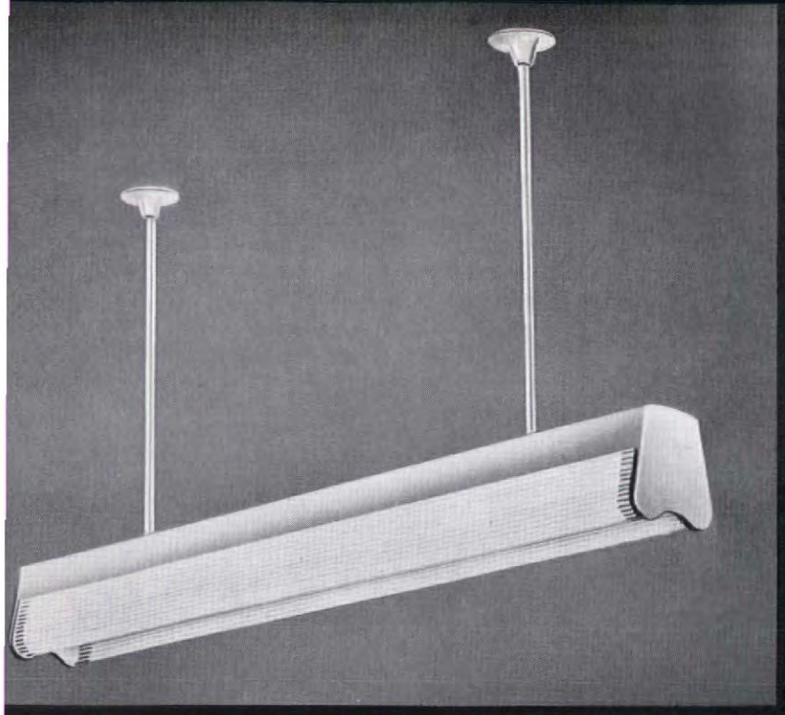
OVE ARUP, born in Newcastle. Mother was Norwegian, his father Danish. Spent the first twelve years of his life in Hamburg, then went to a boarding school in Denmark. Studied philosophy at Copenhagen University for three years, then turned to engineering. Went to work with Christiani and Neilsen in Hamburg (marine engineers constructing jetties and quays, etc.). Was appointed to their London office and soon became chief engineer, staying with them till 1934. Next went to J. L. Kier & Co., also a Danish firm of engineers and contractors, for four years. Worked on Highpoint, Finsbury Health Centre, buildings at the zoo. After that he started a firm with his cousin, acting as consulting engineers and contractors. Finally, wishing to concentrate on design he set up on his own and later took into partnership R. S. Jenkins, Geoffrey Wood and A. Young. The latter has since resigned.

R. S. JENKINS. trained at Imperial College, London University, where after obtaining a degree in civil engineering he took postgraduate course in structural engineering. After this worked as assistant engineer to Oscar Faber, consulting engineer, for four years and then went over to contracting with J. L. Kier & Co. for three years. He left this firm soon after Ove Arup, whom he joined in his new business of engineer and contractor. During the war with this firm contributed to the Mulberry harbour and designed a jetty at Heysham and other work of more than average interest. He became one of the partners of Ove Arup and Partners in 1947.

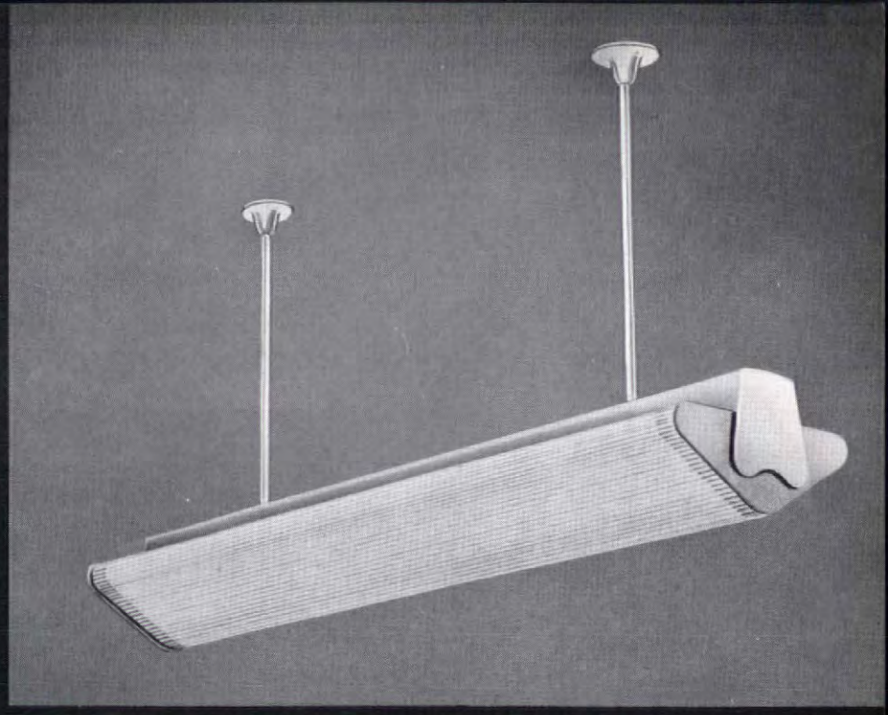
GEOFFREY WOOD was trained in civil engineering at the City and Guilds Engineering College. From 1932 to 1935 was with Christiani and Nielsen. From 1935 to 1937, J. L. Kier & Co.; 1937 went as assistant engineer to the port of Rangoon where an extensive reconstruction scheme ended abruptly in March, 1942. He then joined the staff of the chief engineer (factories) in Calcutta and worked on the design and construction of a large number of factories and accommodation for the Indian ordnance. In early 1944 was transferred to work on the aircraft bases and the fleet air arm stations for India. Later became Works Liaison Officer to the Royal Navy. After leave in Australia and New Zealand came to England and in 1947 joined Ove Arup.

Designers of the Prouvé System (see pages 171-174). JEAN PROUVE, born 1901. (His father was a painter, engraver and sculptor, Director of School of Applied Art at Nancy.) At the age of 15 he was apprenticed to a firm of blacksmiths and metal workers in Paris. In 1921 he set up a forge and metal workshop at Nancy while beginning to consider problems of metal construction. The first electric welding plant in Nancy was set up in this workshop where also some of the earliest plans for the use of stainless steel in building were worked out. His buildings include the Aéro-Club at Buc and the Maison du Peuple at Clichy (architects, Baudoin and Lods); the Palais de la Foire at Lille (architects, Herbé and Gauthier); the offices of the French Master Builders Federation* (architects, Gravereaux and Lopez); the Salle Méridienne de l'Observatoire de Paris (architect, Rémondet) and the metal construction for the French Embassy at Ottawa; the building for the Institute of Metallurgical Research (architect, Coulon) and a residential development at Menton for the Ministry of Reconstruction. Consulting architect on the scheme was Jean Prouvé's brother, Henri Prouvé.

* See *Offices in Paris*, AR, January 1952.



T.416P Pendant. Type: diffused general with direct downward light. Finish: stove enamelled off-white. Perspex: ¼ in. internal reeds. Lamps: two 4-ft. tubular fluorescent. Control gear: with starter switches only.



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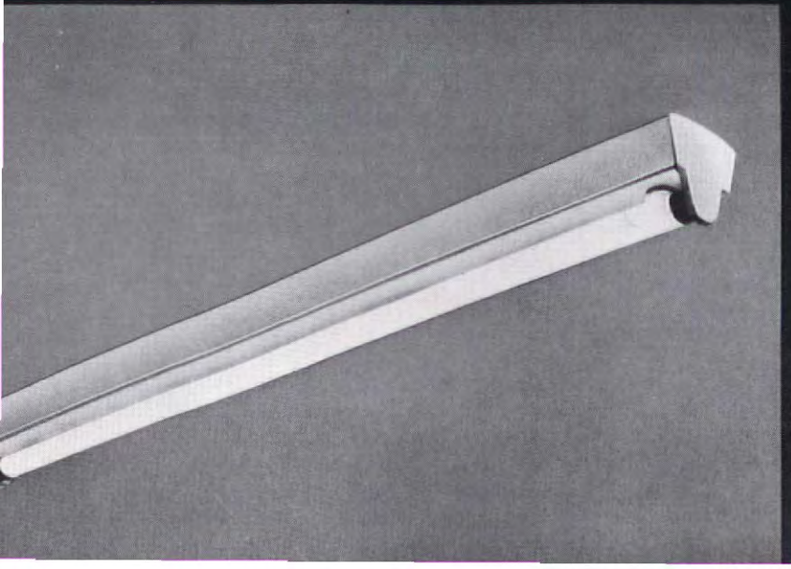
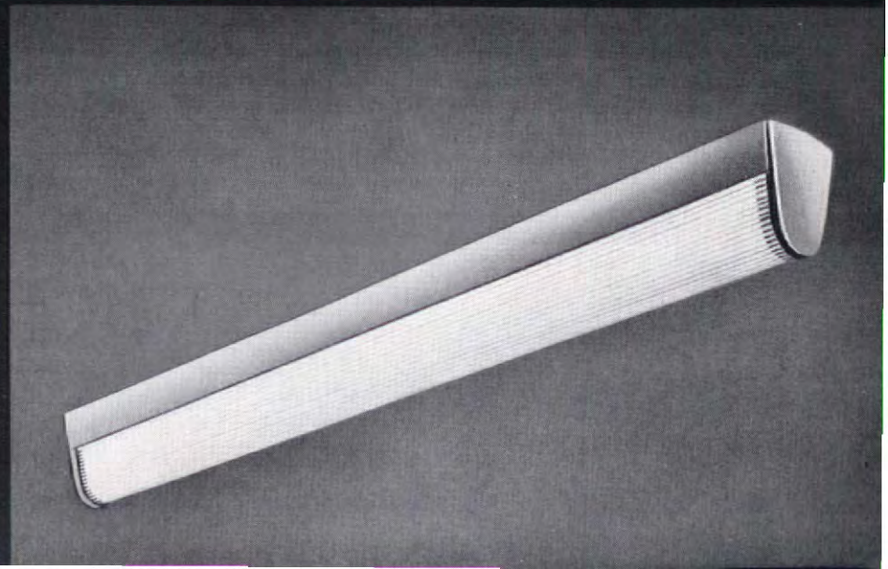
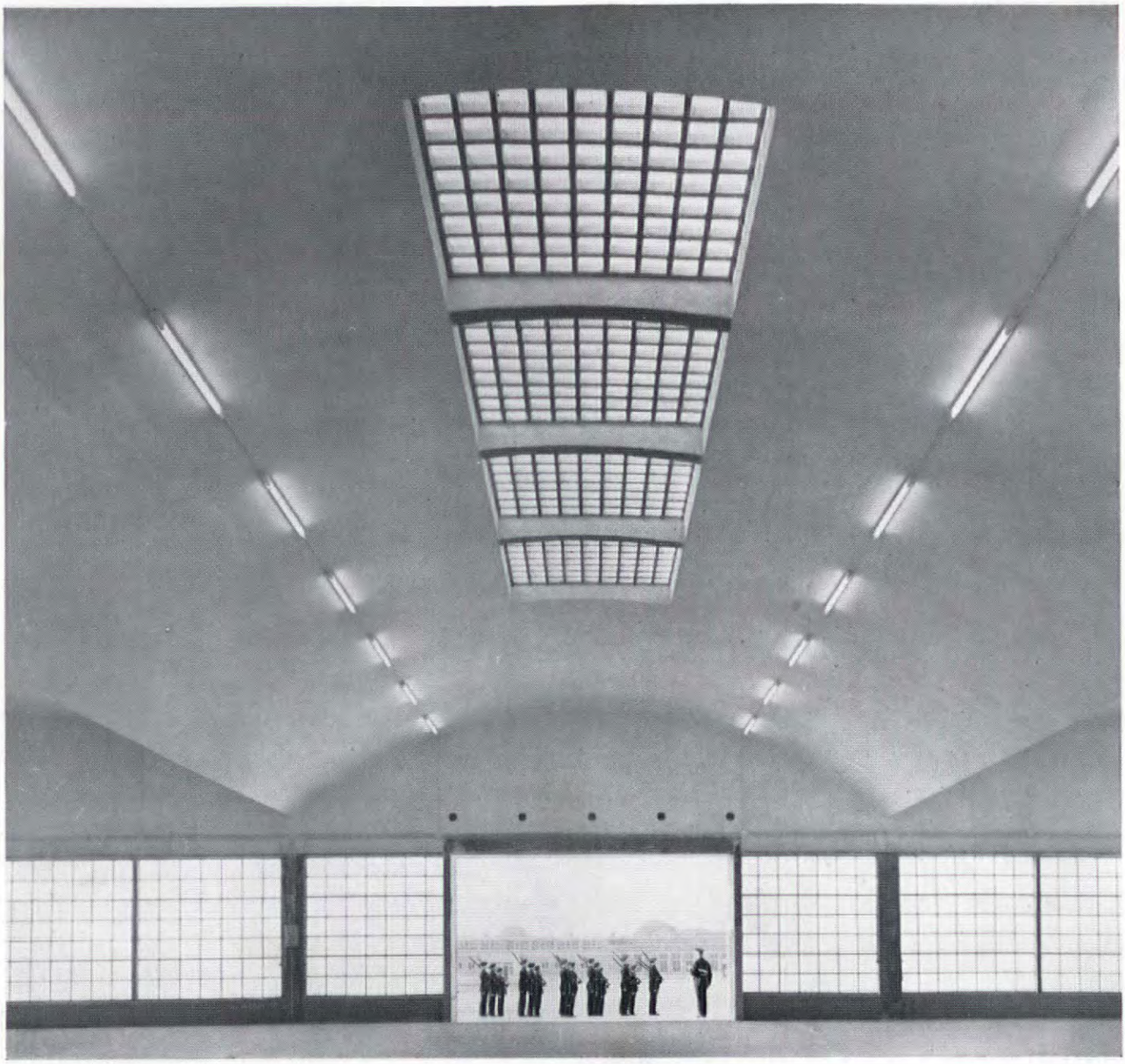


T.418 Ceiling. Type: diffused general light. Finish: stove enamelled off-white Perspex: ¼ in. internal reeds. Lamp: one 4-ft. tubular fluorescent. Control gear: with starter switch or Quickstart unit.





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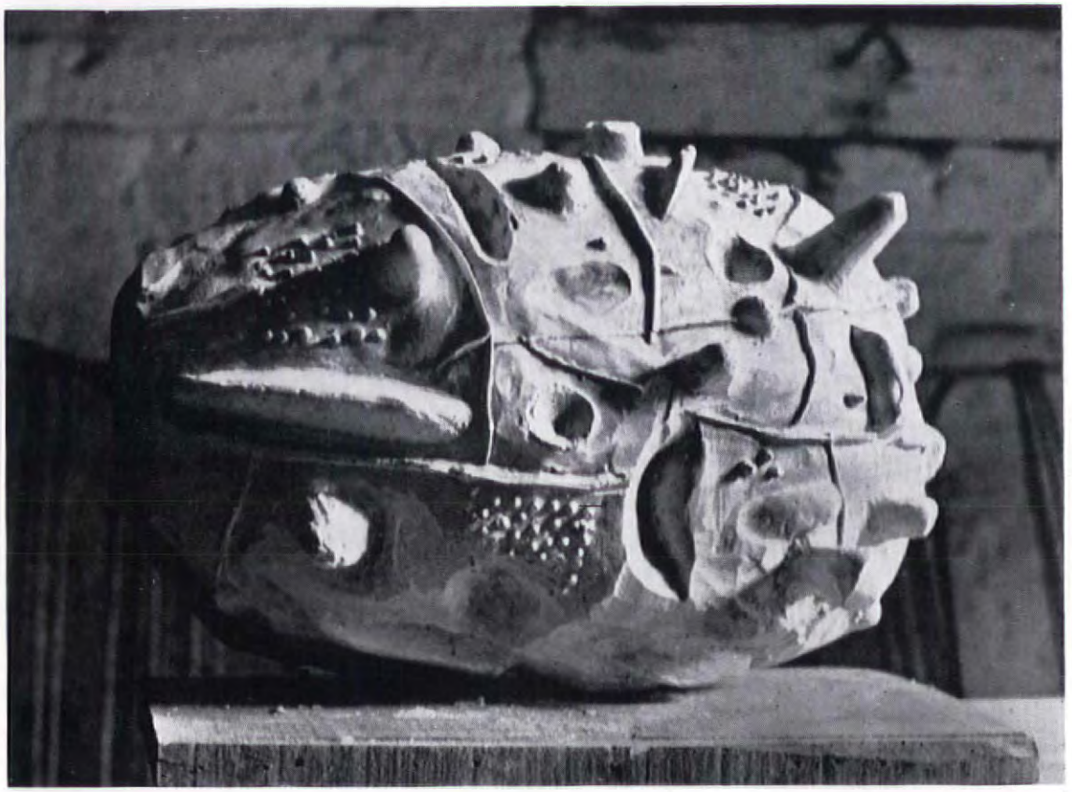

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3, Lord Beaverbrook *by Graham Sutherland (Tate)*; 4, Study for Concrete *by Eduardo Paolozzi, and* 7, Woman and Children *by Rosemary Young (Institute of Contemporary Arts)*; 5, Nu à la Bassine *by Balthus (Lefevre)*; 6, Chiswick Autumn *by Julian Trevelyan (Redfern)*.

EXHIBITIONS

A year ago it was reasonably true to say that the younger English sculptors adhered to the principle of open construction, but it would be rash to generalize about the exhibition of new work by sixteen young sculptors at the Dover Street gallery of the ICA, except to note that stone carving remains in abeyance. Adams, Butler, Paolozzi and Turnbull all contribute solid or closed forms, and few of the others allow us to look inside or through their inventions.

The majority of the pieces on view are meant to be in bronze, but the price of casting is beyond the means of most young sculptors and the exhibition is dominated by the dead, chilling whiteness of plaster. This detestably spectral material blurs the interrelations of planes and gives the subtlest of forms a tinge of melodrama. If it is going to be regularly featured in exhibitions, sculptors would be well advised to pretend for the sake of appearances that it's a permanent medium, and, like Paolozzi, give it some treatment that will make it more considerate of their forms. Paolozzi's antediluvian fish and pimpled and pitted egg, which are among the happiest things in the show, have received a soft suffusion of colour that gives the plaster warmth and life. Bernard Meadows in his plaster reliefs has already followed suit with pleasant results, but he has also had to abandon the human figure in order to rid himself of the influence of Moore, and like others before him has turned to the abstracting of crustaceans. Turnbull, too, is fully aware of the form-effacing nature of naked plaster, but the 'lines of force' that he has painted on his striking automaton seem a pictorial and temporary solution. (Further examples of these strangely haunting, pathetically stiff-jointed figures, learning perilously to walk, or frantically signalling their dream-like inability to make a start, are included in his one-man show at the Hanover Gallery).

Reg Butler's enigmatic object in iron, which refers to Victorian furniture and machinery and seems to be struggling to wake up, like a rusty and battered Rip Van Winkle, brings his forging technique, with its bruisings and blisterings, to a fantastic zenith, and I do not see how he can possibly take it further. In the present show, the examples of iron and steel sculpture from other hands reveal the influence of his early use of iron and look as inexpressive as park railings. Among works by sculptors whose names are not yet familiar, those of Kenneth Armitage and Rosemary Young are outstanding. The Armitage bronze group is anything but in the round, but it demands to be seen from all sides because it is a kind of silhouette with figures coming out like curled paper from each flank, and Rosemary Young in

8

POMPIER The lately released film, Quo Vadis, *of which this is a still, shows that all the traditions of 'pompier' art (see the article on pages 165-170 of this issue) have reached their final consummation on the silver screen: the obvious rhythms, the frozen poses, the clichéd beauties, the pseudo-accurate accessories. At least the producer of* Quo Vadis *knows where he is going.*

little plaster groups is using Giacometti's economical figuration for intensely observed scenes of daily life.

I hate to have to say it, but Balthus is a literary painter. His subjects are absorbing, but his draughtsmanship is faulty and the quality of his paint profoundly unpleasing. It seems, however, that a man can be an indifferent painter and yet be able to summon up enough visual information about a state of mind to leave unforgettable images on the canvas. The Balthus paintings turn the Lefevre Gallery into a 'budding grove,' and the air is heavy with Proustian intimations of the private life of girls in early adolescence. The atmosphere exhaled by his studies of girls in short frocks, reading with unnatural intensity or sitting about in explosive idleness, attaches itself to the more innocuous works; a forest badly painted in the manner of Courbet is a place for bored and avid walks; the zouaves in the barracks yard are observed by the girl at the window. It is appropriate that Balthus should be introduced to us by an eminent man of letters rather than an art critic, and Cyril Connolly's note penetrates so beautifully to 'the very heart of the Balthusian afternoon' that we must forgive him his touching belief that Balthus is a 'grandiose and classical artist.'

In his recent landscapes at the Redfern Gallery, Julian Trevelyan is turning away from the lyrical effusion and taking a more considered look at the scene before him. The results in this transitional stage are uneven, but the best of them justify his new approach. His admirably judicious appreciation of the *fauves* keeps his colour brilliant without sacrificing the spirit of place. His *Chiswick Autumn*, for instance, with its lemon and pale blue river, its warm grey earth, and its stripped trees tipped by brilliant orange accents for the last of the leaves, gives the fading glory and melancholy light of late autumn in London its proper magnificence.

Alan Clutton Brock's second exhibition at the Marlborough is shivery with wet green fields and watery skies, and his sensitive devotion to the English scene compels his rather niggling brushstrokes to achieve little wonders of atmospheric precision. His palette warms when he reaches the coast; his beach scenes in dull yellows and slate greys add charm to sincerity, and if he can overcome the timidity of his hand, English collectors will assuredly reward him some day with the affection that they extend to Boudin.

Graham Sutherland's portrait of Lord Beaverbrook has been lent to the Tate, and is on view in the 'Recent Acquisitions' gallery. He has caught the famous grin, which crinkles the entire face, and seems even to account for the creases in the jacket, but the picture as a whole has immense dignity. It is conceived in a subdued, almost sombre harmony of green, purple and sandy yellow. Beaverbrook gave his sittings in the South of France, and although there are no accessories to convey the fact, one is immediately aware of it, for the green curtain is the colour of sub-tropical foliage lying in pools of shadow, and the triangle of folds at the top of the curtain suggests a straggling palm-frond.

Robert Melville

TRADE & INDUSTRY

The New Building Centre

The Building Industry is sometimes criticized for being slow to adopt new methods and ideas. Generalizations of this kind about an industry with so many ramifications can be extremely foolhardy. It was moreover the first to organize, under one roof, a permanent exhibition to display the many products, materials and appliances relating to a whole industry, and to establish a central information service for everyone interested in building. The word 'Centre,' now becoming almost hackneyed, was then used for the first time to denote the shop window of an industry.

The Building Centre, founded in 1931, has now for the third time acquired a new home. Originally in New Bond Street and the Grafton Galleries, it was bombed out in 1942, transferred to the old RIBA building in Conduit Street and damaged again by bombs. Increased activities and shortage of space after the war made larger premises essential. Now it has migrated eastwards, rather against the fashion of the times, to a site which was considered more central for the architectural profession. At present in the process of settling down in much more commodious quarters than before, the Centre will be better able to pursue its policy of keeping its visitors in touch with the latest inventions and newest products, and in dispensing factual information on every aspect of the Building Industry. Under the direction of that unique personality Frank Yerbury, whose genius has been its guiding star from the beginning, the Building Centre, having long ago become an established institution, will undoubtedly continue to extend its influence throughout the industry and the profession.

The new address is 26, Store Street, a road which leads from Tottenham Court Road directly to the London University building, the tower of which looms beyond. Store Street is the first turning to the right out of Tottenham Court Road going north from Bayley Street, the entry into Bedford Square. The new Building Centre occupies a building which for long was used as a motor car showroom, garage and workshops. It has a most arresting frontage since it stands on one side of a little crescent in full view from Tottenham Court Road. Basement, ground, first and second floors are all used for exhibition space except for the administration office on the second floor. The third floor has a lecture room and hall and will be used for temporary exhibitions and other functions. The Information Centre and the reference library are now placed immediately inside the ground floor entrance. Together with the central stair and lift entrance, this area provides a much more satisfactory and spacious introduction to the variety of permanent exhibits than has been possible before. Some of the exhibits are of course old friends from Conduit Street, but many manufacturers have taken the opportunity to introduce new products or completely to rearrange their displays and, in one case, to reorganize their exhibition policy.

Schoolroom

Starting in the basement, for example, a schoolroom has been designed with a television and radio set let into the wall alongside the blackboard, in almost a 'matter of course' manner. The room is equipped with nesting schoolroom furniture in light alloy and plywood by E.S.A. Ltd., and with tubular and plywood, and with all-wood nesting furniture produced by Kingfisher Ltd.

The Gas Council

Though the main exhibit by the Gas Council will ultimately occupy a large part of the first floor, their gas central heating installation, which may be viewed through a glass partition, must be considered something of a *tour de force*. This provides a completely automatic central heating system for the building, the control system of which reacts to a series of compensating devices. A predetermined internal temperature is set. A 'weather sampler,' fixed outside the building, transmits outside temperatures to the controls which react immediately

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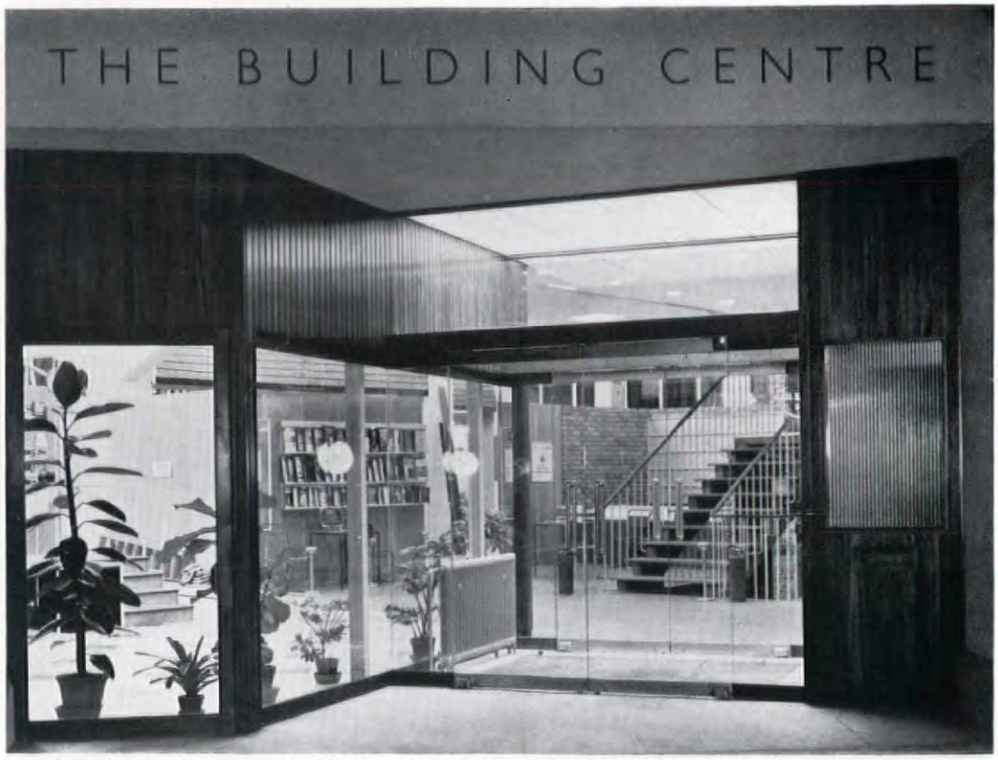

9, *main entrance of the new Building Centre in Store Street.*

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to raise or lower the boiler temperature. A time clock control opens up and shuts down the plant each working day. The outside temperature determines how soon before occupation the plant must be started, and a device is also provided to prevent a possible freeze-up when the building is unoccupied.

A gas plant is of course more expensive per heat unit to run than solid fuel, but against the extra fuel cost must be set the facts that labour costs for stoking, ash removal and similar tasks are eliminated, while redecoration and cleaning costs are less.

On the first floor a temporary exhibit of gas appliances will in the near future be replaced by a large permanent exhibit, a model and drawings of which are now on view. Though appliances will of course be shown, it is the intention of the Gas Council to concentrate more on explaining the services that are available to architects and housing authorities, than on the appliances which can in any case be seen by anyone at local gas showrooms.

Contralux

Among the new exhibits on the ground floor are some very interesting fluorescent light fittings, in which 'Contralux' glass, made by Plyglass Ltd. of South Croydon, is used as a decorative diffuser. 'Contralux' glass consists of two sheets of glass with a multiple interlayer of 'Opalspun' material—a plastic bonded glass gauze. This interlayer can have cut-out patterns to increase, and overlaps to decrease the light transmission, and is available in a variety of colour tints to change the character of the illumination. The designs displayed are based on circles, squares, triangles and chevrons and suggest the infinite variety of shapes and gradations of brightness possible with this very interesting technique. The maximum possible size of panel is 84 inches by 36 inches, though 60 inches by 30 inches is a more convenient upper limit to permit ease of handling.

Ventiblock

Nearby is the display by James Clark & Eaton of Blackfriars, in which they feature their 'Ventiblock,' an all-glass unit which looks rather like their 'Insulight' hollow glass block, but is in fact a ventilation block which permits air currents to circulate through it. It may be built into an 'Insulight' installation and is also available for use independently. It provides permanent ventilation and light transmission, though the internal glass baffles are shaped to prevent direct draughts, exclude driving rain and, as with the normal glass block, obscure direct vision. It is available in three types, a detachable anti-fly screen can be supplied and an opening and closing device is being developed.

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Flooring

Every step one takes in the Building Centre is on somebody's patent floor or flooring material. One's first inquiring steps through the door are made on to pale grey, flecked Vinyl tiles made by Semtex Ltd., a firm which also shows another floor treatment using a composed design in pale grey, fawn, with red and blue circles, a technique with considerable decorative possibilities. Another type of floor covering giving a somewhat similar effect is Armstrong's Accotile, a thermoplastic composition tile which is already well known for its hardwearing qualities and resistance to heavy traffic and to most forms of chemical action.

Warerite

On the first floor, Warerite Ltd. of Ware, Herts, have installed a fitted kitchen and dining annexe to demonstrate the possibilities in the hard-wearing qualities, the resistance to heat and moisture, the saving in effort and the attractive colours, inherent in Warerite plastic sheeting for all working surfaces. A damp cloth is sufficient to keep all vertical and horizontal surfaces in these two rooms clean as a new pin, for the hardness of the material provides resistance to scratches, stains, and hot teapots. One grade is resistant even to cigarette burns. The benefits in hygiene are obvious.

Coal Utilization Council

The importance to the national economy of vastly improved utilization of our coal supplies is the theme behind the display of appliances in the Coal Utilization Council's exhibit on the second floor. These include heating equipment for open slow burning grates, convector fires and continuous burning slow combustion stoves, insulated cooking appliances such as cooking stoves, combination grates combining cooking, water heating and room warming facilities, water heating systems by means of domestic boilers, and the Radiation 'whole-house' warming system, which is demonstrated in the form of a model.

How to get there

Underground: Goodge Street or Tottenham Court Road. Bus routes: 1, 14, 24, 29, 39, 73, 134 and 290. Car: turn off Tottenham Court Road towards London University between Bedford Square and Heal's.

H. McG. Dunnett

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Factory at Brynmawr, South Wales. *General contractors:* Holland & Hannen & Cubitts Ltd.; Gee, Walker & Slater Ltd. *Sub-contractors and suppliers for the boiler house: Piling:* The Cementation Company. *Rolling shutters:* Haskins Rolling Shutters Ltd. *Railings, balustrades, access galleries, cat ladders, duct covers, etc.:* Fisher & Ludlow Ltd. *Spiral staircase:* Advance Welding Company. *Steel windows:* Henry Hope & Sons. *Roof lights and glazing to west end of roof:* Williams & Williams Ltd. *Railway lines, capstan and fairlead:* Thos. W. Ward Ltd. *Sanitary fittings:* Shanks & Company. *Flushing valve:* B. Finch & Co. *Electric wiring:* Troughton & Young Ltd. *Light fittings:* The Benjamin Electric Co. *Tiling:* J. C. Edwards (Ruabon) Ltd. *Ironmongery:* J. D. Beardmore & Co. *Coal screens:* Clark, Hunt & Co. *Boilers and accessories:* Davey, Paxman & Co. *Incinerator:* The Incinerator Co. *Chimneys:* Musgrave & Co. *Pipe fitting:* Matthew Hall & Co. *Sub-contractors and suppliers for the Brynmawr factory: Piling:* The Cementation Co. *Asphalte tanking and damp courses:* Excel Asphalte Company. *Gravel, stone, aggregate and sand:* Hereford Washed Sand & Gravel Ltd.; Monmouthshire Associated Quarries Ltd.; Newport Sand & Gravel Co. *Facing bricks:* The Cattybrook Brick Co.; Dunbrik Ltd. *Common bricks:* Richard Thomas & Baldwins Ltd. *Cement (Aberthaw) partition blocks, stoneware:* H. R. Paul & Sons. *Reinforcing steel:* Whitehead Iron & Steel Co. *Friction block bearings:* The British Graphitised Metals Co. *Expansion jointing:* Expandite Ltd. *Stone for masonry:* Robert Evans & Sons (Abercarn). *Precast facing slabs:* The Penarth Concrete Co. (1927). *Plastering and granolithic work:* W. A. Telling (South Western) Co. *Sanitary fittings:* John Bolding & Sons; Adamsez Ltd. *Electric wiring and installation:* T. Clarke & Co. *Switchgear:* A. Reyrolle & Co. *Light-weight insulating concrete:* Celcon Limited. *False ceilings:* Denny Mott & Dickson Ltd.; Trussed Concrete Steel Co. *False ceilings, expanded metal and access panels:* Campbell Denis Ltd. *Heating and ventilating:* Matthew Hall & Co. *Panel heating:* G. N. Haden & Sons. *Aluminium windows, copings, metal screens, patent glazing and roof lights:* Williams & Williams Ltd. *Street lighting standards (Adastra):* Poles Ltd. *Sprayed asbestos roof insulation and applied sprayed paint finish:* Turners Asbestos Cement Co. *Lifts:* J. & E. Hall Ltd.; Herbert Morris Ltd. *Hydrant and sprinkler installation and fire-resisting doors:* Mather & Platt Ltd. *Aluminium copings, etc.:* Steel Fabricators (Cardiff) Ltd. *Felt roofing and Accotile flooring:* The Neuchatel Asphalte Co. *Roller shutters:* Haskins Rolling Shutters Ltd. *Sliding door gear:* Geo. W. King Ltd. *Door furniture:* Mountford Bros.; A. J. Binns Ltd. *Handrails, balustrades, etc.:* S. W. Farmer & Son. *Weighbridge and weighing platforms:* W. & T. Avery Ltd. *Pumps:* Sulzer Bros. (London) Ltd. *Canteen equipment:* Benham & Sons. *Canteen floor:* The Granwood Flooring Co. *Lavatory partitions:* Henry Hope & Sons. *Aluminium roof light domes:* The London Aluminium Co. *Laboratory installation:* A. Gallenkamp & Co. *Cloakroom fittings:* Mountford Bros. *Clocks, internal telephones and loudspeaker systems:*

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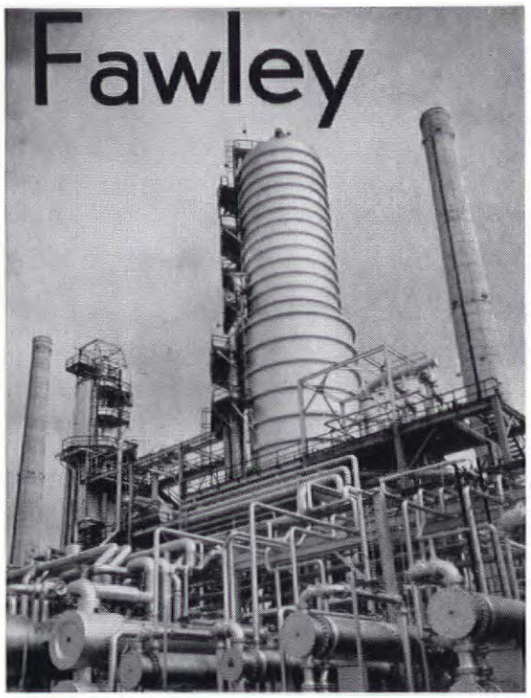
Refinements at Fawley

HOW A PROBLEM OF MATERIALS WAS SOLVED AT EUROPE'S BIGGEST OIL PLANT



THE FAWLEY REFINERY *represents one of the greatest feats of industrial enterprise since the war. Its huge Administration Building (Architects: Messrs. Lanchester & Lodge) was floored almost exclusively with Accotile.*

On the left is shown a typical Accotile floor, in the lecture and conference room. A great variety of designs may be achieved with Accotile.

THE SPEED with which the Esso Company's new refinery at Fawley was completed has in itself been a notable feature of this great enterprise. But it has involved some "tall orders" for architects and builders; for instance, in order to meet their deadline, Messrs. Lanchester and Lodge, the architects, were faced with the task of completing the entire Administration Building, from start to finish, *within a year*.

This meant that only readily available materials could be specified; at the same time, the assignment was far too important to allow any compromise where quality was concerned.

Choosing a Floor

One problem of great importance was, of course, flooring. A material had to be found which would come up to exacting requirements of design and durability and yet be readily available.

The material chosen was Accotile, the asphalt tile flooring made by the Armstrong Cork Company. Practically the whole of the Administration Building has been floored with Accotile, as well as the canteen, medical block, and laboratory administration offices. In all, rather over seven thousand square yards of Accotile were laid by Armstrong's own Contracts Department in conjunction with Gabriel Wade & English, Ltd., Southampton. Accotile was the only asphalt tile used.

Qualities of Accotile

Accotile provides an extremely durable floor (floors laid in this country in 1938 and 1939 are still giving excellent service) which has a strong resistance to alkaline moisture. Hence it can be laid without the necessity of a damp-course, although it is not a damp-course itself.

There are almost unlimited possibilities of design for Accotile and it can be laid to harmonize with existing decorations. Inconvenience is cut down to a minimum, since Accotile can be used as soon as it is laid.

Standard Accotile is easily cleaned by washing with water, and is resistant to stains and most dilute acids. Where conditions make it advisable, a special Grease Resisting Accotile is recommended.

Accotile is available in two sizes of tile (12″ x 12″ and 9″ x 9″); in two thicknesses (⅛″ and 3/16″); and in 19 different colours. In addition, Accotile Coved Skirting, supplied in 36″ lengths, prevents dust collecting in corners and obviates the need for timber.

FOR FURTHER INFORMATION

about Accotile, architects and builders are invited to write or telephone to

ARMSTRONG CORK COMPANY LIMITED

London Office: Flooring Department, Bush House, Aldwych, W.C.2. *Tel.: Chancery 6281*

Birmingham Office: Westminster Chambers, 93a Corporation Street. *Tel.: Central 1271*

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continued from page 212]

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ACKNOWLEDGMENTS

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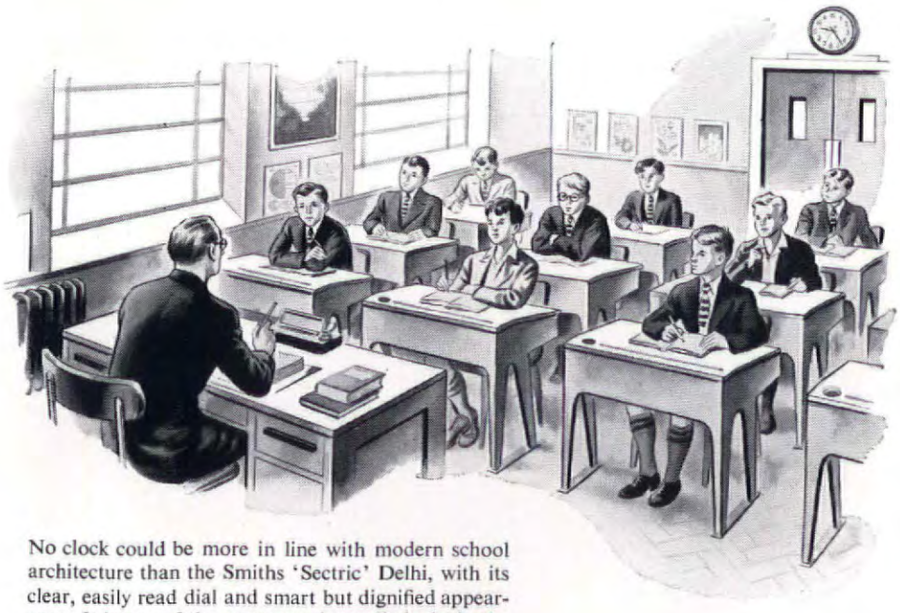

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