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MARGINALIA

Pumping Engines

The Metropolitan Water Board have said farewell to more of the old beam engines which they inherited and which have served London for a century or more. Six of them, working in pairs, are even now being dismantled at the Board's Stoke Newington pumping station. These engines and their pump-house were constructed for the New River Company in 1856, the work being carried out under the direction of the Company's engineer, William Chadwell Mylne. Their job was to lift water from the New River filter beds to the Dartmouth Park Hill reservoir, and, later, to the Crouch Hill reservoir, a height of 133 feet.

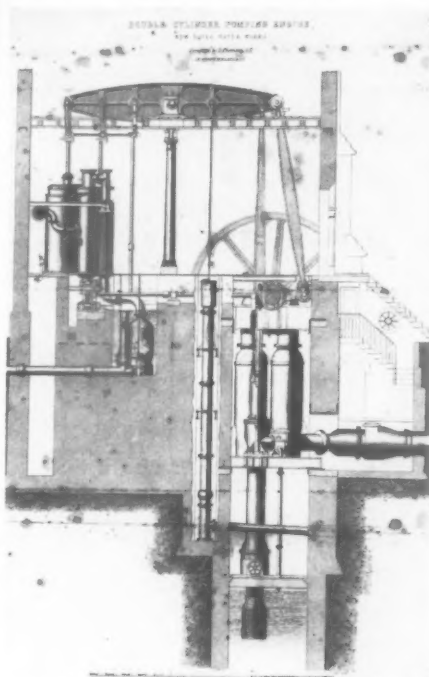
Mylne was a man of considerable personality and his ideas on pump-house architecture were unorthodox to say the least. It is said that he based his general conception of the Stoke Newington building, I, on the Keep of Edinburgh Castle, but that, finding the true proportions at odds with the building's function, he borrowed those of Stirling Castle.



Closer inspection, however, reveals that the building's ornamentation is far from superfluous, but stems from close co-operation between engineer and architect. The three buttresses that adorn the west wall are in fact hollow and house parts of the flywheels within; the stumpy tower in the north corner contains the spiral staircase that gives access to the beam loft; and the taller tower diagonally opposite conceals the stand-pipe.

The engines, 2, consisted originally of a coupled pair of 'simples' designed and built by Boulton & Watt, and two identical pairs of compound engines designed by David Thomson and built by J. Simpson & Co. The

former have beams measuring 28 feet between bearing centres and weighing 22 tons, and their common flywheel was Lancashire built in ten segments, each spoke individually keyed to rim and hub: its diameter is 25 feet, its weight 35 tons. The beams of the Simpson engines, although also 28 feet long, weigh only 11 tons, while the two 18 feet diameter flywheels weigh 25 tons each.



After some modifications in 1880 and 1881, the two sets of engines settled down to over seventy years of almost uninterrupted work. An occasional break for one or two hours was all they could be given and at times they ran for months without a pause. Yet only once was there a major breakdown. This occurred in 1908, when a pump rod snapped. The job of repairing it was given to the Swedish Arc Welding Company and despite the fact that arc welding was then in its extreme infancy, the join stood up to another forty-odd years of service, and the Board have now asked for the return of the repaired portion of the rod to enable them to break it down and examine this remarkable weld. For doing this, as well as for their perspicience in realizing the interest and value of what they were called upon to demolish, the demolition contractors, Messrs. George Cohen & Sons, deserve the thanks of all those with an interest in engineering or in architecture. In our anxiety to record or preserve works of earlier epochs, we tend to overlook the numerous examples of characteristic nineteenth century industrial building which have to be demolished in the normal processes of technical improvement.

Changes at Harvard

With the retirement of Joseph Hudnut as Dean of the School of Design at Harvard, and his succession by José Luis Sert, certain changes will take place in the School's curriculum and, consequently, in its staff. The

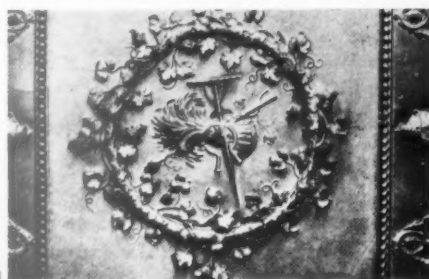
general aim of these changes will be to shorten the period of study for a Master's degree, and to improve the courses in Design Research and Planning—the latter by creating a combined department of City and Landscape Planning. Other new appointments besides that of Mr. Sert, include Reginald R. Isaacs to be Charles Dyer Norton Professor of Regional Planning and Chairman of the new combined Planning department; Serge Chermayeff to be a Professor in Architecture and Critic in Architectural Design; Naum Gabo to be Professor of Design Research; Huxon Jackson and Ronald Gourley to be a Professor and Assistant Professor in Architecture respectively; and Hideo Sasaki as Assistant Professor of Landscape Architecture. These, together with those members who remain from Mr. Hudnut's staff, should form an extremely stimulating team, and architectural teaching at Harvard appears to be on the threshold of a most interesting period of development.

C. R. Mackintosh

The growing acceptance of Charles Rennie Mackintosh as one of the greatest creative spirits this country has produced in recent times has been further demonstrated by an exhibition of his work at Edinburgh, to coincide with the Festival there. The exhibition was organized by Dr. Thomas Howarth, whose book on Mackintosh has done much toward spreading an appreciation of the Glasgow master's art, and all this activity—one hopes—is leading toward the large and definitive exhibition of Mackintosh which would now be so welcome. While we wait, however, a large part of the Edinburgh exhibition will be shown at RIBA in London from December 11 to 23.

National Buildings Record

The record of destruction of country houses and other architectural monuments has received a sort of official summing-up in the twelfth annual report of National Buildings Record. Some thirty houses are listed as destroyed, four of them by fire (including Coleshill) and nine buildings are listed in the ominous category of 'threatened.' The activities of the NBR itself have ensured that 27 of the above items have been guaranteed photographic immortality at least, while in a few cases other bodies have been able to guarantee physical preservation to parts of buildings—the charming naturalistic plasterwork from Whitley Beaumont, 1, has found its way into the Tolson Memorial Museum in Huddersfield, but nothing seems to have been



done, on the other hand, to conserve any part of the superb staircase details of Langford Grove, 2.



The most important part of this year's report, and in some ways the most encouraging, is the appendix which lists the most representative private donations of photographic negatives. The admittedly non-exhaustive list notes over one hundred donations, very few of which contain less than one hundred negatives, while the largest are of the order of eleven thousand (Messrs. Batsford) and over one hundred thousand (the Courtauld Institute). In addition to these the NBR has assumed care of the photographic collections of the Survey of London, the Victoria County Histories, and the Royal Commission on Ancient Monuments, so that it now commands one of the finest photographic archives in the world.

Architects in this Issue

D. CLARKE HALL, architect of school in Essex, was born in 1910 in Essex. He trained at the AA under Howard Robertson. Won first prize for the design of an elementary school organized by the *New Chronicle* in 1937. Was commissioned to design Richmond High School as a result. Has designed more schools since then and now has them standing in eight counties. Spent part war in REs. In 1947 moved to present office in St. James's, which used to be a warehouse. Has staff of seven at present. Lives in London and near Midhurst, Sussex.

CORRESPONDENCE

Gloagopaedia

To the Editors,

THE ARCHITECTURAL REVIEW

SIRS,—In your October issue when you reviewed my *Short Dictionary of Furniture*, your reviewer suggested that the illustrations were drawn almost wholly from one or two mid-nineteenth century sources. Would you allow me to correct this impression by stating that apart from the drawings made specially for the book, illustrations were reproduced from the following: 81 from the first and third editions of Chippendale's *Director*; 8 from Hepplewhite's *Cabinet Maker and Upholsterers' Guide*; 50 from Sheraton's *Drawing Book and Cabinet Dictionary*; 15 from Ince & Mayhew's *Universal System of Household Furniture*; 26 from *The Prices of Cabinet Work* (1797 Edition), and various others from seventeenth and eighteenth century books and engravings.

I am sure your reviewer did not mean to convey that nearly all my material was reproduced from the drawings in Shaw's *Specimens of Ancient Furniture*; actually only 16 drawings were taken from that work; and most of the illustrations of nineteenth century subjects were reproduced from Loudon's *Encyclopaedia* and the pages of *Punch*.

Yours, etc.,

JOHN GLOAG.

London.

I certainly did not intend to imply that all Mr. Gloag's illustrations were from Shaw; but that he shows Medieval, Tudor and Stuart pieces entirely through various nineteenth century reproductions.

MOLLY HARRISON.

Townscape

To the Editors,

THE ARCHITECTURAL REVIEW

SIRS,—As a landscape architect, an item of prime importance to me is the relation of buildings to each other, and to all the out-of-doors world. I was therefore delighted with the thesis under *Townscape* in your issue of July, 1953. At Inveraray (August, 1953) too the arrangement and the connections have had due consideration.

Three Housing Schemes in West London (August, 1953) seem utterly depressing, as do (and for the same reason) the multi-storey housing projects in this country—the Metropolitan Housing in Los Angeles and San Francisco, Stuyvesant Town in New York, and so on.

If abstractionist painters can make music with an arrangement of spots and lines, why cannot architects do as well with cubes? It has been humbly done in the vernacular with air and light enough and to spare, as witness many a farm group everywhere, on Tuscan hills, on the flat bottomland of Salinas River valley.

Yours, etc.,

Beverly Hills, California. E. HUNTSMAN-TROUT.

Group Practice

To the Editors,

THE ARCHITECTURAL REVIEW

SIRS,—I have read with great interest the article 'Group Practice' by Winston Weisman in your September issue. I am very convinced that this is a key problem of our profession and I am glad indeed that the REVIEW has taken it up. The historical part is very good and interesting indeed, but I think that some major points have been left out in Weisman's analysis. I believe that the foremost precondition for good teamwork is a voluntary basis. I think it is very misleading to put the case of the United Nations Building under the heading of this article. Putting the most prominent figureheads from many countries into one design room does not create a team. This is for me an example of how it should not be done. A collection of ideas as started there can bring a satisfactory end result only through a continuous give-and-take to the very end. The members must disregard personal prestige for the sake of the unity of the work and see it through. This was entirely disregarded for the UN Building, and the result shows it.

Another point I would like to mention is that we still know too little of favourable techniques of collaboration. I have found that a basic point is constant exchange of ideas and opinions in mutual communication. This, in the rush of present life, is too easily forgotten. The work must be centripetal instead of centrifugal, which needs a conscious effort by everyone involved.

This is illustrated by a little happening between Frank Lloyd Wright and myself. I was in the house of Max Cetto in Mexico City at a party with Diego Rivera and Frank Lloyd Wright. When Wright came in, I had just started a discussion on teamwork. He sat down at my side and listened with a grin on his face. When I had finished, he

said, 'But, Walter, when you want to make a child you don't ask the help of your neighbour, or do you?'

I answered, 'If the neighbour happens to be a woman, I might.'

He obviously did not realize this to be the biological prototype of a team.

Yours, etc.,

Cambridge, Mass.

WALTER GROPIUS.

Retreat to Moscow

To the Editors,

THE ARCHITECTURAL REVIEW

SIRS,—I wish to congratulate Mr. Meek on his article *Retreat to Moscow*, and on his penetrating reply given to Mr. Boyd in the August number of ARCHITECTURAL REVIEW.

As an architect living here, but keen to keep in touch with the architectural development in my own country, I have been a subscriber to *Architectura*, closing my eyes to the occasional insertion of photographs of Stalin or Lenin, until the theme of the articles and published photographs or drawings of completed and new projects became too obviously inspired by the 'master colleagues of Russia.'

If Mr. Boyd feels certain that the present-day architecture in Poland, for instance, is an uninterrupted tradition, I would invite him to compare the new schemes with those already done in Russia or one of its 'Republics,' and again with the past examples of Polish architecture, and then pronounce his verdict.

May I suggest the design for the 'Palace of Culture' in Warsaw as an example to start with?

Yours, etc.,

Coventry.

J. K. SIEDLECKI.

ACKNOWLEDGMENTS

HOUSE AT SOUTHAMPTON: Consulting Engineers for structure were Dr. K. Hajnal and S. M. Myers; Consulting Engineers for services were Stinton Jones and Partners.

COVER, G. E. Kidder Smith. MARGINALIA: page 351, Pumping Houses, 600 Group; NBR, Tolson Memorial Museum. FRONTSPIECE: D. Dewar Mills. SCHOOL IN ESSEX, pages 362-365; 1-8, John R. Pantlin. SCHOOL IN WORCESTERSHIRE, pages 365-369; 9, 12, Colin Westwood; 10, 11, 13, Henry Lewes. SCHOOL AT SOUTHAMPTON, pages 369-371; 14-21, Galwey, Arphot. BEYOND THE ATLAS, pages 372-379: all photos G. E. Kidder Smith. GERMANY, pages 380-387: 1, 2, Grubenbecher, Scheel, Stickelmann; 6, 8, 33, 34, Pfau; 13, *Baukunst und Verkform*; 20, GMBH, Berlin; 29, Dr. Rathschlag; 30, Karl Hell; 31, 36, Hugo Schmölz; 1, 2, Dr. Otto Bartning; 3, 4, K. W. L. Mueller; 5, Ellen Schwarz; 6, 7, M. Krajewsky; 9, 16, 17, Hugo Schmölz; 10, Harald RP; 12, Photo Schlossar Crailsheim; 13, Kessels; 14, Anker; 20, 21, Pfau; 23, Geist Foto; 24, Ernst Scheel. CURRENT ARCHITECTURE, pages 395-398: *Offices at Clackmannan*: E. R. Yerbury & Son; *Shop in Bond Street*: 1, John R. Pantlin; *School at St. Paul's Cray*: John R. Pantlin; *Health Centre at Sighthill*: J. Roman Rock. MISCELLANY, pages 399-404: *Lettering*: 1, Victoria & Albert Museum; 2, British Museum; 3, 4, 7, Lambert, Arphot; 5, 6, 8, 9, Galwey, Arphot; *Exhibitions*: 1, Tate Gallery; 2, Whitechapel Art Gallery; 3, Lefevre; 4, Redfern; 6, Victoria & Albert Museum. SKILL, pages 405-420: *External Finishes*: 2, Galwey, Arphot; 5, John Maltby; 7, E. J. Reynolds; *Furniture*: 3, John McCann; 4, John Gay; 6, 7, 25, 29, 34, Mann Brothers; 8, 26, John Bignell; 11, Leslie Collier; 13, Trevor Hill; 14, 16, 20, 23, 24, 27-29, 32, 34, 38, Council of Industrial Design; 17, John R. Pantlin; 24, Dennis Hooker; 27, Rex Smith; 28, Associated Graphic Arts; 32, 35, Kennet Studio; 36, 37, Millar & Harris; 38, A. J. Knowles; *Heating*: 1, 2, Photographic Craftsmen.

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This month's cover is a view over the crenellated towers and walls of the castle of El Glaoui, hereditary pasha of southern Morocco, whose recent political activities in connection with the deposition of the Sultan have lately been in the news. But this kasbah in the oasis of Tinerhir is notable for other reasons, for it is at the desert end of the Dadès valley which is lined for the whole of its length, between the Atlas and Anti-Atlas mountains, with other forts and fortified villages whose extraordinary architecture is described in *Beyond the Atlas* on p. 373.

351 Marginalia

352 Correspondence

352 Acknowledgments

354 Frontispiece

355 Failure of the New Densities The widespread comment which has been aroused by J. M. Richards's article 'The Failure of the New Towns' has centred around the relationship between urbanity and density. Letters on this subject from Dr. Stephen Taylor and Mr. H. G. Alexander are quoted here. The first of these challenges Mr. Richards's argument by quoting different density figures from those in his article, at the same time introducing the proposition that an increase in density brings an automatic increase in urbanity. But density figures like all other statistics can be almost meaningless on their own, and to illustrate the confusion they can generate, Dr. Ruth Glass has written an article comparing the different ways in which urban density can be expressed, and demonstrating the degree of irrelevance which such figures can achieve. The relationship between density and urbanity is no more automatic and mathematical than the relationship between density and living conditions. The letter from Mr. Alexander takes a different line, and queries the acceptability, to the average New Town inhabitant, of the degree of sociability and neighbourly propinquity which higher degrees of urbanity would require. But this resistance to neighbourliness is a product of the same fifty-year campaign of garden-city propaganda which has produced such rule-

of-thumb planning precepts as: high density equals bad living conditions. Both living conditions and urbanity depend on more factors than density, and the New Towns were originally conceived as a way of providing better living conditions without destroying the countryside as inter-war housing estates had done. But in the event they have continued to smudge over the distinction between urban and rural in the same old way, and since the sharpness of this distinction is essential to the validity of both, they may truly be said to have failed.

362 School in Essex Denis Clarke Hall: Architect

365 School in Worcestershire Richard Sheppard and Partners: Architects

369 School at Southampton Lyons, Israel and Ellis: Architects

373 Beyond the Atlas by Michel Santiago The architecture of the Dadès valley in Morocco is like nothing else in Africa, either in its setting or in the crisply geometrical outlines of its mud-built forms. Constructed in the days before motor traffic and the pacification of Morocco, the fortresses and walled towns which lined the uncertain stream that waters the valley were built to protect (and exploit) the camel-borne trade which came by this route from the desert to the area around Marrakech. Since their functions have now disappeared the forts themselves are beginning to decay through neglect and alteration. This study of the district, together with Mr. Kidder Smith's photographs, provides a record of a remarkable architectural scene which is bound to disappear within a generation.

379 Germany: Modern Architecture under and after the Nazis

1: The Hidden Opposition by Gerhard Rosenberg The extinction of modern architecture in Germany after Hitler came to power was never quite complete, and here and there it was possible for bold men, or fortunate men, to continue to build in the modern idiom, though many famous and conspicuous figures capitulated or remained silent. Mr. Rosenberg reviews these semi-underground activities between 1935 and 1945, and finds that it was factory design, where political interference was least, which kept modern design and designers alive, and passed on the modern tradition to the new Federal Republic.

2: Progress since the War by Otto Voelckers In the new German Republic the conventional battle between the modernists and the traditionalists is still proceeding, but Dr. Voelckers feels that a diminishing insistence on rigid doctrines, and an understanding view of what has been done in Switzerland, will lead to a new, softer style which will nevertheless be completely contemporary. This may already be seen emerging as the Middle Style of some of the buildings which are illustrated in the photographic survey which concludes this section.

389 Telford by R. J. M. Sutherland The advance of civil engineering from practices based on empirical experience to practices based on scientific knowledge reached a crucial phase in the late eighteenth century, and the characteristic figure of this transitional period in England was Thomas Telford. Born in 1757 and trained as a stonemason, he was typically bold, imaginative, versatile and convinced of the almost universal possibilities of cast iron—a material which plays an important part in each of the four structures dealt with by Mr. Sutherland; the aqueducts at Chirk and Pont Cynllyte, and the suspension bridges at Menai and Conway. Though the design of the Menai Bridge has proved lacking in stiffness to resist wind loadings, and has therefore had to be rebuilt after a series of partial failures of the structure, it remains one of the finest monuments of this transitional phase of engineering, and Telford's most admired work, and Mr. Sutherland devotes to its design and building history the attention which it undoubtedly deserves.

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The Authors Gerhard Rosenberg, born in Berlin, 1912. Student under Professor Poelzig. Qualified as architect in London. Has visited Germany each year from 1933 to 1938 and from 1948 to 1953. Lives and works in England. Otto Voelckers has lived through the rise, fall, and rebirth of Modern Architecture in Germany. In 1911 was with Muthesius and in contact with Gropius, Adolf Meyer and Mies van der Rohe, all then working with Peter Behrens. Saw the famous Werkbund exhibition of 1914, was present at the inauguration of the Dessau Bauhaus, and closely connected with the Weissenhof and Dammerstock developments; also connected with Haesler in Celle. Can therefore claim to be well qualified to speak on behalf of the Modern Movement, with whose subsequent vicissitudes and post-war triumph he has been equally closely involved. R. J. M. Sutherland, born 1923, civil engineer. Interests cover the no-man's land between architecture and engineering—bridges, aqueducts, viaducts, warehouses, etc.—and the history of civil engineering in general during the last two hundred years.

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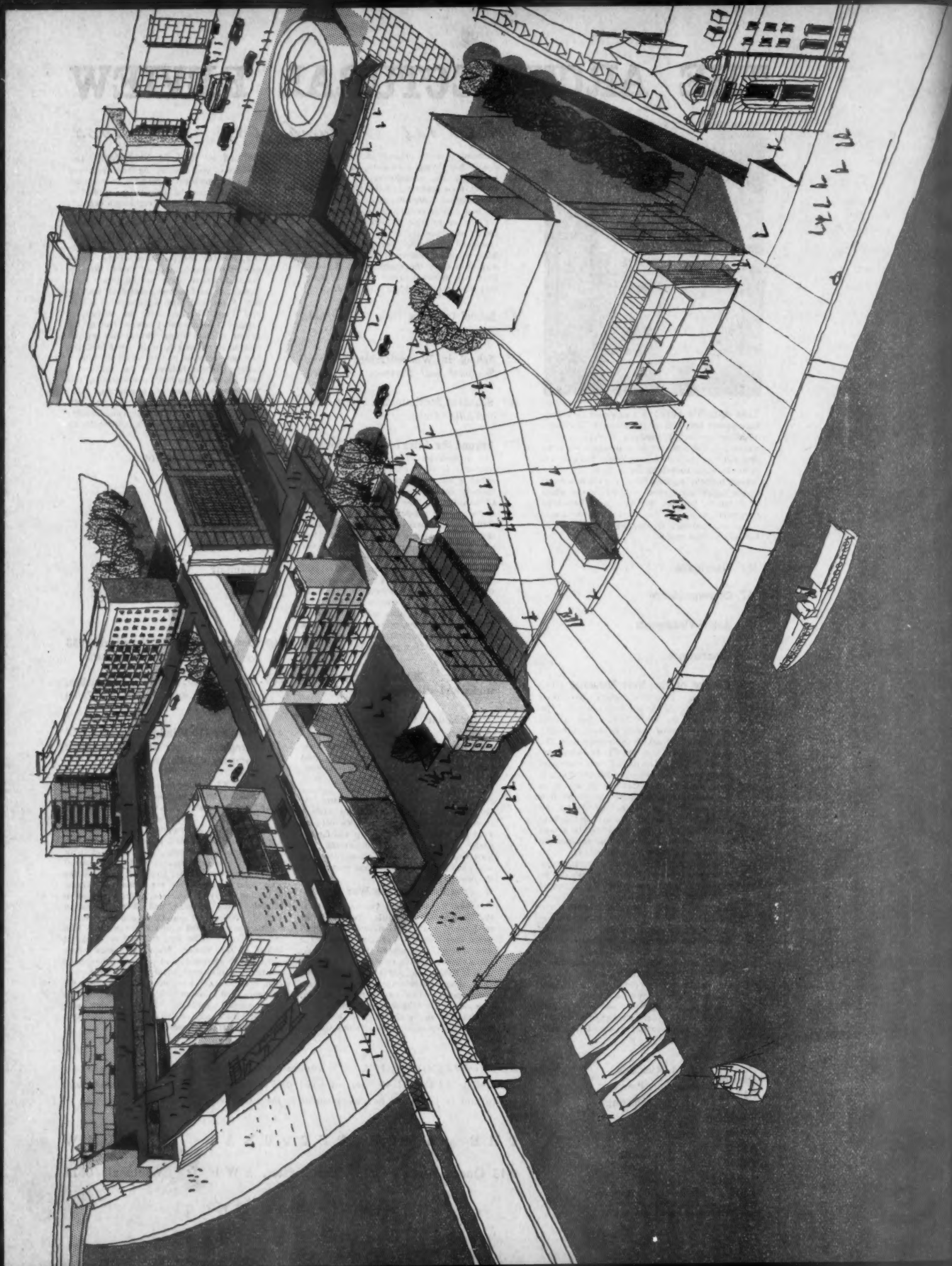
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FIVE SHILLINGS



The London County Council has announced its plans for the permanent development of the South Bank of the Thames, between Westminster and Waterloo Bridges. Opposite  is Donald Dewar-Mills's impression of how it may appear when all the projected buildings are finished, emphasizing by colour the planners' use of continuous horizontal planes to unify the design and provide a series of pedestrian promenades weaving in and out of the buildings. In so far as architectural details are shown they are only conjectural. The plan is described in an article on page 399.

The Editors

FAILURE OF THE NEW DENSITIES

J. M. Richards's article in the July issue, entitled 'The Failure of the New Towns', and Gordon Cullen's that followed it, have received world-wide comment.* The same views have been expressed in the leader columns of *The Times*, and it seems to be agreed that it was time the facts they outlined were faced and the problems that arise because of the shape the new towns are taking ventilated. There has also been adverse criticism, which was only natural, because no-one likes to accept the idea that one of the post-war achievements that Britons have been most complacent about is not in fact gaining its object. Protests, however, have chiefly come from those concerned with planning and building the new towns. Two letters are printed below. In the August issue appeared a commentary on some of Mr. Richards's points from Lionel Brett, architect-planner of one of the new towns, Hatfield. The first letter is a more vehement protest by a member of the development corporation responsible for another, Harlow. It is followed by a critical but more constructive letter from an outside observer.

* For example, from the Executive Director of the City Planning Commission of the city of Philadelphia: 'It is difficult for me to remember any article which I have read which I consider to be of such fundamental and practical importance to the planning profession as Mr. J. M. Richards's 'Failure of the New Towns' in the July, 1953, issue of *THE ARCHITECTURAL REVIEW*. In my opinion this article is much more than a criticism of the new towns—it is a positive and creative statement on a large number of issues which planners wrestle with almost daily.'

TO THE EDITORS

Stephen Taylor : A. G. Alexander

SIRS,—The article by Mr. J. M. Richards in your July issue entitled 'Failure of the New Towns' contains some useful criticism, but nothing to justify its title. He claims that new towns have failed socially, economically and architecturally; the evidence for his assertions is scrappy and, in the main, wrong.

If I reply mainly with regard to Harlow it is because I am a member of the Harlow Development Corporation. It is true that Mr. Richards gives faint praise to Harlow in his footnotes, but even there some of his statements are erroneous.

The most vigorous part of his attack is devoted to

proving that the housing density of the new towns is too low, and that in consequence they lack the essential quality of urbanity.

He says that the Reith Committee recommended a very low density of 12 persons to the acre, averaged over the whole built-up area, and goes on to quote new town densities of between 12 and 17.4, as against Letchworth at 18.6 and Welwyn at 21.8. 'So the new towns represent an even further retreat from the best English traditions of compact urban planning.'

The Reith Committee figure of 12 persons to the acre was an *Overall Town Density* figure, which is

given by dividing the total number of residents by the total developed area of the town, including green wedges, belts and parks inside the town area. The Overall Town Density of Oxford is 14.4, of Cambridge 12.3, and of most country market towns between 8 and 12. These are, surely, admirable examples of urban development.

The *Overall Town Density* of Letchworth, based on the town development plan, which follows closely the original plan, is not 18.6 but 7 persons to the acre (32,000 persons in 4,700 acres). This may be compared with the Harlow Overall Town Density of 12 persons to the acre (80,000 persons in 6,320 acres), of Stevenage 12, and of Crawley 12.

The *Gross Residential Density* includes all public buildings and public open spaces, but excludes green belt and agricultural wedges. Here the Letchworth figure is 19 persons (or 6 dwellings) to the acre, as against the Harlow figure of 31 persons (or 10 dwellings) to the acre.

The *Net Residential Density*, which excludes non-residential land use, can only be applied to individual housing areas. The Harlow Mark Hall North housing area, of which Mr. Richards was critical, has a net residential density of 35 persons (or 11 dwellings) to the acre. Housing areas now under construction at Harlow have a net residential density of about 50 persons (or 16 dwellings) to the acre. This, of course, gives a high measure of urbanity. Indeed almost the only criticism which the Harlow residents have to make is that they consider the gardens to be excessively small.

As far as Harlow is concerned, Mr. Richards is wrong in thinking there has been any further retreat from compact urban planning. Quite the reverse is the case. Densities have always been higher than Letchworth, and are now higher than ever before.

Attached to Mr. Richards's article are aerial photographs of the little Yorkshire town of Blanchard, which we are invited to admire and imitate. About half the houses shown have no gardens at all, and about a quarter have not even a backyard in which to hang the washing and conceal the dustbin.

With regard to social failure, Mr. Richards offers little evidence. The basis of social life is a meeting place, and to every 500 or so houses Harlow is providing a tenants' or residents' common-room. I suggest Mr. Richards might study their booking lists. Among new town residents there are already over 60 different voluntary organizations in action, ranging from the Archery Club and the Amateur Theatre Guild to the Chess Club and the RAF Association. The town has its own new weekly paper, the contents of which do nothing to suggest social failure.

Perhaps the best index of social success or failure is the rate of return of families from their new to the old home areas. With the ordinary out-county estate, a figure as high as 10 per cent has been all too common. Of the first 2,000 families in Harlow, the comparable figure is well under 1 per cent, and a similar figure is being achieved in other new towns; this despite high rents and the other disadvantages pointed out by Mr. Richards. An important reason for this is the success of the new towns in attracting industry.

On the economic side, Mr. Richards is equally nebulous. 'The operation (of town building) has become drawn out to such a length that it differs

little in tempo from the building of an ordinary housing estate.' In fact the tempo of building of almost every new town has been greatly increased. Harlow, for example, is likely to be completed in fifteen years from the establishment date of the Corporation five years ago, rather than twenty as originally contemplated.

'The new towns overhead costs, represented by the Development Corporations and their staffs,' says Mr. Richards, 'must contribute largely to the uncomfortable economic situation in which new towns find themselves.' At Harlow, total administrative costs run at six or seven per cent of capital expenditure, which is surely a satisfactory figure. One of the very few avoidable expenses are outside architect's fees; it might be cheaper to do all designing in the Corporation's own office, but architectural diversity is surely worth paying for.

On the industrial side, Mr. Richards says: 'The most successful in building factories has been Crawley . . . Harlow, too, has done reasonably well; other new towns much less so.' In June, 1953, the progress in factories completed and under construction at new towns was as follows:—

	Factories completed sq. ft.	Factories under construction sq. ft.
Crawley ...	414,000	350,000
Hemel Hempstead	323,000	277,000
Harlow* ...	256,000	236,000
Stevenage ...	36,000	170,000
Bracknell ...	65,000	80,000

Mr. Richards has been misled about progress at towns other than Crawley and Harlow. Even in the case of Crawley his figures are open to doubt. He says: 'Crawley factories provide employment for 6,280 people.' At an average of 200 square feet per worker, this means that Crawley would have already completed 1.25 million square feet of factory space!

Visitors to the new towns, who are prepared to study the facts, may find things to criticize. They will, however, also find much to praise. They will certainly find a surprisingly vigorous and contented population and a measure of urbanity which will surprise them after reading Mr. Richards's article.

Yours, etc.,

STEPHEN TAYLOR.

London, August, 1953.

* The September, 1953, figures for Harlow are 306,535 sq. ft. completed and 200,620 sq. ft. in course of development; no doubt the other new towns can record similar progress. S.T. Oct., 1953.

SIRS,—Having just returned from a visit to two New Towns, I should like to express my appreciation for the stimulating articles which you printed on this subject in your July number—and violently to dissent from them.

It is certainly to be regretted that this great venture has been so little discussed—in a Commons debate, an M.P., Mr. Frank Tomney, complained that discussions on the New Towns were always conducted in a thin house—and I was glad to come across your essays. It may be impertinent on my part to cross swords with your highly qualified contributors, as I am not an architect and paid short visits to two towns only. All the same, my impressions, superficial as they must be, differed so much from the melancholy conclusions in your columns that I beg to dispute these.

Some of the shortcomings castigated in your paper undoubtedly exist. 'Prairie-planning' is a delightful epithet, for example, for Corby such as it presents itself now. But is there really a 'Failure of the New Towns'?

One of your contributors' main arguments is that these towns are rather unsociable—settlements or garden suburbs, in short. From the continental point of view I gladly concede that they are unsociable. But from the continental point of view, most English provincial towns are unsociable, and they do not want to be anything else.

(I remember my first visit to King's Lynn, a very interesting place architecturally. It was so deserted that I almost felt like walking among ghosts. I hurried back to the railway station only to find that it was closed and padlocked, in broad daylight, but displayed some posters inviting me to go to Bury St. Edmunds. Quite funereal.)

Nobody wishes more than I do that small British towns should be a little more continental. But they won't, and towns must be built to suit people, not the other way round. You write that apparently New Towns are planned on the theory 'that everybody else stinks, and so you must have as much room as possible between.' I do not know whether it is for olfactory reasons, but it seems to be a fact that the ordinary Englishman—it does not apply to the other races on these islands—does not wish to be acquainted with his neighbours. I talked to quite a few people both in Crawley and Corby, who, almost without exception, told me that they did not know their neighbours, and seemed to be proud of that achievement. It did not matter whether they were living in semi-detached houses or in rows with no room in between. By all means let us have continental towns

on the Continent. But should allowances not be made for the whims of the English?

Besides, in spite of my foreign extraction, I found some of the New Townscapes rather charming. The cheerful little houses of The Link, for example, at West Green, Crawley—are they really part of 'a disastrous failure'? Even at Corby, which seems to have a much more doubtful future as a real community, I am rather thrilled by the market place now being built.

Incidentally, the planners, in their master plan, report on this market place: 'The site's sole drawback is that among the views it at present commands is one of the works (i.e., the gigantic blast furnaces of Messrs. Stewarts and Lloyds, which are the *raison d'être* of Corby); and although these have a grandeur of their own most Corby people do not want to be reminded of them when shopping.' They conclude that this view is to be screened by buildings and trees.

Personally, I fully share the between-the-lines feelings of the Corby planners. The blast furnaces are for Corby what the Belfry is for Bruges, and they should be seen from the Town Centre. But people do not like the sight. Should the planners have imposed it on them? I think they should be commended for suiting a town to the people, whatever their own predilections.

Even while differing, I should like humbly to thank you for printing your articles. I only hope that they are but a beginning, and that your readers will be treated to further discussions of this important subject from qualified people (to whom I, for one, do not belong). I feel that among them as well there may be more than one view.

Yours, etc.,

London, August, 1953.

H. G. ALEXANDER.

If we set out to answer Dr. Taylor first, we must start by saying that the question goes a good deal deeper than a discussion of the correctness of density figures. It is not only that Dr. Taylor disputes several of Mr. Richards's figures without effectively challenging his conclusions; nor is the real point Dr. Taylor's suggestion that Mr. Richards's comparisons are misleading.* Figures very easily can be misleading, and are almost bound to be so when density means so many things. In Dr. Taylor's letter he writes of over-all town density, of gross residential density and of net residential density; Mr. Richards quoted figures for the density of built-up areas. Many other ways of expressing density are not only possible but frequently employed. No, the point is something every town-planner knows but is not encouraged to tell the layman: that density figures are employed, let us face it, by planners, statisticians, officials of one sort and another, for debating purposes, as little more than a game by which to delude those who are impressed by figures into thinking that some sort of new development in amenity or social hygiene is being introduced into town-planning practice when in fact, except at their extremes, densities impinge scarcely at all on creative town design. To establish this point it seems worth while trying to do two things:

(1) Call the bluff of those who conjure with density figures. The article that follows,

* The figures Dr. Taylor quarrels with were taken from reliable sources. Those dealing with Crawley were from a statement made by the chairman of the Crawley Development Corporation; the interpretation of the Reith Committee's intentions is supported by C. B. Purdom's *Building of Satellite Towns* (1949), a standard work, and the density figures for the new towns round London, averaged over the whole built-up area, were taken from a paper entitled *The New Towns Programme in Britain: its background and purpose*, prepared by the Senior Planning Officer of the Ministry of Local Government and Planning (now Housing). These were admittedly compiled in 1950, so there may have been minor variations since then, but they are still generally valid.

written by a sociologist, Mrs. Ruth Glass of the Department of Town-planning of University College, London, shows how the game is played and just how many loopholes there are for clever gamesmanship.

- (2) Demonstrate that even if densities mean something on paper, they mean next-to-nothing in practice. The best example is the new towns themselves.

First, Mrs. Glass's analysis of density and what it implies and does not imply:

HIGHER OR LOWER*

Ruth Glass

The subject of density is a highly subjective one, more appropriate for slogans or sermons than for discussions, because in talking about density it is very difficult indeed to find a common denominator. Both ideological and technical reasons—to give them convenient labels—prevent us from doing so. These reasons are related to, and reinforce, one another.

It is urbanism or urbanity that is usually the real topic of a debate about density. And there is bound to be a stalemate because both factions—the pro-urbanists and anti-urbanists alike—believe that density is directly associated with urbanity, although they are, in fact, thinking of quite different aspects of density and of opposed interpretations of urbanity. Nevertheless, both sides suffer from the same historical hangover: both assume that there are absolute density norms: black and white, good and bad densities.

It is true that there was a time when there appeared to be such norms: in the new industrial town of the nineteenth century, high population density was undoubtedly an index of bad living conditions. But it has been forgotten that then as now definitions of urbanity differed. Just as our new towns of to-day are criticized for being non-urban, so were the new towns of a century ago, and for the same reason: their shapelessness, their lack of continuity and of social and visual diversity. And despite their obvious dissimilarities, there is bound to be resemblance between the new towns of then and now, for there is a close genetic link. It was the fearful flight from the crowded industrial towns of the nineteenth century, with their "frantic monotony of disorder," that led to the retreat into the empty garden cities of the twentieth, with their lazy monotony of order.

As nowadays the towns of the industrial revolution are still essentially unchanged—just wrinkled and enfeebled, not ennobled by age—and will remain so as long as we despise them, the prejudices which they have inspired persist as well. It is still part of orthodox doctrine to believe in the old syllogism which has motivated housing and town planning schemes (or rather anti-town planning) for over a century. It runs as follows:

Urbanism = high density

Urbanism = bad living conditions

Ergo high density equals bad living conditions.

There are some who have their doubts. For is it not a fact that places like Bedford Square in Bloomsbury, Church Row in

Hampstead, and many other squares, terraces and crescents, which have a high standard of amenities and are regarded as textbook cases of good conditions, both socially and aesthetically, also have high densities? Of course this is true¹, and thus the controversy continues and the examples are flung back and forth. But even so, it is hardly possible for the protagonists to agree to differ, so long as they fail to see the important differences in the scale and context, and in the measurement and interpretation, of the cases which they quote. And they fail to do so because they all tend to accept, implicitly or explicitly, the most important hidden premise on which the old syllogism is based: the assumption that density is a fixed objective category—not subject to the relativity of space. In fact, however, there are so many different ways of looking at density, so many inevitable ambiguities and inaccuracies in definition, computation and evaluation, that density calculations can be used to uphold any doctrine that we wish to preach: in other words, they can be relied upon to contradict one another.

If A wants to prove that residential densities in new towns are high, B that they are medium, and C that they are low, these three people could go to the same area of Hemel Hempstead or of any other new town. Having completed their computations conscientiously and honestly, A could quote the net accommodation density—58.0 rooms per acre; B the present net population density—about 41 persons per acre; and C the floor space and building density indices—0.34 and 0.41 respectively.

¹ While it is true that such places have now a fairly high number of habitable rooms per net acre (though not always a high population density), it is difficult to give exact figures which have value for comparative purposes. For instance: it is hardly fair to include habitable rooms in basements in our count, if we want to compare the net accommodation densities of old and new areas. And again, should we count the actual number of habitable rooms in houses now used by institutions in Bedford Square, or would not the figures be more comparable if we assumed that all houses were still in residential use and some rooms, now defined as 'habitable,' had therefore been converted into additional kitchens and bathrooms? (On the latter assumption, there would now be about 80-90 habitable rooms per net acre in Bedford Square, and about 100 in Church Row.) On the other hand, it must also be remembered that the actual net accommodation density of such an area is in some respects an understatement: Bedford Square has a fairly high room density in spite of the noble dimensions of its rooms. Both in terms of height and floor area, the rooms in such Georgian and Regency houses are far more spacious than those in new residential areas, while in other old streets, which have retained or regained their attractiveness, room sizes are equal to, or below, contemporary standards. A common 'conversion factor' must, therefore, be used if we want to compare the net accommodation densities of old and new, of satisfactory and unsatisfactory, areas. We could assume, for instance, that the old residential layouts were re-designed (not converted) in terms of a generous contemporary standard of room height and average gross floor area—such as 300 sq. ft. per room. (There would thus also be no basements and, of course, different elevations.) On that assumption, layouts similar to those of Bedford Square and Church Row, Hampstead, would have net accommodation densities of 154 and 170 habitable rooms per net acre respectively. Whenever the tall old houses are in fact converted, and therefore divided into maisonettes or flats, their net population densities are likely to be significantly increased, in so far as the occupancy rate is raised when the house is converted for multiple occupation. The net accommodation density, however, might be reduced as a result of conversion, since some rooms which were previously 'habitable' might have to be used as kitchens and bathrooms.

And if A, B and C wanted to do so, they could indulge in further endless permutations and complications, resulting from variations of scale, that is, in the size and surroundings of the area considered, from different definitions of gross and net density and of habitable rooms, from distinctions between assumed, actual and projected occupancy rates, and so on. Even subtle variations in the range, units and methods of measurement, quite apart from the scale and accuracy of maps, produce marked changes in the final figures. The assessment of density is evidently an art and not a science.

As density measurements in any single area, and even in a newly planned one, are so ambiguous, confusion becomes worse confounded when we try to compare the densities of different areas—of towns of varied ages, sizes and kinds, and of different parts of towns. In a new town, especially, we can be certain that the data used for the calculation are accurate, and we can check the process of calculation. The actual number of rooms and of persons can quite easily be counted; floor space and acreages can be plotted precisely, for the internal and external layout is still true to the type plans. The pattern is a simple and a repetitive one, undisturbed by the odd hidden deviations and accretions of the older urban street; there has not yet been time to assert individuality. Moreover, when one authority or person measures density, we can find out what definitions have been used, and we would therefore know what is meant by a figure of 41 persons per net residential acre. But this is not the case when we look at the figures for a whole range of towns. Although some specifications are laid down in the various Ministry circulars on survey and plan, there is no common yardstick: apparently like density ratios do not have like significance, nor is it always possible to find out what significance they do have. As the demarcations of areas, in terms of their primary use, vary according to the characteristics of towns, especially according to the degree of land-use mixture, the resulting measurements mask, rather than reveal, the full extent of differences between towns². Comparisons between residential densities, and between the number of industrial, commercial or 'town centre' acres per 1,000 people in different towns, are, therefore, apt to be mis-

² It is far easier, for example, to delineate 'primarily residential areas' in Surbiton than in St. Pancras, and as gross and net residential density figures are given for such areas, the Surbiton and St. Pancras density ratios are not, in fact, comparable. In one town or borough, where there is a good deal of scattered residential use (probably of especially high density) the odd pieces, though perhaps a fair proportion of the total residential land, would necessarily have been left out of the count, while in another town, with clearly marked use zones, all would have been included. The same difficulties apply in considering density ratios for other land-uses—with certain exceptions, such as open spaces, the areas of which are fairly clearly defined.

* I am indebted to Mr. D. H. Crompton for a series of density calculations which have been most useful in writing this article.

leading. In any case, the components of such ratios—such as acres and people—are by no means as concrete as they appear to be. The count of acres is dependent upon the drawing of boundaries, which must always be arbitrary to some extent. The population totals, which are used to express gross and net residential densities, are generally not based on fact, but on a series of guesses, more or less inspired³. Here and there, the errors may cancel one another out, but they can hardly be relied upon to do so. The more detailed, therefore, and the more precise the density figures of town maps are, the less reliable they become; they are unsuitable for general comparisons of urban conditions. And the overall town density, though most easily verified, tells us hardly anything at all.

It is not just the difficulty of fact-finding and arithmetic, however, which explains why we speak so often and so bitterly about density and know so little about it. The main trouble is that there is not one density, but there are many densities in the physical and social sense. To some extent this is recognized, and various kinds of density indices have, therefore, been devised—gross and net population density, net accommodation density, plot ratios, floor space and building density indices—though not all of these are generally applied. But it is less widely recognized, in spite of the Ministry's recent lucid manual on the subject, that such indices, measuring different variables of density, are liable to produce inconsistent results, because the variables themselves are not closely correlated with one another⁴.

There is so much disagreement between the different density indices that it is by no means easy to assess their significance. As the indices are not interchangeable, and there are, for example, areas with high room densities but low population densities, high or low 'density' as such does not have an absolute value: it is not simply good or bad, satisfactory or unsatisfactory. No valid conclusions can be drawn from any single set of density measurements. Thus a statement about net population density, for example, has no direct physical or social implications, since the same population density can be achieved by all sorts of different physical arrangements, which in turn influence the appearance of the layout and the social relationships which exist within it. The same is true of net accommodation density—the number of rooms on a site. Taken by itself, this

rate does not indicate the grouping of rooms and buildings, their massing and juxtaposition, nor the number of people living and moving about in the area. Nevertheless, technically the rate is a useful one for the planning of new development, because it is honest and tells us exactly what it is supposed to tell, as a matter of fact and not of guesswork⁵. Building density, too, though again pertinent in its own right, and a potent index of differentiation between concepts of layout held at successive periods and by various schools of thought, indicates only one side of the picture: the massing of buildings, that is, the relation between covered and free space⁶.

A given level of density, as expressed by any one of these measurements, has a spurious value not just because it indicates only one of the manifold aspects of environment, but also—and even more important—because every aspect has varying significance for different social groups and generations, and even for the same person at different stages of time. Attitudes towards population, room and building density, and towards the many more intangible aspects of density, are not the same throughout society: what is regarded as good by some groups is inevitably regarded as bad by others. On the basis of tradition, prejudice, habit and of distinct individual preferences, each one of us draws up a balance sheet, consciously or unconsciously, between the competing needs for domestic space and access to communal space, between 'privacy' and 'sociability,' as again variously understood. We decide whether we want an outlook tower from which we can see a wide horizon, sometimes bewildering in its strangeness and variety, or a point of anchorage giving a narrow horizon, always cosy in its familiarity and intimacy. It is this balance sheet which determines our choice of location—if we have a choice—as well as our attitude towards the pattern and density of development.

This is not to say that a particular kind of aspiration—urban or suburban, for example—is always rational in terms of the genuine self-interest of the people imbued with it. Nevertheless, planners can ignore differences in density preferences only at their peril. They are, of course, entitled to disagree with people's views about density and to try to influence these views—presumably after having taken all aspects and implications into account far more thoroughly than the public themselves are capable of doing. But it is wholly unrealistic to regard density—and especially low density, however defined—as a kind of patent medicine, which can be mass-produced by the same prescription everywhere and which has to

be swallowed by everyone. As long as planners are apt to reject non-conforming ideas as well as non-conforming uses, simply because these do not fit into the universal blueprint which has been arbitrarily devised, the layman is quite justified when he associates the idea of planning with the idea of uniformity, and opposes it accordingly.

But even when all this has been said, the search for a formula is still likely to continue. The belief that there is an absolute morality in density, particularly in low density, has been held for so long that it cannot be easily discarded. Granted that density indices have a spurious value—because they are only fragmentary and their results have varying and often conflicting significance—is it not true that there are still extremes of density, as measured by any index, which are incompatible with social and visual satisfaction? This question is bound to be asked, and in theory the answer would be an affirmative one: there are probably such extremes of high and low density alike. But in practice it requires formidable courage for generalization to name any figures of such extremes. For exceedingly high and low densities are found in places which have social value and prestige, if not always aesthetic merit.

Moreover, even in the case of such extremes, as over the whole range of densities, it is not so much the level of density as such which matters, but the scale of development to which it is applied and the context within which it is set, quite apart, of course, from the felicity of design⁷. In exceptional cases, repetition of the same layout over a wider area would not greatly diminish our pleasure and sense of well-being. But in most other cases, such as tall blocks of flats, as well as suburban municipal and speculative developments, the effect of enlargement or repetition is far more doubtful: it certainly meets with a less unanimous response. How much better would even Honor Oak or Dagenham be if there were not so much of it. As human beings, if not as planners, we demand diversity: a visible sequence of densities. And it is this fact—the dominant significance of scale, context and sequence—that is the most important cause of density relativity. Scale and context, moreover, are not immutable: they change with the horizon and point of view of the beholder. It is, therefore, impossible to define density concepts with universal validity: 'density' is categorized by bound-

³ Appropriate census figures have so far not been available, and they could in future only be obtained whenever the boundaries of wards coincide with the boundaries of areas as defined in the survey and plan. There is no way of getting accurate population figures for such subdivisions except through special sample surveys or detailed re-tabulation of census data in terms of small territorial units, i.e., census enumeration districts.

⁴ See e.g., *The Density of Residential Areas*, HMSO, 1952, Table 2, p. 13. This table shows clearly that great variations in population density arise from alterations in occupancy rates though the net accommodation density is held constant. Thus in one area, a low net accommodation density may be associated with a greater population density than is found in another area which has considerably more habitable rooms per acre. It should also be remembered that it is the grouping of rooms in dwellings, not the total number of rooms per acre, that largely determines the occupancy rate and consequently the net population density. For example, an estate with 50 habitable rooms per acre, which has mostly five-room houses, will in the long run have a far lower occupancy rate, and therefore a far lower population density, than an estate with the same room density, but a wider range of dwelling sizes corresponding to the range of household sizes. And it must be stressed that this connection between dwelling distribution, on the one hand, and occupancy rates and population density, on the other, does not exist merely in theory. It is important in practice, as is shown, for example, by an analysis of the One-Per Cent Sample figures of the 1951 Census.

⁵ This is not true of net population density figures stipulated in the plan for a new residential area. In fact, such figures are simply based on an assumed occupancy rate, and often the assumption, in turn, is neither clearly thought out nor stated explicitly. We are told, for example, that the Lansbury exhibition area would have a net population density of 126 persons per acre; in fact there were originally 133 people per acre. And the figure is bound to fluctuate significantly over time, especially in new residential areas, which invariably experience drastic changes in population structure. Net population density, therefore, whether accurate or not at a particular moment of time, is never a fixed figure: it can be regulated only by State birth control and by issuing 'passports to Filniclo.'

⁶ The building density index shows the relation between space about buildings and gross floor area (as is described in more detail below). This index would be even more useful for a comparative study of layout concepts if it were broken down further to distinguish between domestic and circulation space about buildings; that is, between the amount of space taken up by gardens and by the street respectively.

⁷ At one end of the density scale there are, for instance, parts of Welwyn Garden City, where people live happily at a density of about 20 habitable rooms per net acre. Examples at the other end of the scale are the Athenaeum Court (Piccadilly), Arlington House (Green Park) and Oslo Court (Regent's Park) which have net accommodation densities of 460, 322 and 211 habitable rooms per net acre respectively, and yet their average gross floor areas per room are fairly high—378 square feet in the first, 514 square feet in the second, and 335 square feet in the third example. By comparison, a place like Honor Oak, which could not properly be described as a social success, has a far lower net accommodation density—145 habitable rooms per acre—though it also has a far lower gross average floor area per room, i.e., 190 square feet. And if layouts such as those of Bedford Square, Church Row in Hampstead, and of pleasant Cambridge streets, set between College grounds and open spaces, were repeated nowadays, and if such layouts were designed in terms of generous contemporary standards of room dimensions, very high net accommodation densities could be achieved without loss of amenities—densities ranging from 154 to 214 habitable rooms per net acre. (See also footnote 1.) But we are not really aware of the very low or very high density figures of the examples mentioned since in practice the meaning of a given population or room density varies with the area of the site and the nature of the surroundings. How different would Oslo Court be without Regent's Park, and Arlington House and the Athenaeum Court without Green Park. Bedford Square might not appear to us quite so spacious and restful as it does, in spite of its rather high density, if it were not next door to the crowd and noise of Tottenham Court Road.

daries—social and physical boundaries—which themselves are shifted about according to the purpose for which they are drawn and the position of the draughtsman.

This is not to say, of course, that density concepts are so relative that they have no objective meaning. On the contrary, when relativity is revealed, objectivity is in sight. When scale and compass directions are given on the density maps, we can use them for comparison and evaluation.

To begin with, when the relativity of space is recognized, the premise that high density as such is an index of bad living conditions will be rejected. This premise is derived from a period when there were, for instance, no means of fast transport; there was a far more restricted domestic circumference, both in terms of functions and movements; in this country, the symbol of social aspiration was still the country house—and its many imitations all down the scale—and not the town house. Luxury flats had not yet been built. Thus it was the space within the home and at the doorstep that was almost invariably most important, and the amount of space in and around the home was a mark of social rank. But as distances have narrowed, and as social status distinctions have become more diverse, the old maxim—the more space the better—has become fallacious. It should now be abandoned.

Nor is there as close and consistent a relationship between density and urbanity as we are generally inclined to assume. If we ignore the differences in definitions of urbanity, and look at layouts which are unanimously regarded as positive examples of urban design, we do not find that these have always a greater number of rooms or of people per acre than is found in developments of the garden city type. However, the urban streets and squares of which we are proud—and even the most spacious ones—have usually a far higher *building density* than the suburbs, housing estates and new towns. In other words, in the urban scene, there is far less space about buildings than floor space, while in the suburban pattern the opposite is true.⁸

⁸ The building density index shows the relation between 'space about buildings' (i.e. site area, including half the surrounding streets, less coverage area) and 'gross floor area.' This relation can be clearly stated by expressing space about buildings as a percentage of gross floor area; the higher this percentage is, the lower is the building density. In a number of areas in Bloomsbury, Chelsea and Hampstead, for which the indices were calculated, the figures range from 32 per cent to 65 per cent, and similar figures are found in various Cambridge residential blocks in or near the central area. In several examples of new town residential areas, on the other hand, space about buildings was very much greater than gross floor area, i.e., 245 per cent to 324 per cent of gross floor area. In other words, in Bedford Square, for example, there is only about half as much space about buildings (including the open part of the square) as floor space, while in the new neighbourhoods of Stevenage, Hemel Hempstead and similar places, there is two or three times as much space about buildings as floor space. As far as can be judged at present, new town neighbourhood centres, too, are characterised by low building densities, as compared, for instance, with the new market place in Lonsbury. And this is the case even when these new town local shopping centres appear to need less circulation space than the Lonsbury market—i.e., when they are intended to serve a smaller population than Lonsbury. But, of course, there is not the same scarcity of land in the new towns as in the reconstruction areas, and thus not the same pressure to make a virtue of necessity.

It is, of course, not surprising that there are striking differences in terms of building density between the urban and the garden city types of development. For it is not just the dissimilarities in standards of building height and road width, of garden sizes and the other paraphernalia of external space which the building density index reveals: it also gives a clue to the ideas of the designer: it shows what relationship between the public and the private, the extrovert and introvert, features of a layout he had in mind. Thus building densities are high in the older towns, in their residential and non-residential areas alike, because the layout pattern is so closely knit together. The houses belong to the street: they are in direct communication with one another and with the street. Their sociability is, moreover, not always achieved at the expense of privacy. On the contrary, the pleasant old squares and terraces are fortunate: they often have more of both than the suburbs⁹.

While building density is a fairly consistent index of urbanity, this is not true of either population or room density. And there is bound to be a rather weak connection between the number of rooms or people per acre and urbanity, not only because such measurements are ambiguous, but also—and more important—because it is the very essence of the town to provide diversity of conditions, and thus of densities.

Indeed, as soon as we discuss variety, and therefore also our ideas about towns, the division bell begins to ring in the density debate. For it is then obvious how radically the approach to urbanity has altered. There was a time when the essence of the town was wholeness. The town or city had visual unity, a sense of historical continuity and of social interdependence, just because contrasts were accentuated, changes were emphasized and conflicts were acknowledged. But as it has been increasingly disconcerting to contemplate the complexity of society, this deductive approach to city design and city life has been replaced by an inductive one. A town is now thought of as a series of Chinese boxes: the details of a single part are designed with loving care; the whole is shapeless and disjointed because it is but a

⁹ If site coverage is held constant (i.e., the percentage of the site that is built over) building density increases with the height of buildings in so far as height increases floor space. In the older urban areas, site coverage is, however, not held constant: that is, streets with two-storey houses are usually narrower than those with buildings of greater and of varying height. On the other hand, in the new towns, site coverage appears to be fairly uniform, and also rather small: in the cases considered only between 14 per cent and 18 per cent of the site was built over, as compared with 19 per cent to 58 per cent in various old urban examples. In the new towns, there is altogether more space about buildings, a great deal of which is taken up by street verges and external passages. Both houses and gardens are less varied in size—and also far less spacious than those of some old urban areas—while the 'street' is usually wider and also more remote. This aspect of density, especially—the amount of space used for private gardens or greens and for external circulation—requires further study. Do we really need so much space for the street as is now provided on housing estates and in new towns?

piecing together of like particles. Unity and permanence are taken for granted, and they are therefore missing, since they can be derived only from the appreciation of differences in ideas, conditions and moments of time. It is this inductive concept of urbanity which we find in High Paddington and Low Letchworth alike¹⁰. It has been brought about by the assumption that system and sameness are synonymous. In such town design, an elementary ideological and statistical error has unfortunately become true: what is average has also become typical: the most frequent phenomenon¹¹.

However disquieting and strenuous it may be, we shall have to rediscover the differences which are now concealed behind the averages, but which will soon re-emerge and upset the tidy structure. For architects or planners cannot eradicate such differences, nor is it their function to do so, even if they could. They should not try to press either the urban patriot from Pimlico into the mould of a garden suburb, or the refugee from the metropolis, whose social aspirations are symbolized by Stevenage, into that of a skyscraper. One of them finds his social security in the comradeship of the crowded urban block; the other looks for safety in seclusion, and it is for his sake that the planners are dreaming of broad streets in which human beings are permitted to appear only as occasional vertical features. The genuine differences of outlook between the urban patriot and the refugee have to be respected, though we may disagree with one or the other. It is the planner's duty, however, to give the Pimlico and the Stevenage people the chance to compare their modes of living and their value judgments, and thereby to change these, if they wish. This can only be done if such people do not live thirty miles apart, but together in a true town that provides a meeting ground for varied generations and social groups. In that kind of town, the relativity of space and distance is recognized and, indeed, exploited to advantage: it is not a hindrance, but an inspiration to civic design.

In the long run, planners will find it easier and also more satisfying to return to such a concept of urbanity. It can certainly solve their density puzzles for them.

¹⁰ It should be remembered, however, that Ebenezer Howard took a position somewhere between the 'deductive' and 'inductive' approach to town planning. His disciples stressed the inductive approach, and it is they who have introduced the illusion of permanence, as shown, for example, by their insistence on the 3-bedroom house. A house of that size is supposed to be universally suitable on the assumption that married couples want the same home for the whole period of their family life: from the moment the wedding bells are ringing to the day of the ultimate funeral.

¹¹ Uniformity is by no means lessened by the current insistence on 'balance': balanced communities, balanced population and industrial structure, socially mixed neighbourhoods, etc. On the contrary, the very term 'balance' shows how difficult it is for planners to forget their affection for neat and tidy formulas. And how could they do so when such formulas were prescribed in plenty in the primer issued by the Reith Committee?

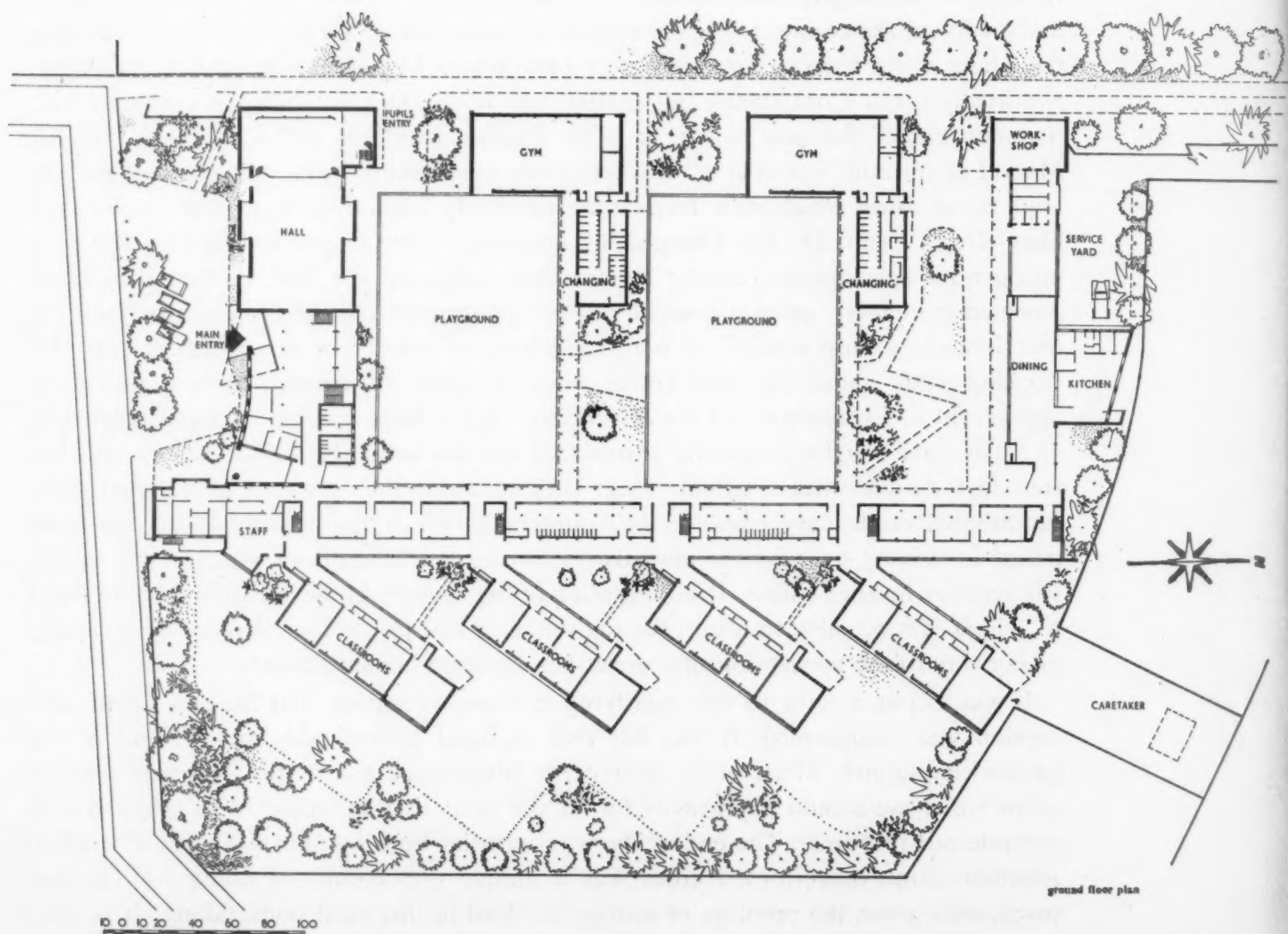
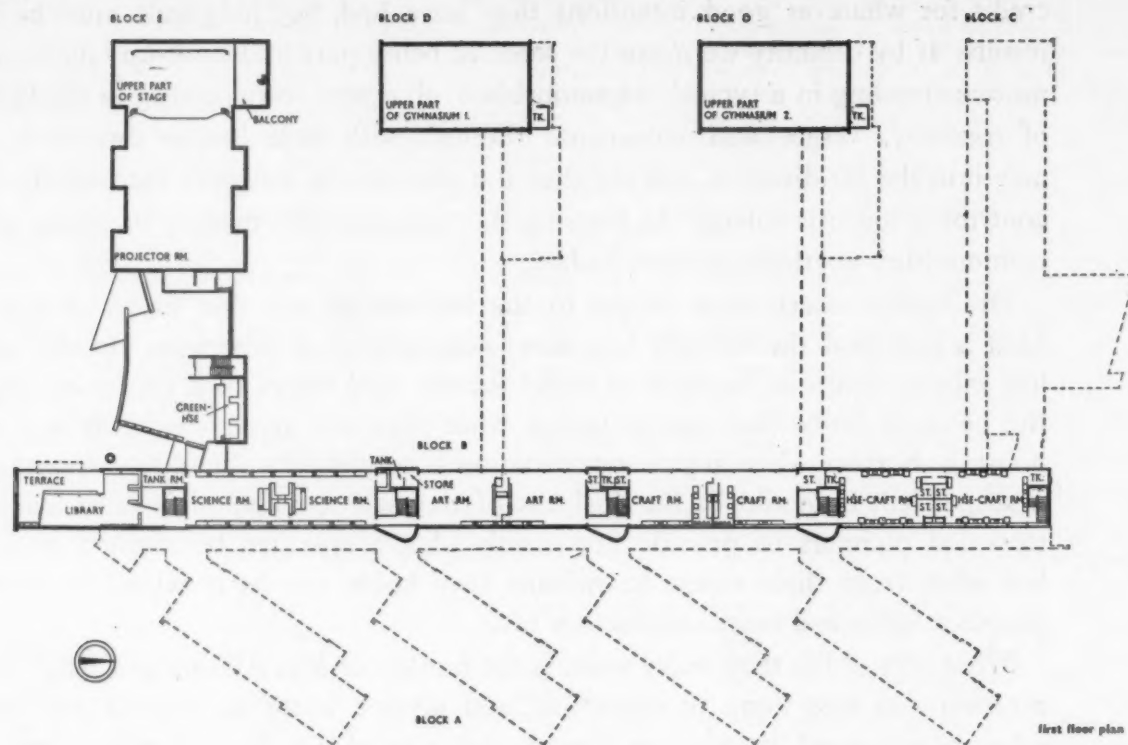
So much for densities regarded as material for gamesmanship. Now for our second point, that density figures mean little in practice, as the new towns themselves show. For all Dr. Taylor's arguments about its net residential density giving Harlow a high degree of urbanity, Harlow, to look at and walk about in, has not a high degree of urbanity—and the other new towns have even less. Their architects must be given

credit for whatever good intentions they have had, but judgment must be based on results. If by urbanity we mean the sense of being part of a built-up community, then no-one standing in a typical neighbourhood of a new town, taking in the vast deserts of roadway, verges and pavements rimmed with little houses dwindling acre by acre into the far distance, can say that the new towns, however successfully they may contribute towards solving the housing shortage, are, as attempts to create new urban communities, anything except a failure.

Dr. Taylor asserts that visitors to the new towns will find much to praise there. That is true, and the REVIEW has never suggested it is otherwise. He also quotes the low rate of return as an index of social success, and refers to a contented population. But he must know that people accept what they are given, especially in a period of housing shortage when any accommodation is so welcome that dispassionate judgment is suspended. It should be the business of the new town administrator and his architects and planners to provide not merely what people can be counted on to accept, but what from their expert knowledge they know can be provided in order to give people a fuller and more satisfactory life.

What sort of life they really want is the burden of Mr. Alexander's letter. This is by no means an easy thing to determine, and no-one wants to compel the Englishman into an unnatural, let alone a Continental, way of life. But it is not so long since his civilization was largely based on life in towns he had devised for himself—the Georgian market town, the county town, the cathedral town—which are models of town building the whole world admires, even if King's Lynn leaves Mr. Alexander cold. King's Lynn admittedly is not Continental, but neither has it anything remotely in common with the suburbia of the new towns; it is by English standards urban, from its Tuesday Market (a splendid example of market-town-monumental) to its crowded and narrow High Street down which even Jeeps must nervously edge their way. The Englishman likes King's Lynn. He has changed his gregarious King's Lynn nature into that of a misogynous suburbanite because he has been subjected for half a century to high-powered garden-city sales talk which has turned the best part of this country (with the best intentions) into a series of housing estates of greater or less worth. It was this housing-estate abuse the new towns were designed to correct. Instead they have aggravated it. Everyone is not a town-dweller, but a large number of Englishmen are, and they have a right to demand towns that are towns in the fullest sense, with the true, historic amenities of urban living. They have also the right to demand what every Englishman needs, easy access to the countryside, which the housing-estate new town policy is driving ever further towards the horizon—a horizon on which is just visible still another housing-estate. The conception of the country as the unexploited hinterland to which it is possible to return for rejuvenation and psychological renewal is rapidly giving way to the conception of a green-belt between housing-estates.

It was to put a term to this terrifying process, we repeat, that the new towns conception was inaugurated. It was felt that to build interminably in the form of the garden-city suburb, whatever its short-term advantages, was in the long view a social crime which we should pay heavily for in the end; that we must learn again to concentrate our resources. The end of the war, with its housing shortage and its need to rehabilitate our overcrowded cities, was a unique opportunity of doing so. The new towns were given the privilege of setting the lead in this vital undertaking. It is only necessary to look at them to see that they have failed.



10

11

12

13

SCHOOL IN ESSEX

DENIS CLARKE HALL: ARCHITECT
R. A. H. Ruth: Assistant Architect



1, view from the main entrance porch towards the medical inspection room, above which is a terrace forming a continuation of the library.

This four-form entry secondary modern school is surrounded on three sides by the housing of the London County Council's South Ockenden estate which it serves. The site is virtually flat and as far as possible every safe tree has been kept.

The main planning elements consist of a central spine



2

block on two storeys, giving a corridor on the ground floor. Access to the first-floor teaching rooms is from staircases at 90 ft. 0 in. intervals, each serving pairs of rooms on the first floor. These staircase units form the main pupils' entrances and exits for arrival and break periods. They come opposite the branch corridors to the classrooms, which consist of four blocks set at an angle to the main axis of the building.

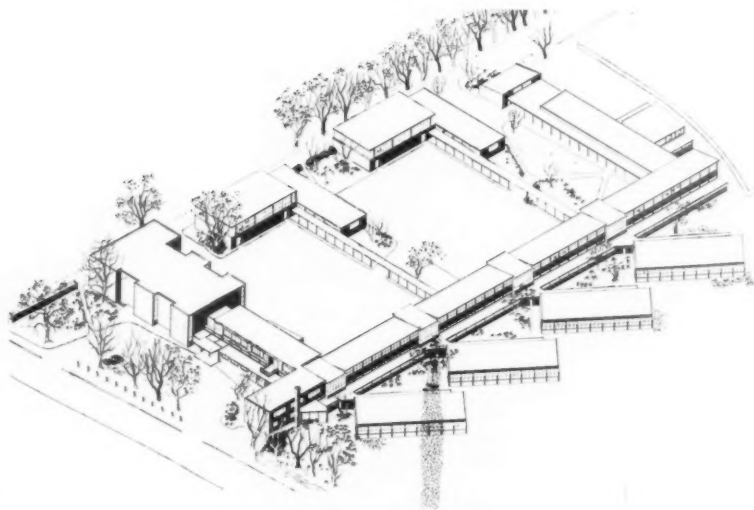
The teaching rooms on the first floor occur over the cloakrooms and lavatories as, according to the 1949 standard, the areas required are almost identical. This has the advantage of reducing the vertical circulation, and using intermediate columns on the ground floor to support the first-floor beams.

The entrance hall structure and staircase are designed to have additional further education rooms on the first floor, over the staff rooms, and, if necessary, a second floor. The gymnasias take the form of isolated blocks, connected to the main building by covered ways, and have direct access to the playing fields to the west.

Construction is of light welded steel frames using R.S.J. sections at 10 ft. 0 in. intervals, the main planning being carried out on the 3 ft. 4 in. module. With the exception of the assembly hall and gymnasias, which are on solid load-bearing walls, the structure is carried on reinforced raft foundations with ground trimmer beams at the edges. The roof consists of woodwool slabs on aluminium purlins at 2 ft. 0 in. centres spanning the main frame. The first-floor structure has hollow



2, the main entrance with the school hall on the left. 3, one of the enclosed playgrounds looking north east towards the two-storey spine block. 4, north west façade of a typical classroom block. 5, on the opposite page, view from the rear of the main entrance block across the southern playground towards one of the gymnasias and changing rooms. 6, the main entrance hall. 7, view of the assembly hall with the stage set up. 8, one of the four staircases leading from the spine block to the first floor specialist classrooms. Below, aerial perspective of an earlier design before the main entrance was given its present curved south elevation.



blocks and *in situ* floors, with construction joints at each staircase.

There are coloured concrete tiles in the corridors, cloakrooms and lavatories, and composition wood block flooring in the teaching rooms. The walls are plastered and painted with emulsion paint, and ceilings are exposed woodwool, spray distempered. A wide variety of colour has been used. The school was designed in association with H. Connolly, the County Architect.



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7,8

SCHOOL IN WORCESTERSHIRE

RICHARD SHEPPARD AND PARTNERS: ARCHITECTS
Mrs. A. B. Leslie and Miss D. Downer: Assistant Architects

9



9, the main entrance which is on the ground floor of the specialist teaching block. On the left is the dining hall. Above the entrance hall is the library and above that the needlecraft room.



10, rear elevation of the three-storey specialist teaching block. 11, the dining hall block from the west and, 12, the assembly hall and stage.

The architects were originally commissioned to design this school in 1948 as a three-form entry school for 450 children and later asked to expand it for 600. Surrounded by a new housing suburb, laid out by the Redditch U.D.C., the school is planned on the north side of the site which lies in a hollow between two hills.

All the theoretical teaching spaces have been placed in the two-storey block, and these are connected to the specialist rooms, which are arranged in the three-storey block, at ground floor level by means of three short corridors, off each of which are placed the lavatories. The ground floor of the three-storey block consists of a wide gallery to which all parts of the school connect, with open cloak spaces arranged out of this. A carefully designed rural science block, comprising greenhouse, tool shed, potting shed and livestock shed, has also been incorporated. Advantage of a brick end wall has been taken to provide five courts. The assembly hall, dining-room and staff rooms open off the main entrance so that

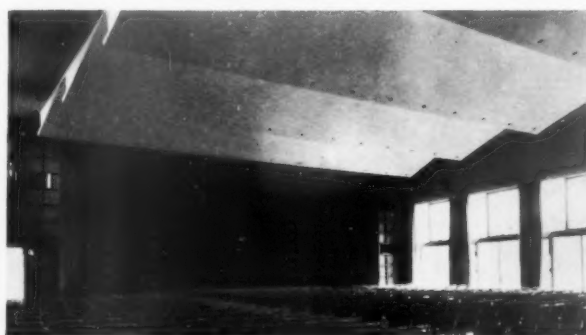
the hall or the dining-room can be used by the public without interfering with school activities.

The whole of the structure of the two and three-storey buildings was standardised and to a large extent was fabricated off the site. All floors and roofs are of one standard width, while stanchion heights and wall panels were also standardised and made uniform throughout.

11

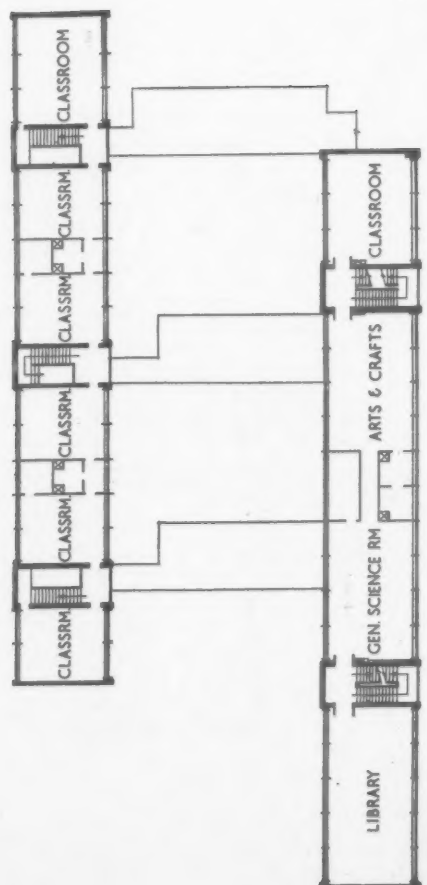


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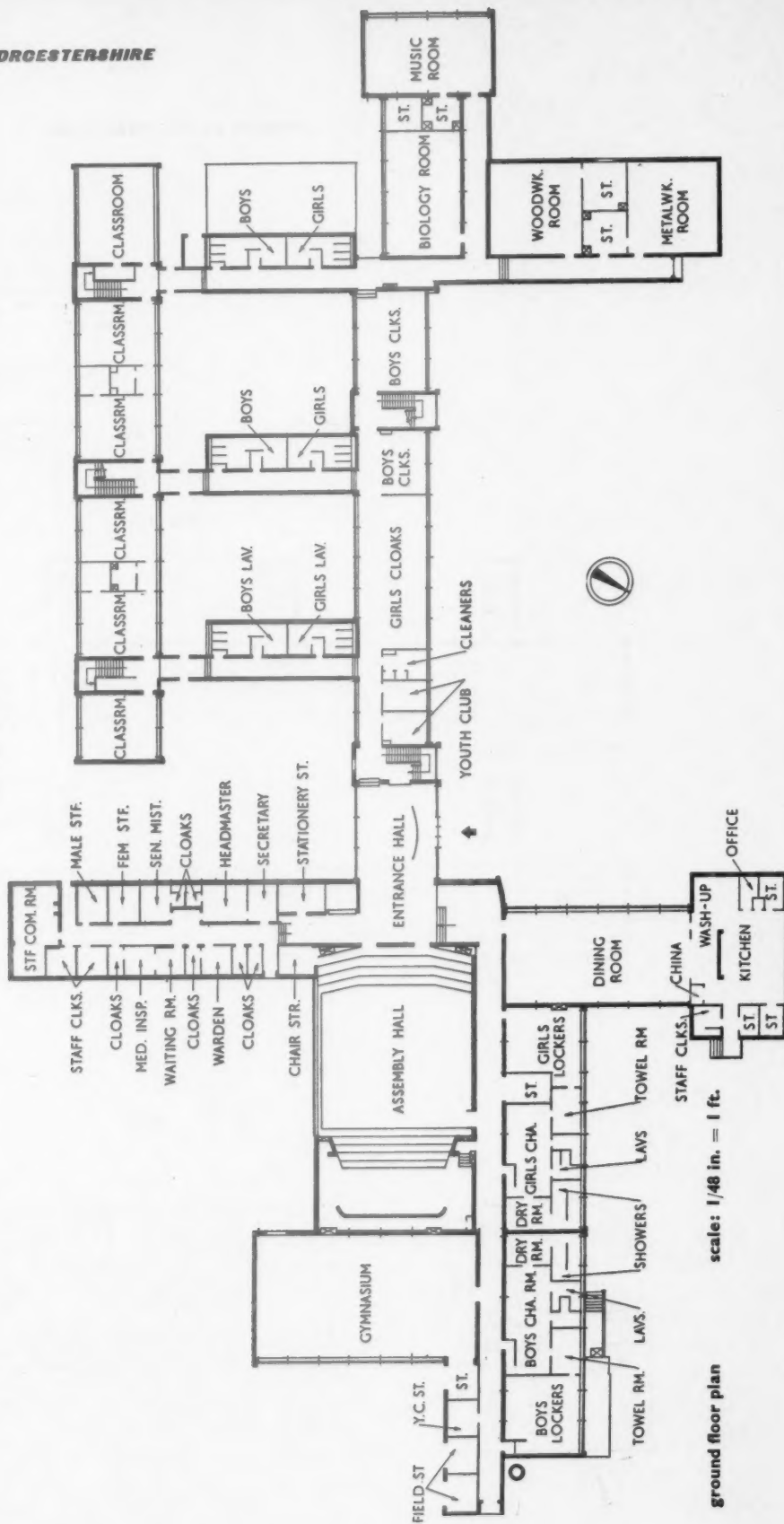


The construction is of 8 in. $\times$ 5 in. steel stanchions connected transversely at 10 ft. centres with two lattice girders 5 in. apart. Steel beams encased in concrete bolted laterally between stanchions carry the pre-cast floor and roof decks. Pre-cast concrete external wall panels were designed with stiffening ribs and slots cast in, enabling them to be fixed direct to the steelwork. They were faced externally during casting with Derbyshire spar. To minimise fire risk cross walls on either side of the staircases are of brick, and the staircases themselves are in all cases of reinforced concrete construction. The end gable walls are similarly of brick.

second floor plan



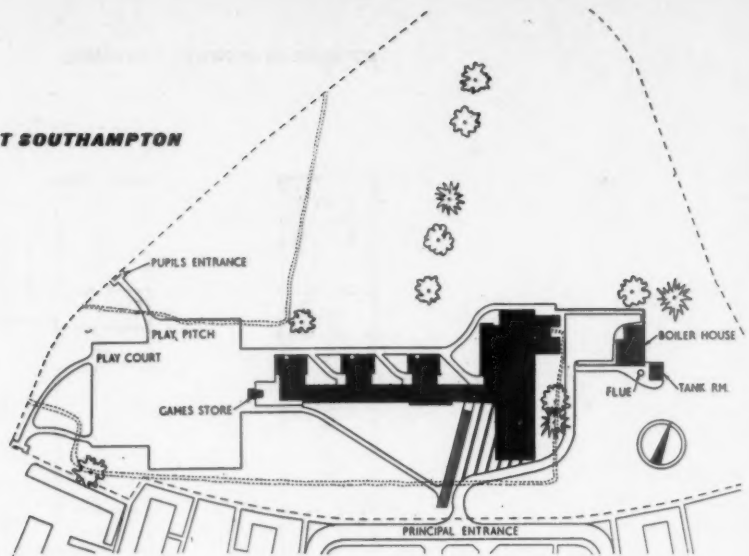
First floor plan



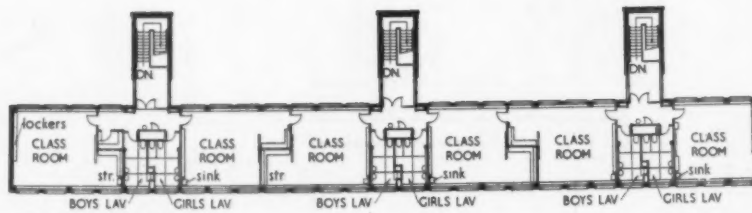
Ground floor plan

scale: 1/48 in. = 1 ft.

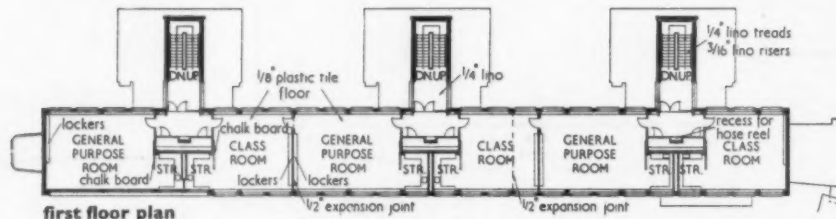
SCHOOL AT SOUTHAMPTON



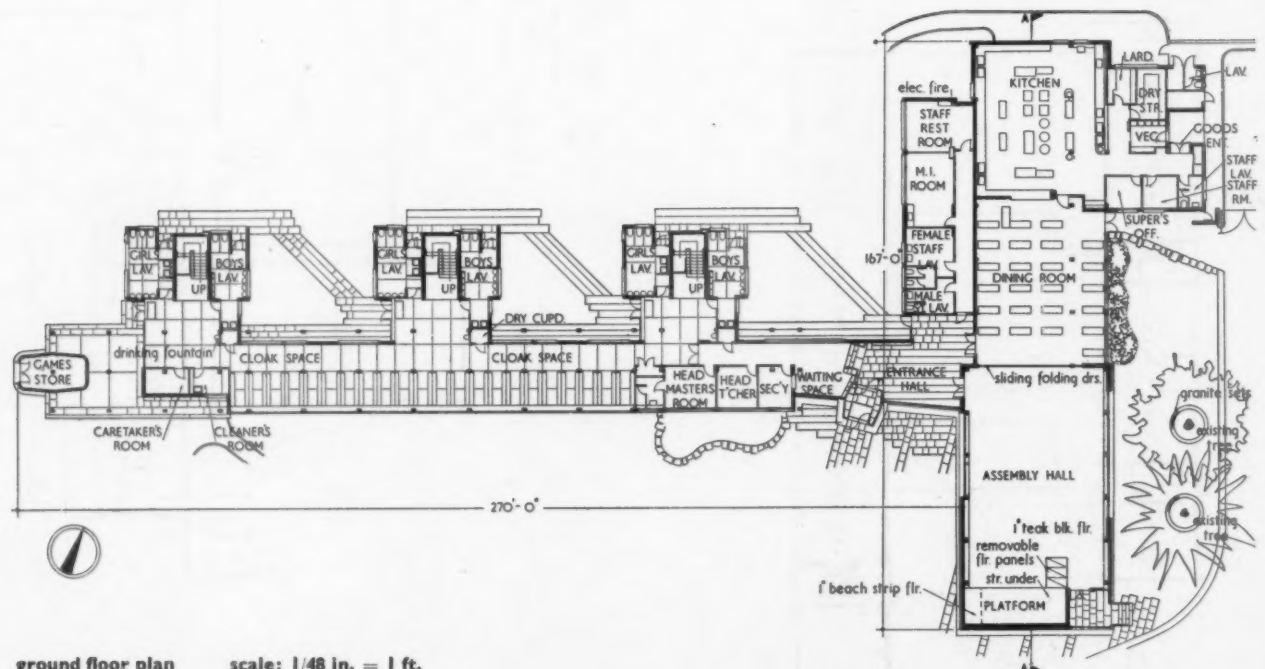
site plan



second floor plan



first floor plan



ground floor plan

scale: 1/48 in. = 1 ft.



13, the main entrance hall looking north east. The passage on the left leads past cloakrooms to biology, music, woodwork and metalwork rooms.

SCHOOL IN WORCESTERSHIRE

The internal colour scheme has been related to the three staircases contained in each block, which are connected to each other by three cross corridors at ground-floor level. These staircases have their own basis, blue, red or green, used on the end wall and forming the theme of development for colour schemes in the teaching spaces opening off these.

SCHOOL AT SOUTHAMPTON

LYONS, ISRAEL AND ELLIS: ARCHITECTS

14, the entrance waiting space looking towards the secretary's office.





This is a three-form entry junior school for 480 pupils, situated on the western boundary of the city. It stands in the centre of a housing estate, occupying the southern end of a seven-acre plot, part of which is reserved for a future infants' and nursery school.

Owing to the difficulties of the site which formed a collecting basin for water drained off nearby higher levels, it was essential to reduce ground coverage to minimum and plan vertically where practicable. Layout forms two components: the single storey communal and administrative block and the three-storey teaching block with classrooms reached by three staircases serving two rooms on first and second floors.

Frame and foundations are of reinforced concrete and support pre-cast lightweight beams with foam slag covering. There are foam slag infilling panels and eleven-inch

cavity brick external walls which are clear of the frame.

The whole of the overlay site slab is twin layer reinforced concrete, with a loaded waterproof membrane. The few underground ducts are designed as a continuous 'U' beam to combat the upthrust of water pressure in the sub-soil. They are tanked with three layers of asphalt and loaded to create a weight at least equal to their displacement in water. Roofs are covered with built-up bituminous felt finished with green stone chippings. All windows are of hardwood and double glazed except in assembly hall and cloakrooms.

All internal and external joinery is hardwood left oiled or varnished. External facing bricks are of yellow stocks. A considerable amount of the internal walls are left fairfaced and finished with turquoise blue, grey and yellow pointing.



SCHOOL AT SOUTHAMPTON



17

15 and 16, on the facing page, two views of the three-storey teaching block ; 15, the south elevation ; 16, rear elevation looking east. 17, the main entrance. 18, steps to the assembly hall platform. 19, the assembly hall looking west towards the classroom block. 20, part of the east wall of the assembly hall with the dining hall beyond. 21, the south wall of the assembly hall with the classroom block in the distance ; concrete-filled steel piping, painted black and white.



18



19



20



21



 The Kasbah of Taourirt, a crowded city of tall houses built of mud bricks and palm trunks, commands the western approach to the Dadès valley in Morocco. Through this valley there now runs a modern motor-road, but it is not so long since the only traffic was the camel caravans bringing desert products from beyond the Atlas mountains to the coastal area around Marrakech. To protect and exploit this traffic there were built the extraordinary mud-walled fortresses and fortified villages, now falling into disuse and disrepair, which are illustrated here and on the following pages by G. E. Kidder Smith's photographs.

Michel Santiago

BEYOND THE ATLAS*

Beyond the Atlas lies a region, unknown even to those *de luxe* tourists who have already discovered Morocco, whose scenery and architecture are unique in Africa and can only be paralleled in the Hadhramaut of Arabia. The valleys between the Atlas on the seaward side and the Anti-Atlas toward the Desert, though they have been opened up by a good motor road along which the heavy lorries of Western commerce run, have managed to retain much of the atmosphere of the days when they canalized and controlled the camel-borne trade that passed through their narrow confines on its way from the desert to the coastal region around Marrakech. Strung along the road beyond the Tizi n'Tichka pass one can still find the tall crenellated strong points and walled villages, all built of mud, which protected and exploited these trading routes, and their fantastic walls and towers, set in landscapes which are sometimes as extraordinary as those of science fiction, form scenes unlike anything else so near to Europe.

The road over the Tizi n'Tichka brings the motorist to the beginning of the Dadès valley, watered by an uncertain stream which supports a marginal vegetation. The western approach to this valley was controlled by the walled *kasbah* of Taourirt, which commands the oasis of Ouarzazate. The impact of motor-borne Western culture on the established Berber way of life at this valley-head is even now picturesque, but was still violent only twenty years ago, and, theoretically, a military *laissez-passer* is required.

However, it is perfectly possible for the visitor to enter the *kasbah* of Taourirt and appreciate the close-packed and apparently planless urbanism which builds up the fortress town's pyramidal silhouette. The crooked streets, which provide a labyrinthine defence against the 'evil eye' as well as the desert wind, and the small open squares, form a close-textured townscape pattern which will always strike the tourist by its contrast with the urban scenery of the West. But the walls and labyrinthine plan also

* This article is based on information provided by G. E. Kidder Smith and is illustrated with his photographs.

protect the life of the *kasbah* against outside influences, and in spite of the Westernization of the adjoining oasis, where native craftsmanship has already become a matter for preservation in a *Musée des Affaires Indigènes*, Berber culture flourishes within.

Beyond Taourirt, in the direction of Tinerhir, the road passes numbers of *kasbahs* and *ksours* (walled villages) while at El Kelaa des Mgouna a whole complex of crenellated towns can be seen grouped together, like a stage set or a Gothic painting, against the background of the snow-covered Atlas ranges. Tinerhir is at the other end of the Dadés valley, where a small roadside hotel commands enormous views of mountain scenery and fortress-studded valley. The nearest of these fortresses to the hotel is that of El Glaoui, the Chief Pasha of southern Morocco, but the treeline of the whole oasis is continually broken by turrets and towers.

El Glaoui is still a political force in the life of Morocco, as recent events have shown, and his castle, which serves him as a sort of palace and strategic headquarters, has therefore a continuing *raison d'être*, but the functions of the others have disappeared along with the pattern of trade and culture which they supported and which supported them—since tribute had to be paid in return for the protection which the forts afforded. The camel has been replaced by the heavy lorry as the normal motive power of overland trade, and the Berber populace, though they retain their traditional way of life within doors, have already come to accept the lorry and the metalled road on which it runs as the customary mode of long-distance transport.

Deprived of their functions, the old forts are also deprived of upkeep, and their existence has therefore a limited term—but in the case of these *kasbahs* and *ksours* this term is very short indeed, sometimes as little as twenty years. The locally available materials for building construction are only bricks of mud and straw, and these, reinforced by an occasional palm-trunk, are so friable even in this rainless climate that they perish rapidly unless they receive constant repair and attention. The battlements and observation towers, already rendered pointless, are beginning to disappear even from forts whose outer walls must be kept because they support houses inside.

The disappearance of skyline features like battlements is already softening the typically bizarre silhouettes of these fortresses, and the continued decay of function and structure in the main body of the works—as they decline from superposed bastions to terraced vegetable gardens—will confuse and destroy the typically cubic geometry which, under the Moroccan sun and in the fantastic scenery of the Moroccan valleys, has made them one of the secret wonders of Africa. While they still stand, however, there will remain a world of dreamlike architectural scenes, unlike anything else so near or so easily accessible, waiting to astonish the eyes of any traveller who is prepared to penetrate beyond the Atlas.



Seen from a distance, 1, Taourirt reveals its crammed pyramidal form, giving greater density of occupation toward the centre only as an incidental to greater elevation for its look-out posts, while seen from a closer viewpoint, 2, it reveals the simple geometrical forms of the buildings, powerfully modelled by the Moroccan sun, and the characteristic texture of the mud-built walls.





BEYOND THE ATLAS

Closer again to the houses of Taourirt, 3, one sees how boldly they rise above life of the town, blank-walled below, but pierced with windows and adorned with blank arcades and filigree patterns of brickwork in their upper parts. These arcades and decorative brick patterns are seen to even better effect in the towers of Tighrempt, 4, a little farther along the valley from Taourirt. This is the classic form of Dadé's valley fort, square, its corners strengthened by square towers, one of which is built up higher than the rest of the fabric to provide a look-out point. At Bou Malne, farther along the valley, or at any of a number of points along the little stream that made the camel-road practicable, one can see elegantly decorated forts like 5, standing in cubic isolation. But though this fort shares its mur d'enceinte with no other, it is only one of a large number of kasbahs which are grouped together at Bou Malne, 6, making one of the most extraordinary scenes which the valley has to offer—a romantic assembly of clear-cut cubic volumes in the sun, seen against an abstract background of barren hills.

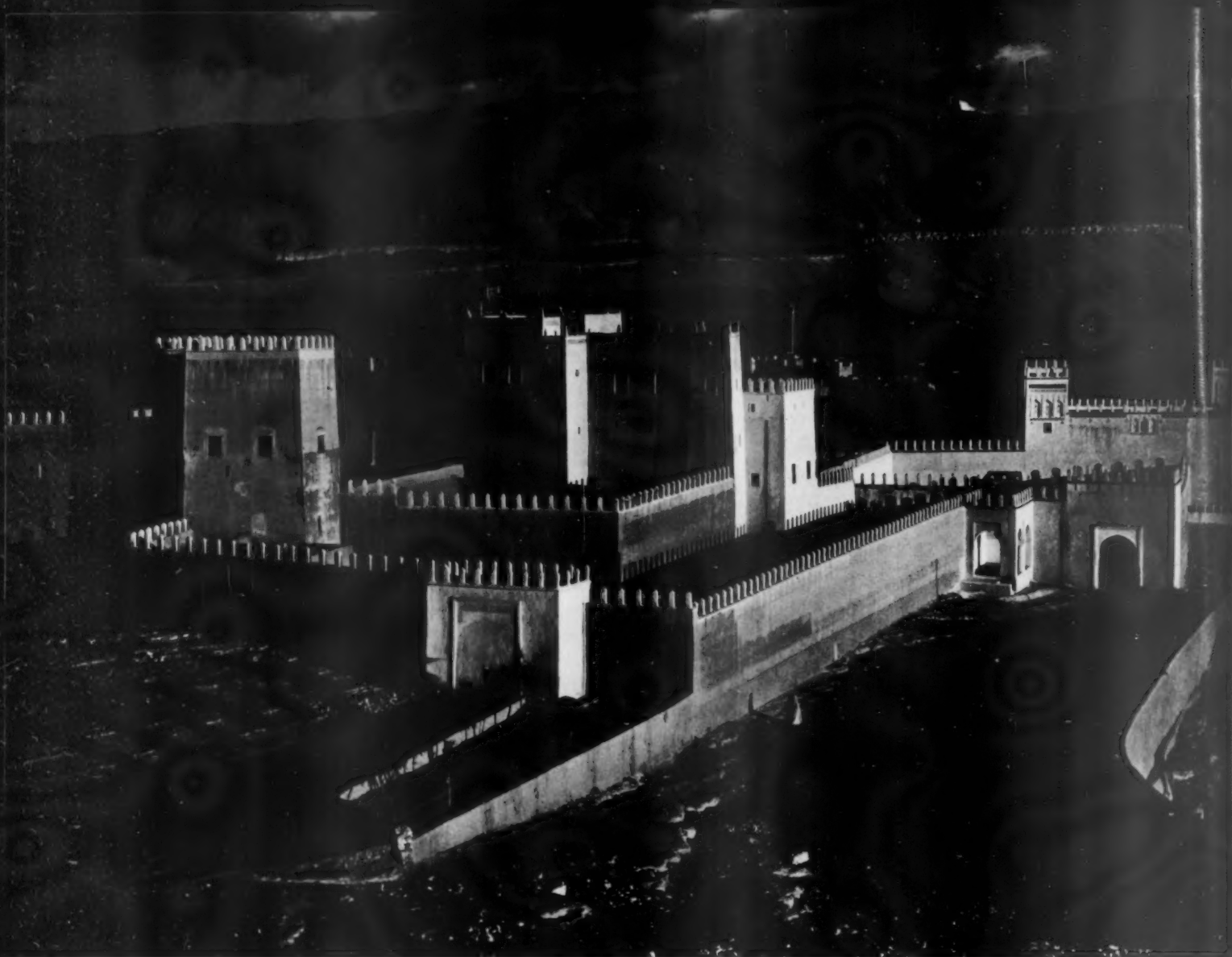




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6



The eastern end of the valley is commanded by The Kasbah of el Glaoui, 7 (see cover note on p. 358) at the fantastic oasis of Tinerhir, 8, a sea of palms and mist and battlemented towers.

Gerhard Rosenberg

GERMANY

MODERN ARCHITECTURE UNDER AND AFTER THE NAZIS

There is such an atmosphere of high tragedy about the rise of modern architecture in the Germany of the Weimar Republic, and its apparently ignominious collapse in Hitler's Reich, that its recent re-emergence as the characteristic architecture of the Federal Republic has mystified most observers outside Germany. If the destruction of the Bauhaus ideals was so thorough, where can the tradition and the skills have wintered the years of oppression? Few of the great exiles have returned, and no time-server could change his style at the behest of successive masters and still produce work of quality.

One begins to suspect that our view of conditions in Germany may have been distorted by short-range day-to-day political necessity, for we have now begun to see that the Nazi machine was rather loosely assembled, that within its recesses various forms of opposition and dissent were possible, and here and there one could avoid practising the degenerate Schinkelism of the official style. It is from these unobserved corners that the men who now head the German architectural revival have emerged.

The new movement bears the marks of this period of 'silence, cunning and exile.' Its finest monuments are probably its factories, and this should not surprise us, for factory design was the least supervised branch of architecture under the Nazis. The men who were trained in this industrial tradition have been able to contribute their fine-drawn detailing and machine-aesthetic to the new movement. Housing, on the other hand, which was normally subject to active political interference has failed to rise to the same high peaks of achievement, though its average level is highly competent.

But it should also be remembered that the social structure of German building since the war has not been the same as that of England, for instance the rebuilding of bombed commercial areas in the centres of towns has claimed a dominating propor-

tion of labour and investment, and the characteristic building-type of post-war Germany has been the tall block of shops and offices on a busy city street. In buildings of this type the two traditions, the machine-aesthetic and the housing-academic, meet to produce a synthesis which is the characteristic 'Middle Style' of the Federal Republic. Though that style has certain superficial resemblances to other quasi-empirical manners, the qualities which make it specifically German can only be understood by first examining the peculiar conditions of the pre-war and post-war periods.

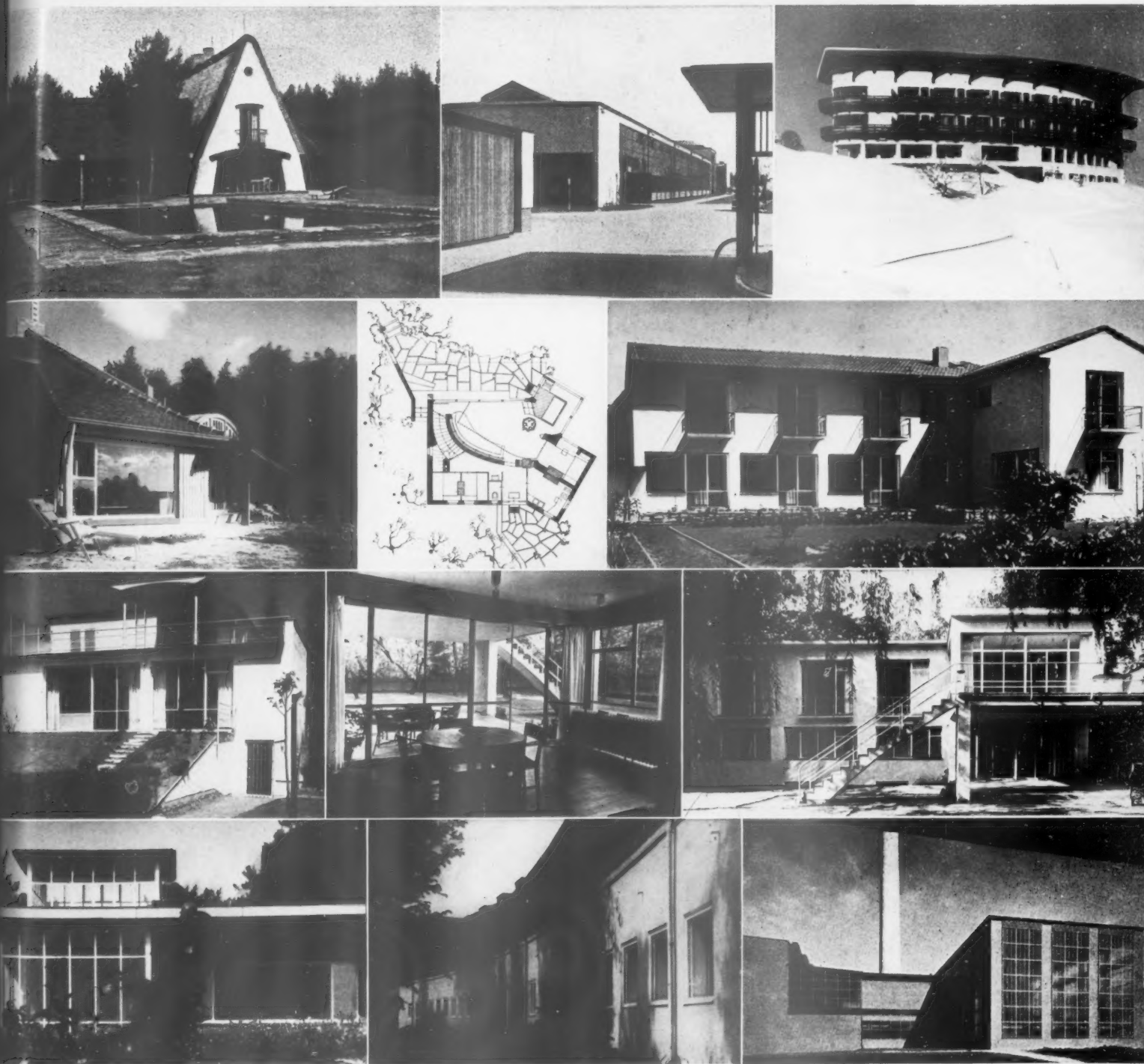
Hitler, at first, clung to the bourgeois standards he knew before the Lesser War, and positive Nazi architectural theory was slow in emerging. People at large did not care overmuch. People are not in doubt where good engineering, industrial efficiency or scientific ingenuity are concerned. Yet in architecture and the arts there is a semi-vacuum that can be filled by an officially promoted ideology. Even architects—and some very considerable architects—did not care overmuch. Fahrenkamp, Kreis, Behrens and others 'collaborated.' Others again simply capitulated. In a sad and thoughtful little book on 'The Architect as a Personality,' Rudolf Lodders wrote in 1948 of Heinrich Tessenow that he was the true heir of Schinkel, and combined the disingenuousness and depth of the Biedermeyer with the objective clarity of modern functionalism. He neither emigrated nor capitulated, but was not prepared to accept the obligatory policy of design, nor the speed with which planning and building were irresponsibly pushed through, nor the inhuman scale of the work. He remained silent.

Others took their refuge in industry and commercial building. Here is the reason that Germany has not come to its reconstruction task empty-handed. By a stroke of good fortune, Hitler—like any pre-1914 Beaux-Arts student—did not consider industrial buildings a worthy field for architectural philosophy. He had no very strong views on industry and commerce, except that they had to be efficient. Provided his architects produced a life-like scale-model with railway trucks, canals, cranes and docks, he would be known to pass schemes that were most flagrantly modern, not only with flat roofs and large windows, but with the friendly openness and human scale that was quite alien to the Nazi programme.

Much of the industrial work of those years has been destroyed in Hitler's war, but it was a haven for men like Reichow, Eiermann, Ochs, Leowald, Giefer and Maeckler. Lodders himself, and others, made the best of both worlds, and built contemporary factories and nostalgic houses, so that the art of detailing in the contemporary manner was not lost. Huge industrial offices with nominal heads, who were politically acceptable, worked on a scale otherwise found only in the United States, and turned out some fine work, like the Heinckel Aircraft Factory from Herbert Rimpl's office. There were a very few others—hard to trace even now—who built houses in the modern manner, but it must be made quite plain that in Western Germany to-day it is not the thing to brag about one's anti-Nazi past, and the illustrations of modern domestic work built between 1935 and 1945 cannot be a complete survey. While there was some 'jester's licence' for weekend houses or beach huts, it meant real danger to build a full size modern house. Doctors seemed to be willing to take such risks—perhaps because they were sacrosanct (after the elimination of Jewish physicians) by reason of their importance in case of war, and to build 'Doctors' houses' was a well-known saying. It is, however, in the industrial work that the real German contribution lies, providing the reservoir from which further contributions can come.



1939-45 THE HIDDEN OPPOSITION



Rudolf Lodders produced a building as romantic as this shooting box at Zeven, 1, at the same time as one of such objective clarity as the Borgward Works in Bremen, 2, subsequently bombed and now rebuilt by the same architect. Lodders, however, is no cynic. He has these divergent elements in him, and honestly believes in both worlds. It is hard to understand why the hotel in the Alps, by Kirchhoff, 3, should have been considered an outrage at the time it was built, but it was and its architect subsequently turned hotel-keeper. 4 and 5, a house near Berlin for an art dealer by Hans Scharoun. After it was designed for a very prominent site with a fine view, and had even been passed by an unsuspecting local authority, the surveyor was warned of the grave risk he was taking in passing it. Building was finally allowed only when the client agreed to plant a screen of trees, so that no passing Nazi potentate could see it from the road. These houses, 6, 7, 8 and 9, all built for

doctors by Rudolf Schwarz in collaboration with Johannes Krahn turn their faces away from the road. They are among the few examples that could be traced of a successful and uncompromising defiance of Nazi architectural standards. Doctors could allow themselves a certain freedom of expression, and if one asks some of the German architects who were known to be 'moderns' before 1933, what they had done during 1933 to 1940 they will answer as often as not: 'I built some houses for doctors.' Another example of successful defiance is the small weekend house, 10, by Hans Bernhard Reichow, near Wannsee, overlooking the lakes. The home for old people, 11, is by the same architect. 12, a power station by Karl Wilhelm Ochs, Professor of Architecture at the Technical University in Dresden after the war. Under the Nazis he worked as staff architect for an industrial concern and produced some remarkable designs.

1	2	3
4	5	6
7	8	9
10	11	12



13	14	15
16	17	18
19	20	21

Like the Kahn office in America the Rimpl office was a large planning concern primarily for industrial buildings. Within the firm individual architects were, however, allowed great independence. 13, a steel mill designed in the Rimpl office by S. Bormann. 14-21, the Heinkel works at Oranienburg near Berlin, perhaps the greatest achievement of the Rimpl office. The architects chiefly concerned with the designing were Leowald, Gießer and Maeckler. 14 and 15 are exterior and interior views of the main assembly hall; additional top lighting is provided by deeply recessed lighting bays, which nevertheless do not destroy the impression of complete window walls. 16, a delivery hangar allowing aircraft to drive in and out without needing to

turn. Some of the most finely considered detail was in the boiler house, 17 and 18, and the railway signal box 19. The main office block with its colonnaded entrance portico, 20. Here nazification is subtle but insidious; its influence can be traced to this day in the work which is going up for the Headquarters of the British Army at Hardter Wald, near the Dutch frontier. 21, typical houses of the estate for Heinkel employees laid out to the south of the factory area. Here in the domestic field design reverts entirely to the accepted dogma. Taken in all, however, the whole project, with its careful attention to detail in landscaping and buildings, remains a fine example of progressive architecture.

2

PROGRESS SINCE THE WAR

by Otto Voelckers

At the end of the war the situation in Germany seemed beyond hope; discouraged spirits in starved bodies lacked contact with the outside world and seemed incapable of helping themselves. But this lethargy soon passed and under almost grotesque conditions work began again. At first it had to remain on the drawing board, because there were neither materials nor money, and corruption pervaded everything, until foreign aid and the painful surgery of the currency reform cleared the way for reconstruction.

The severe bombing of many cities seemed to offer wonderful opportunities for complete reorganization and the elimination of their old faults, but this huge task exceeded the economic, political and social resources of the country. Work had to proceed piecemeal, and many pieces of stop-gap rebuilding have blocked any later attempts at radical reconstruction. Under such circumstances the New Architecture has not had an easy rebirth. The threads dropped in 1933 had to be picked up again and since the rest of the world has not stood still, lost time had to be made up. Periodicals, books and exhibitions from abroad were a great help, as was also the freedom of architects and students to travel abroad, when it was granted.

On the following pages are shown the various tendencies that revealed themselves in German architecture in the years immediately following the war. One will see an extensive use of glass and steel, aluminium and corrugated asbestos, a cautious acceptance of the tall urban block, the tendency toward the single family house, and the single storey school, and side by side with this, a school of traditionalism—the after effect of Nazi architectural ideology—with its sentimental desire to put things back exactly as they were before the war (see below).

Between these two tendencies the New Architecture is moving into a new phase. It is beginning to grow away from the stereometrical rigidity which has its roots in the Weimar and the Dessau of the 'twenties, and aims at a more relaxed approach. Some so-called principles may have to be sacrificed, but we can study the steadfast development of Swiss architecture, and learn from its *laissez faire* approach that all is well as long as architectural honesty is safeguarded, and there is no attempt to revive past styles for their own sakes. Such a philosophy supports the kind of 'Middle Style' which is now emerging in Germany, and which is illustrated in the last examples on page 387.

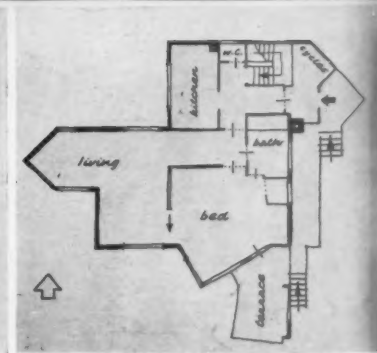
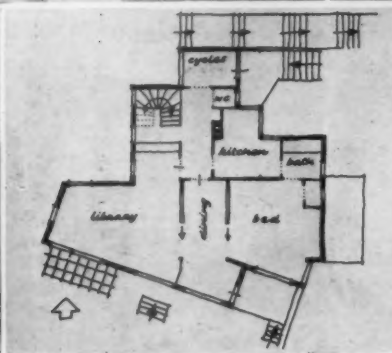
Meanwhile we have to accept the fight between the traditional and modern schools which is being fought in all countries, and perhaps has always been fought throughout history. We bear no grudge against the men of yesterday and the day before, though we do not see how they can be so blind to the developments of our own time, but we do object to fanatics who claim that they alone are building for the future.

MUNSTER

before



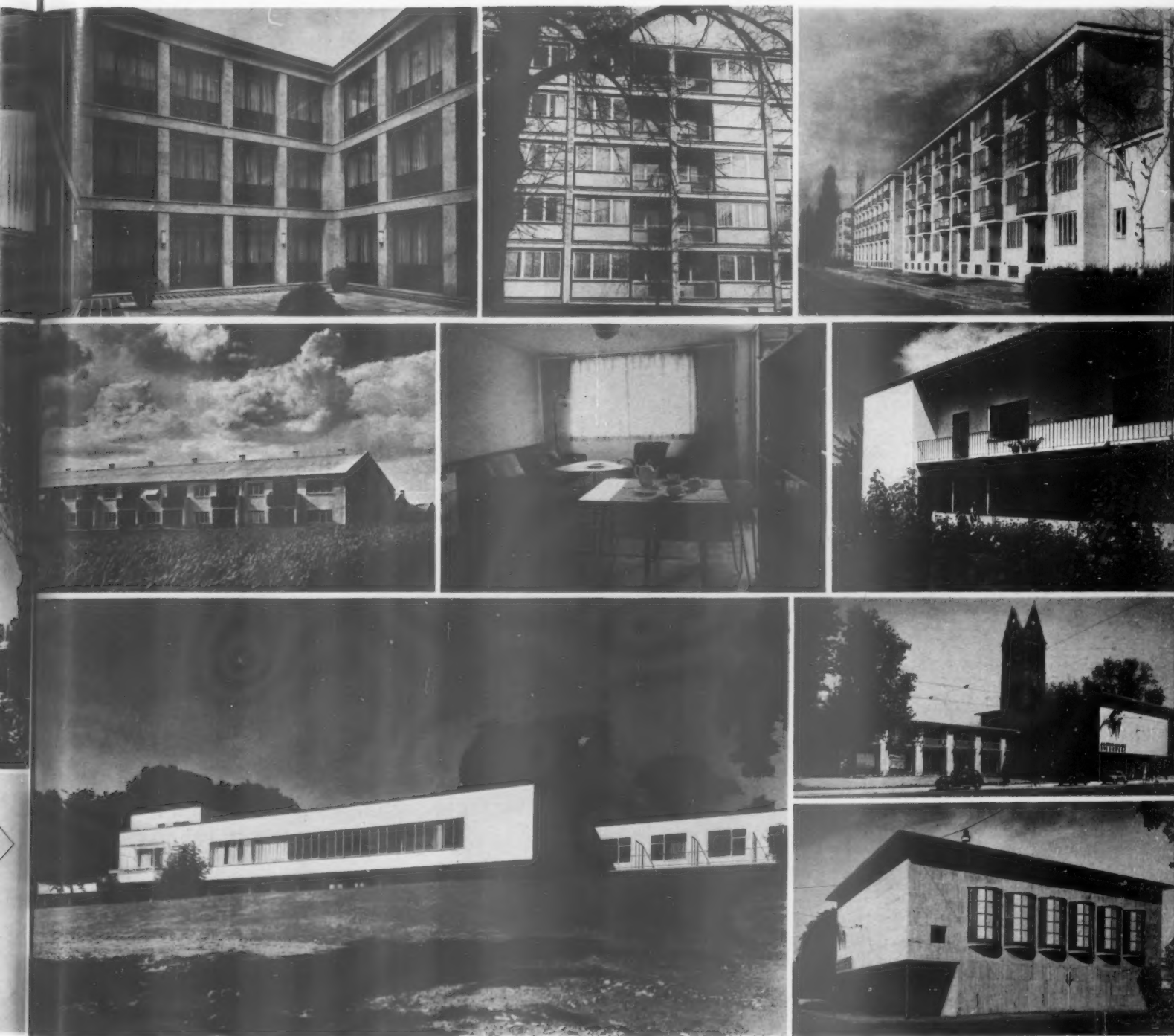
A doctrinaire example of the archeological approach to reconstruction, the Prinzipal Markt in Münster; a weak effect produced by watered down detail and silhouette.



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1, Church at Mainz. 2, Interior of a church at Cologne by Otto Bartning. Both of these churches were designed for the Reconstruction Group of the German Protestant Church Council, for whom the same architect completed a number of emergency rebuilding projects in West Germany. The walls were normally built of reclaimed rubble from bomb-debris, and the interiors and roof-structures were of prefabricated units. 3, Cinema in Cassel by Paul Bode, in the sweeping curvilinear tradition which, in Germany, goes back ultimately to Poelzig. By the same architect, and also in Cassel, is the shop front, 4, with a retractable and adjustable sun-screen of aluminium and glass, actuated by an electric motor. 5, Three-storey block of flats 'Am Park' by the brothers Conlè. Intended for low rental occupation by single women, the small flats are self-contained, but bathrooms and W.C.'s are communal. 6 and 7, George C.

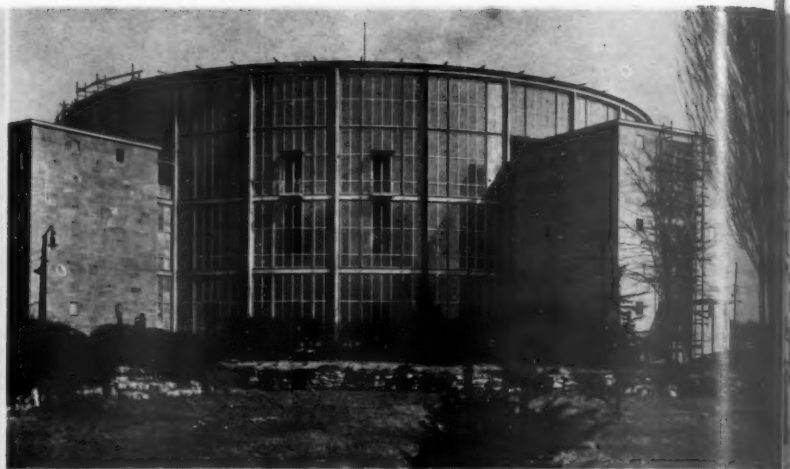
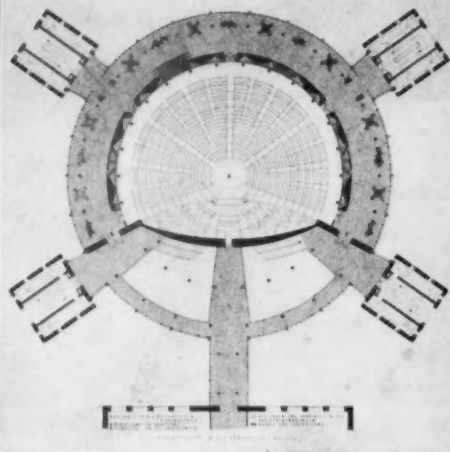
Marshall House at the Berlin Industries Fair of 1950 by Bruno Grimmek. This exhibition building, designed for the ERP exhibit, with its large areas of glass and rather precise detailing, is typical of a whole school of post-war work in Germany. 8, 9 and 10, two houses at Biberach near Ulm, by Hugo Haering. More personal, not to say idiosyncratic in style, they represent the work of Germany's most convinced proponent of an organic style. Haering eschews the use of the rectangle wherever possible, dismisses technical considerations to a secondary level and tries to adjust his work as closely as possible to the needs of site, sun, landscape and his client's habits of living and working. 11, the Trinkhaus Bank, Düsseldorf, by Hentrich and Heuser. This view of the interior courtyard shows an example of the 'middle style' of some years back, with a degree of traditional classicism about



it, but as it might have been seen through the eyes of a pioneer modernist like Peter Behrens. 12, Employees' housing for the Deutscher Laender Bank at Frankfurt am Main, by Hebebrand, Freiwald and Schlempp. Besides these box-framed five-storey flats with gallery access on the other side, the scheme also includes four-storey blocks, with two flats per landing. 13, Flats in Karlsruhe by Willi van den Kerkhoff, a continuation of the famous Dammerstock scheme of 1931. The architect has now been called to work on housing schemes at Bogota in Colombia. 14, Terrace Housing at Crailsheim, Württemberg, by Heinrich Lauterbach. The architect has a long-established and well-founded reputation in the field of housing, and this scheme was erected in collaboration with the 'Housing and Construction' research group of Stuttgart. Lauterbach has also worked on the furnishing and equipment of small houses,

and 15 shows an interior in the Crailsheim scheme. 16, architect's own house, near Munich, by Franz-Xaver Holzbauer, one of the few Munich architects with a contemporary outlook, so that his recent death is much to be regretted. The apparently traditional eaves and balcony are required for sunscreening on this south facade. 17, Osnabruck X-ray Institute by Emanuel Lindner—a purely contemporary design which has met with general approval, even from traditional critics. The institute was erected in six months for the X-ray scientist, Professor Albrecht, on his flight from the eastern zone. 18 and 19, the British Centre (Die Brücke) in Cologne, by Wilhelm Riphahn. The architect is an 'Old Guard' modernist who worked on the Dammerstock scheme; here he has had to solve the complex planning problems of a multi-purpose cultural centre in a dignified yet friendly way.

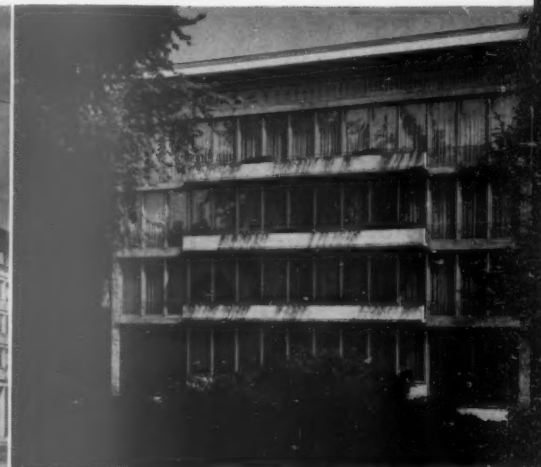
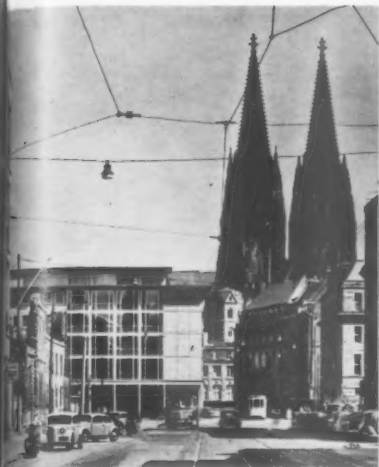
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20, A new Suspension Bridge across the Rhine, joining Cologne to Mulheim; an extremely successful design, with its clear-cut outline and careful attention to detail in the design of accessories such as lamp-posts and railings. 21 and 22, Auditorium in Frankfurt by Gerhard Weber. Originally conceived and built to house the Federal German Parliament (which eventually settled in Bonn instead) this magnificent circular hall has now passed into the hands of the Broadcasting Corporation, who may adapt it to completely different purposes. 23, Parliament Buildings in Bonn, by Hans Schwippert, assisted by Stefan Leuer. The main parts of this complex of buildings are well known, but the office wing shown here is more recent, and is a good example of current German steel-frame practice. 24, Terrace houses in Hanover, by Konstanty Gutschow, a good example of the kind of house-types created by the American-sponsored E.C.A. competitions in various

parts of Germany. 25, Klufterhof housing scheme near Godesberg, by Eugen Blanck and Walter Kratz. An example of the kind of housing being built in the area around Bonn to house government and occupation officials. 26, The Süd Office block in Frankfurt am Main, by Assmann and Bartolmes. This block was conceived as a bridgehead in conjunction with the first new bridge across the river Main and is typical of a style that has become very general. 27, Apartment block in Munich by Sepp Ruf. A high building in what was once a very monotonous district; the open verandahs catch the winter sun, and afford views towards the Alps. 28, Grindelberg flats in Hamburg, by Hermkes, Hopp and Jaeger, Lodders, Sander, Strelb, Trautwein, and Zess. This scheme was originally put in hand for the British occupation authority and later handed over to the city of Hamburg, who have since built further blocks. 29 and 30,



Chamber of Commerce building, Cologne, by Karl Hell. The courage required to place so resolutely modern a building in so traditional a setting has not always been available in Germany, but here—perhaps because of the new building's beautiful detailing and freedom from over-emphasis—the experiment has been an undoubted success, and a credit to both the architect and Rudolf Schwarz, the city-planner. 31, Glass Industries House in Dusseldorf by Bernhard Pfau. As with other buildings of this type, the exterior must advertise the wares of the proprietors, but it is done here with commendable restraint, the undifferentiated glazing being relieved by stone end walls and facings, and coloured aggregates in the edges of the concrete floor slabs. 32, School in Bergzabern by Johannes Krahn, for the children of members of the French occupation authorities. The single-storey school is regarded in Germany as an Anglo-Saxon importation and although there

has been some opposition the type is rapidly gaining in esteem. 33 and 34, Three-storey school in Baden-Baden by Johannes Krahn, for the French Services Techniques, and a good example of his characteristically fine detailing. 35, Transport and Communications Exhibition, Munich, 1953; Architects in charge, Eduard von der Lippe, Alex von Branca. Here, too, one may suspect Anglo-Saxon influence but the quality of the detailing is unmistakably German. 36, Forest-School in Leverkusen by the City Architects Department (Architect, Paul Seitz). The single-storey type is firmly enjoined by the Baden-Wurtemberg Education Authority for all rural districts. The increasingly rapid rate of building in Germany makes an exhaustive survey of recent work impossible. However, one of the most notable omissions, the factory at Blumberg by Egon Eiermann, was fully illustrated in THE ARCHITECTURAL REVIEW for June, 1953.

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pont cysyllte **1**



chirk **2**



menai **3**



conway **4**

R. J. M. Sutherland

TELFORD

AN ENGINEER'S ANALYSIS OF HIS BRIDGES AND AQUEDUCTS

In the eighteenth century engineering was almost entirely empirical. After 1800 it became more scientific, but even then theory, as we know it today, crept in only slowly. In the transitional period at the turn of the century the engineers started more or less from scratch, finding the strengths of their materials by experiment, trying out their ideas on models and finally designing, not only the complete structures, but almost every detail of the plant required to build them. They had no standard parts and neither graphs nor handbooks to provide short cuts. They began as craftsmen and developed their theory from experience, rather than starting with the theory and gradually finding its practical use. Even the books they read gave little but unrelated observations.

These men were not only versatile and inventive, but they had great faith, in their own power, in scientific progress—its desirability was unquestioned—and also in iron. Iron went to their heads—anything previously impossible could be done with it—and iron generally meant cast iron. Perhaps it is a good thing that some of the more grandiose schemes of the time never materialized. Telford's proposed 1000 foot wrought iron suspension bridge at Runcorn was structurally unsound, his cast iron arch of 600 foot span would have been a bold gamble and Tredgold's suggestion that cast iron should be used for the cables of suspension bridges is horrifying. But wild as some of their ideas may have been, no engineer was ashamed to change his mind even when the work was well advanced.

Telford was born in 1757 and superficially he fits the general pattern. He started life as a stone-mason, was almost entirely self-educated and with any problem always preferred a practical to a theoretical solution. He revolutionized masonry technique

and was one of the foremost pioneers of iron construction. Of his versatility there is no doubt. As well as practising in every branch of engineering, he wrote poems, practised as an architect, dabbled in archaeology and politics and was the first president of, and largely responsible for founding, the Institution of Civil Engineers. His poems are not memorable and his understanding of architecture went little beyond the copy-book stage; but it is surely sufficient praise to say that he was probably the greatest civil engineer that this country has ever had and that his interests extended far beyond the limits of his profession.

1, pont cysyllte

The valleys of the Dee, at Pont Cysyllte, and of the Ceriog, near Chirk, presented by far the most formidable obstacles on the line of the Ellesmere Canal. To build locks down into each valley was undesirable and scarcely possible; apart from engineering difficulties caused by the steep slopes, the delay to traffic, and even more vital, the loss of water would have detracted greatly from the value of the canal. Clearly the only feasible solution was to build a high-level aqueduct straight across each valley; but aqueducts on such a scale were quite outside the experience of the canal engineers of the time. The normal aqueduct was then little more than a masonry bridge with the parapet walls raised and thickened and the whole lined with puddle clay—a very massive form of construction imposing heavy loads on piers and foundations.

Here the valley of the Dee is 2,500 feet wide, with a steep slope on the north side and a more gentle one on the south. Of this width 1,500 feet on the south side was filled with an earth embankment reaching a height of 75 feet—in itself no small undertaking—leaving about a thousand feet and the river to be crossed by the aqueduct. With piers over 120 feet high

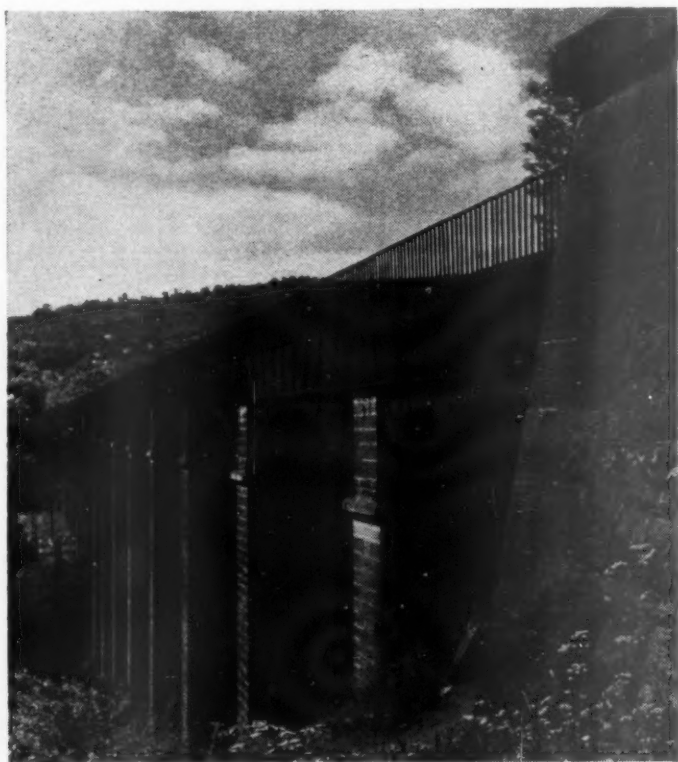
the conventional construction was out of the question. Something very much lighter was needed.

In 1795 Telford had used a cast-iron trough supported on cast-iron columns to carry the Shrewsbury Canal over the River Tern. The success of this, the first cast-iron aqueduct, prompted him to use the same principle on a far larger scale at Pont Cysyllte; but this time to support the trough on cast-iron arch ribs spanning between masonry piers. The saving in weight over



Telford's cast-iron aqueduct of 1795, the first of its kind, carrying the Shrewsbury canal over the River Tern.

the traditional construction was enormous. In fact, slenderness and lightness are the outstanding features of the whole aqueduct. The piers are not only slim but hollow above the first 70 feet, the



PONT CYSYLLTE 2, general view showing the extreme economy of materials used. The trough section has been reduced to a minimum: the masonry piers are hollow above the first 70 feet. 3, view at canal level. The towing path is placed over the water to reduce resistance to boats.

section of the trough has been whittled down to a minimum and the only superfluous weight is that of the spandrel panels on the outer arch ribs; these panels are just lightly bolted on and, having no structural value, can only be an understandable concession to æsthetics. Width, as well as weight, was a vital factor in the design—with such tall piers even an extra couple of feet in their width would have added thousands of pounds to the cost. In order to keep both the overall width and the resistance to boats as low as possible, Telford placed the towing path over the water, supporting it on iron columns resting on the bottom of the trough, thus giving just enough clearance for a boat, whilst allowing a free passage below the towing path for the displaced water.

In all, Pont Cysyllte aqueduct took ten years to complete, and nothing was left to chance. The workmanship is faultless throughout. The piers are a lesson in masonry, the trough is beautifully fitted together and the handrails are firm and graceful—a perfect example of the good functional 'trim' featured in THE ARCHITECTURAL REVIEW of January, 1950. Like so many cast-iron structures, Pont Cysyllte virtually defies mathematical analysis and it is hard to say, by modern standards, just how 'efficient' the design is. However, few would deny that, considering its date, it is a very bold structure indeed.

2, chirk

It is often implied that Chirk Aqueduct shows the transitional stage between the old puddled channel type of aqueduct and the later development of the cast-iron trough of Pont Cysyllte. This is not so. Pont Cysyllte is the direct descendant of the Tern Aqueduct of 1795—the similarity between the two troughs can be seen at a glance. Telford and Jessop considered the use of an iron trough at Chirk, but they rejected the idea, presumably on grounds of cost; with a height little more than half that of Pont Cysyllte the problem of the piers and foundations was less crucial. In the end they produced a compromise between the two systems, using masonry arches, a cast-iron bottom for the canal and masonry side walls, the last being made impervious with a layer of hard burnt bricks set in Parker's cement. The elimination of the puddle-clay lining reduced the weight and the adoption of Telford's favourite arrangement of longitudinal walls instead of solid spandrel filling cut in still further.

In comparison with Pont Cysyllte, Chirk Aqueduct is disappointing. Not only is its random rubble less attractive than the beautiful ashlar of Pont Cysyllte, but the whole structure is much heavier. It has none of the breath-taking unlikeliness of Pont Cysyllte. The later addition beside the aqueduct of Chirk Railway Viaduct, of finer masonry and grander proportions, has done nothing to reduce this unfavourable impression.

3, menai

In 1785, the question of bridging the Menai Straits was first raised in Parliament. In 1801 John Rennie was consulted and put forward four schemes, all based on cast-iron arches. He expressed doubts about the possibility of erecting sufficiently firm centering for the arches, and in the end nothing was done. In

	PONT CYSYLLTE	CHIRK
Engineers ...	Thomas Telford, with William Jessop as Consultant.	
Dates ...	1795-1805.	1796-1801.
Length ...	Aqueduct : 1,007 feet. Embankment : 1,500 feet.	710 feet.
Height (canal water level to river water level)	127 feet.	70 feet.
Width ...	11 feet 10 inches wide trough with 4 feet 8 inches towpath, leaving 7 feet 2 inches clear waterway.	11 feet wide waterway with 5 feet 6 inches of masonry on each side.
Depth of water in canal (over aqueduct)	About 5 feet.	About 5 feet.
Arches ...	Nineteen, each of cast-iron spanning 45 feet.	Ten, each of masonry spanning 40 feet.

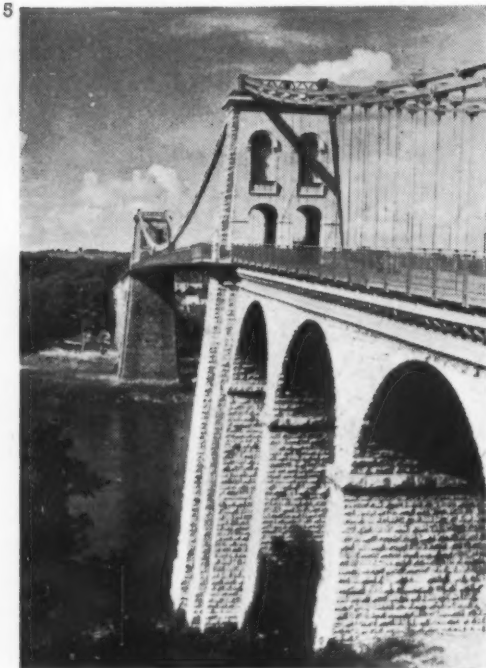


CHIRK This aqueduct has masonry piers and trough walls. Only the trough bottom is cast-iron. It lacks the grace of Pont Cysyllte, particularly in contrast with the grander railway viaduct, of a later date, standing beside it.

1810, Telford was asked to report. He proposed a single cast-iron arch of 500-foot span, to be erected on a novel system of suspended centering, which got over Rennie's main difficulty. Although he was fully confident of the practicability of his system and his estimate was less than half the lowest of Rennie's, again nothing was done. In 1815, an Act to improve

the Holyhead Road was passed and a commission appointed. Two years later the Commissioners asked Telford to design a suspension bridge similar to that which he had proposed for Runcorn Gap. In 1818, his design was approved by Parliament.

The most curious feature of this bridge is that on the approach spans the road is apparently supported both by suspension cables and by massive masonry arches. If cables are sufficient for the centre span, why not also for the shorter approaches? The answer is that Telford changed his mind. Originally, he had intended to use these arches, not only to support the road, but also as anchorages for the cables, which were to be fanned out on the landward sides of the main towers and each fixed to the masonry at a different point.



Telford's suspension bridge over the Menai Straits, opened in 1826.

When he decided to extend the cables and anchor them into solid rock, the piers for the arches were already partly built. To make the best of this redundancy he tied the cables down over the approaches with normal suspension rods, thus giving them a curvature similar to that in the centre span, where they really support the road. The functionalists may condemn this

as sharp practice, but it has some slight technical advantages and these curves certainly improve the appearance of the bridge.

Another major change which Telford made was in the suspension cables themselves. At first he proposed cables each made up of 36 small iron bars—a system similar to the modern practice of making suspension cables of thousands of strands of wire. At the time there was no method of making a continuous wire or rod and Telford eventually changed over to the eye-bar link type of chain, invented by Sir Samuel Brown a few years before; perhaps he was not sure of the strength of the numerous welds which would have been necessary with the first arrangement and he would certainly have found such a stiff cable difficult to erect.

The rest of the design is straightforward. The main towers were made hollow for the greater part of their height—Telford had an almost fanatical distrust of rubble-cored masonry—and in the more slender parts above the road not only was each block doweled but iron ties were fitted lest the arches over the

carriageways should spread. Sixteen cables were used, arranged in tiers of four, one tier on each side of the deck and two in the centre. The ends of the cables were carried down through tunnels into the rock, and at the towers each cable was fitted to a separate cast-iron saddle, mounted on rollers, to allow it to move freely.

The one great defect was that the deck was almost completely unstiffened, and this was a constant source of trouble until the recent rebuilding. Earlier suspension bridges had been so small that the effects of wind had not really been noticeable; Telford does not seem to have considered them. In a storm a few days after the opening the deck was damaged and a few of the suspension rods were broken. Ten years later the bridge was again damaged by wind, on this occasion the bridge-keeper reporting a vertical movement of 16 feet in the deck. He probably exaggerated, but no one who has seen the film of the failure of the Tacoma Bridge in America will have any doubts about what can happen to a suspension bridge in a high wind.

In 1839, in a more violent gale, almost all the outer suspension rods were broken and the deck was completely smashed, parts of it falling into the sea and others left dangling from the remaining suspenders. After this disaster Provis, who had been Telford's resident engineer during the construction, designed a new and better deck, which in turn was replaced in 1893 by a steel one designed by Sir Benjamin Baker. Even this was too flexible, and in 1906 the lattice parapets were rebuilt in the hope that they could be made to act as stiffening trusses. They did not. By the nineteen-thirties it had become necessary to do something more drastic. The loading then permitted, although twice that allowed for by Telford, was still quite inadequate for modern traffic, and the cables, which except for the replacement of individual links had remained unchanged, were beginning to show their age.

The bridge was largely rebuilt by Sir Alexander Gibb and Partners between 1938 and 1940, and it is to their credit that at first sight the rebuilding is scarcely noticeable—one of the Ministry of Transport's conditions was that the appearance of the bridge should be altered as little as possible. Some iniquitous suggestions had been put forward from time to time including a proposal to replace the centre span by a reinforced concrete arch; but in general engineers are sentimental about the Menai Bridge, and have always been loath to change it.

There had been objectors to the scheme for a Menai Bridge ever since its first suggestion. They said that the bridge would make the navigation of the Straits impossible, and, although some may have believed this, others were probably more concerned about the effects of the new through-route on certain local trades. The objectors became so insistent that in 1818, shortly after work started, the Commissioners were forced to get a fresh Act passed defining their powers more exactly. All but preparatory work stopped until this Act was passed in the following year.

On August 10, 1819, Provis quietly laid the first stone. With rock available everywhere at a reasonable depth for the foundations, the masonry presented few

difficulties; however, its volume was large and there was no suitable stone nearer than the north coast of Anglesey, some ten miles away. Landing stages had to be built both at the quarries and at the bridge, and a fleet of ships provided to carry the stone. In bad weather progress was erratic; several of the ships were wrecked, and, as the majority of the masters would not venture out at all when it was rough, dressed stone piled up at the quarries and the masons at the bridge were forced into idleness.

After about three years it became obvious that the work would not be finished by 1823, the date fixed by the Act of 1819, and yet another Act of Parliament was passed fixing the completion date as July, 1825; this last Act also gave the Commissioners power to close the Straits to shipping while raising the chains.

All the ironwork was supplied by William Hazeldine of Shrewsbury. Before despatch each link was tested for size and strength and 'rustproofed' by immersing it, when hot, in an oil bath and heating it again on removal until the oil dried on the surface.¹

The operation of greatest interest to the public, and worst anxiety to Telford, was the fixing of the first chain. The lengths of chain over the approach arches were assembled in their correct positions on scaffolding and their lower ends were secured in the tunnels. On the Anglesey side the chains were stopped at the main tower, but on the Caernarvon side they were continued down the face of the tower almost to water level. Two large capstans with appropriate blocks and tackle—all carefully tested—were built on the Anglesey shore, and the centre section of the first chain was assembled on a 400-foot raft. The plan was to float the chain into position between the towers at high tide, attach one end of it to the appropriate length hanging from the Caernarvon tower and raise the other to the top of the Anglesey tower by means of the capstans. This required exact timing, as the tidal current in the Straits is very strong except at slack water. One trial run was made with the raft and the date of the event was fixed. A vast crowd collected on both shores and in boats to watch. The raft moved smoothly into position, the connections were made and 150 men, moving to the time of a fife band, turned on the capstans. When the chain first hung free the crowd broke into wild cheers, and an hour or so later, after the final connection had been made and approved by Telford, the cheering broke out again. A little later two men, evidently anxious to be the first to cross the bridge, clambered over on the single chain. The day ended happily enough with free beer for all the workmen.

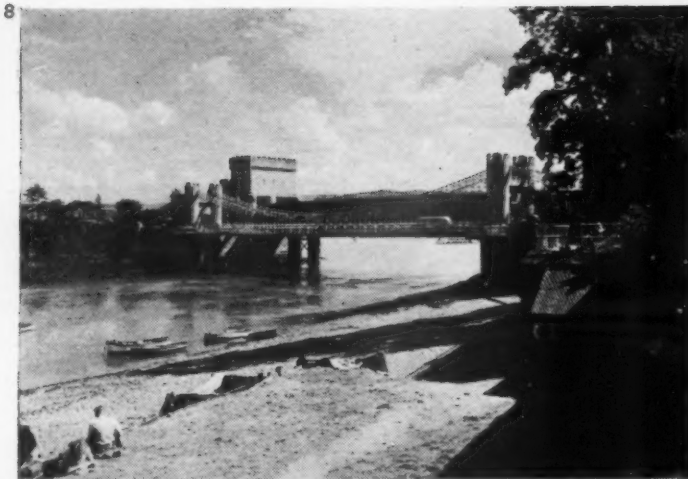
The other chains were raised in the same way without serious mishap, and the rest of the work was then mere routine. The bridge was opened on January 30, 1826.

As it was never intended to alter the character of the bridge, little need be said about the rebuilding

¹ Thus the White Knight's 'design,' in *Alice through the Looking Glass*, 'to keep the Menai bridge from rust by boiling it in wine' is not so far removed from sense as it appears.

MENAI Although the bridge was largely rebuilt between 1938-40 its appearance has remained unchanged except for the addition of the stiffening trusses, 6, and the cantilevered platforms carrying footpaths, 7. The main towers (see 5 on the facing page) are hollow for the greater part of their height: in the slender parts above the roadway each block is dowelled and fitted with iron ties.





CONWAY 8, a general view of the Conway suspension bridge, which was completed in 1826. Behind it stands Stephenson's tubular railway bridge of 1848, virtually destroying the clear silhouette of the suspension bridge. Though on a smaller scale the ironwork is almost identical with that designed by Telford for Menai.

except to show how the new bridge differs from the old. The masonry is virtually unchanged. The original 16 chains have been replaced by four stronger ones of the same type and with the same curvature. The deck with its stiffening trusses is new, as are the cantilevered platforms which carry the footpaths past the towers. It may be objected that these platforms break the vertical lines of the towers, and the stiffening

	MENAI		CONWAY
	As originally built.	After Reconstruction.	
Engineers ...	Thomas Telford, with W. A. Provis as Resident Engineer.	Sir Alexander Gibb & Partners (Engineers for reconstruction).	Thomas Telford, with W. A. Provis as Resident Engineer.
Dates ...	1819-1826.	1938-1940. (Dates of reconstruction.)	1822-1826.
Distance between points of support of cables	580 feet.	580 feet.	327 feet.
Dip in cables	43 feet.	43 feet.	22½ feet.
Height of deck above high water	100 feet.	100 feet.	15 feet.
Road width	Two 7½-foot carriageways and one 4-foot footpath.	Single 23-foot carriageway and two 5-foot footpaths.	Single 17½-foot carriageway (no foot-path).
Cables ...	Sixteen, each of 16.25 sq. inch cross section. (Wrought iron.)	Four, each of 105 sq. inch cross section. (High tensile steel.)	Eight, each of 16.25 sq. inch cross section. (Wrought iron.)

trusses would certainly be neater had they been welded instead of riveted; but otherwise there is little cause for regret.

All the rebuilding was done without closing the bridge. The new deck was built below the old and raised into position. Single-line traffic was necessary for only five days during the change-over from one deck to the other.

4, conway

Opposite Conway Castle the river narrows and is divided into two channels by a small island. Telford blocked the broader eastern channel with an embankment and, having concentrated the flow into the western channel, bridged this with one clear suspended span.

The Menai and Conway Bridges have much in common. Their early histories are almost inseparable, and both were eventually built by Telford under the Holyhead Road Act of 1815. The design of the ironwork is almost identical in each case; but at Conway almost everything is on a smaller scale.

For a few years the slender cables of the Conway Bridge must have contrasted delightfully with the mass of the castle; but the railway age was no kinder here than at Chirk. When Robert Stephenson's Tubular bridge was built in 1848 the clear silhouette of the suspension bridge was destroyed. Later the scene was further confused by the addition of an untidily suspended pipe between the two bridges.

Of these four, not one is the first example of a new technique; but they are all amongst the first of the great engineering projects which had become so familiar by the middle of the nineteenth century. They came fresh to an age not yet satiated with railway wonders, and they provide grounds enough for Telford's quiet boast² 'But, Gentlemen, allow me to observe, we do not consider any thing impossible.'

² When consulted about a bridge at Budapest in 1832.



1, the new block from the north-east, showing covered staircase linking the old block to the new.

2, interior of covered staircase link.



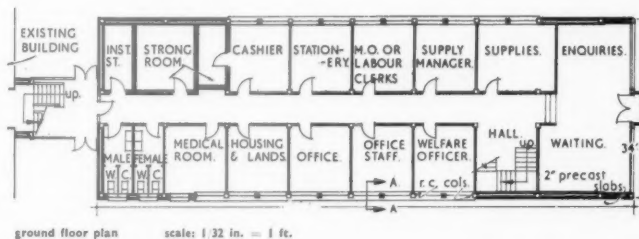
OFFICES AT CLACKMANNAN, SCOTLAND

ARCHITECT: EGON RISS, Production Architect, National Coal Board (Scottish Division)

This office block for the Scottish Division of the National Coal Board is an extension to an existing block. It is the first part of a proposed development of the Alloa area headquarters. The block has three floors, each with a central access corridor flanked by offices on either side. It is linked to the existing block by a staircase enclosed in glass which has prevented any restriction of light in the old offices. The offices of the chief surveyor and the chief planner who work in the building have each a glazed wall overlooking a drawing office.

The structural frame is of reinforced concrete with continuous beams at ground

floor level and in situ ribbed concrete floors and roof. External panel walls are 13½-inch cavity brickwork (4½-inch cavity); 9-inch by 9-inch structural columns are concealed



in the thickness of the inner skin and cavity and thus provide a flush wall finish internally. Internal partitions are of 4½-inch brickwork.



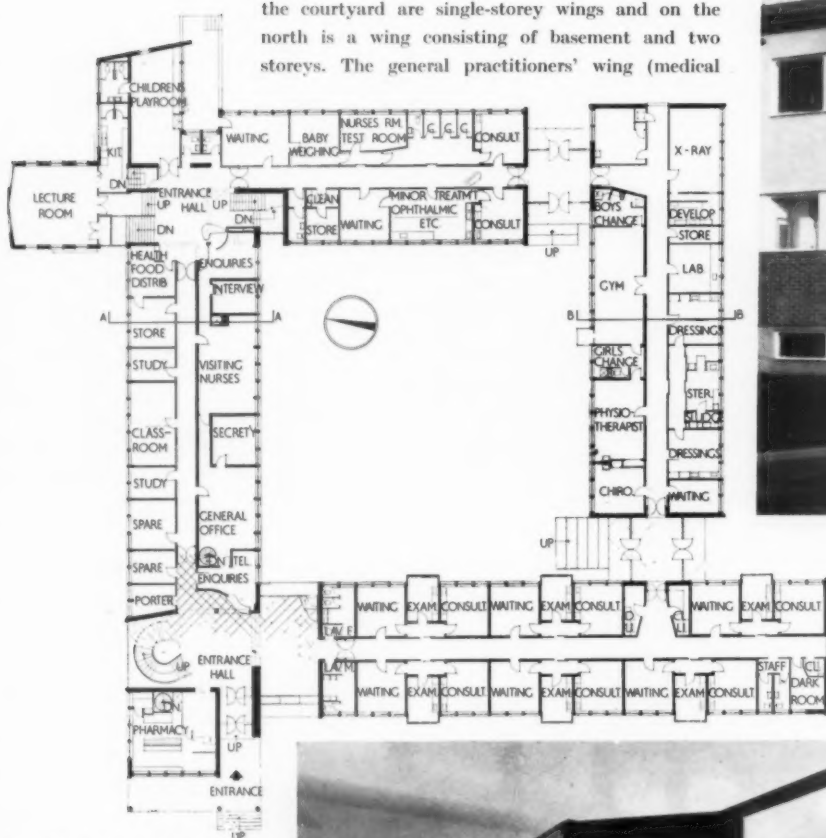
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HEALTH CENTRE AT SIGHTHILL, EDINBURGH

ARCHITECT: ROBERT GARDNER-MEDWIN, Chief Architect, Department of Health, Scotland

This is the first health centre to be completed in Scotland. It has been designed to serve an eventual population of 20,000.

The centre stands on two acres of land which slopes gently from south to north, and is built round a garden courtyard. On the west, south and east of the courtyard are single-storey wings and on the north is a wing consisting of basement and two storeys. The general practitioners' wing (medical



ground floor plan scale: 1/48 in. = 1 ft.

3 and 4, the administration and dental unit block. 4, is a continuation of the same view as 3. External cladding of bay windows is W. African afrormesia. The concrete facing blocks to the basement have been acid washed to expose the aggregate. 5, the pharmacy.



5



unit on plan) contains six suites, each comprising waiting room, consulting room and examination room. The maternity and child welfare wing contains a waiting room, baby weighing room, changing room and consulting rooms. (For the school health service there is a waiting room, treatment room and consulting room.) This wing has an entrance with covered parking space for perambulators. It also includes a lecture room, with a demonstration kitchen, a play room, an enquiry office and a distribution counter for health foods. The area is 6,462 sq. ft. Situated between the general practitioners' wing and the maternity wing is a joint services wing which contains X-ray facilities, sterilizing and dressing rooms, a laboratory and a physiotherapist's suite with gymnasium for remedial exercises. The dental wing, which is situated on the first floor, contains four surgeries, two of which are operated by the local authority. One of the local authority surgeries will be equipped for treating children. There are three waiting rooms and a recovery room, also a dental workshop and a dental X-ray and dark room.



6, a staircase in the junior classroom wing. 7, the dining-room and terrace from the north-west. 8, a general view from the south-east.

PRIMARY SCHOOL AT ST. PAUL'S CRAY, KENT

ARCHITECT: ELIE MAYORCAS in association with S. H. Loweth, County Architect

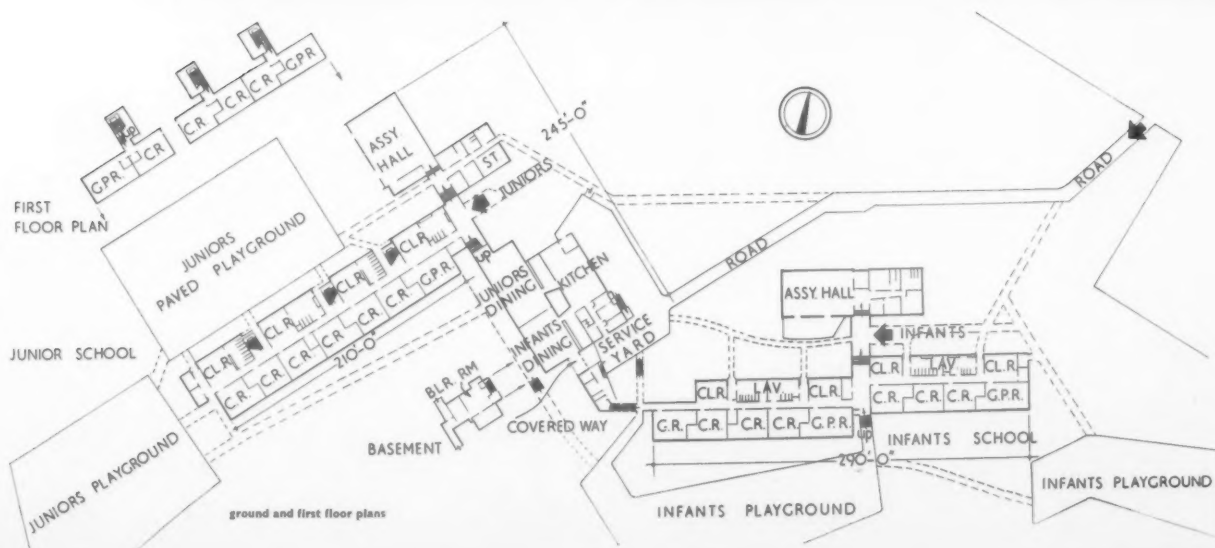
These junior mixed and infants' schools for the Kent Education Committee are both three-form entry schools; one for 520 juniors, the other for 360 infants. The two schools are linked by a covered way and share a kitchen. Later, a two-unit nursery school will be added. The first floor classrooms in the two-storey junior school are approached in pairs by staircases, thus avoiding an upstairs corridor and allowing cross lighting in ground floor classrooms. The construction generally is a combination of light welded steelwork and load-bearing brickwork. In contrast to the rest of the school the dining room has a reinforced concrete in situ frame supporting a shell concrete barrel roof. Foundations are of mass concrete with R.C. ground slabs and precast trough units for suspended floors. Internal partitions and panel walls are 4½-inch sand lime brickwork, increased to 9 inches and 13½ inches externally, where load bearing. Roofs are of light welded steel trusses or welded steel bar joists with mainly 2-inch woodwool slabs supported on mild

steel tees. Staircases have precast R.C. treads on in situ R.C. spine beams. Insulation board ceilings have been sprayed with water emulsion paint and the soffit of the dining room roof is sprayed with a material which gives sound and thermal insulation and has a 'sand' texture. The external cladding of corrugated asbestos sheeting is fixed direct to light steel frame or timber studding. Internally, walls are plastered only in assembly halls, administrative rooms and in the kitchen. Elsewhere decoration is applied direct to brickwork either in the form of glazed rubber chlorinated paint or water emulsion paint.



7

8





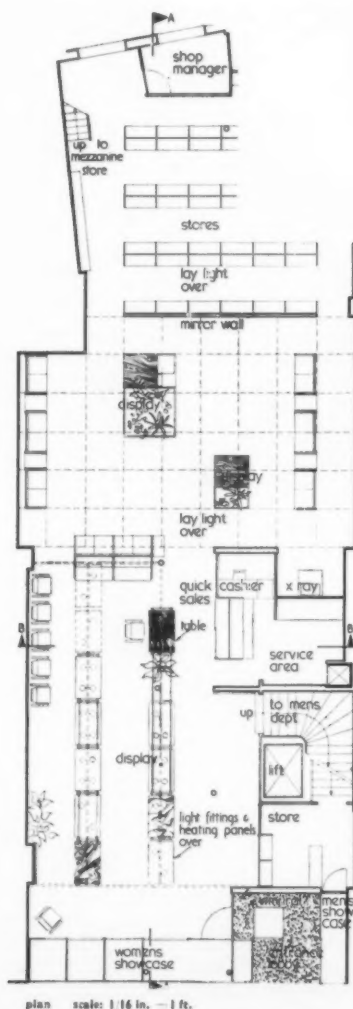
9, the façade facing New Bond Street. 10, below inset, shop front before redecoration.

SHOP IN NEW BOND STREET, LONDON

ARCHITECTS: CHAMBERLIN, POWELL AND BON

The original premises for the London Shoe Co. were designed in 1910 although the façade was redesigned in 1935 by Mallet Stevens (see photograph inset). Shelves for shoe boxes lined every wall from floor to ceiling and chairs, fitting stools and showcases were spread informally. In the new layout the shop has been divided into the entrance and display area at the front, the service and quick sales department, the fitting room and the storage area.

In the re-planning, the main showcase has been set back so that people can view the display at ease when the pavement becomes congested. The front and back, as well as the top, of this showcase are glazed to counteract reflection and allow the shop interior to be clearly visible from outside. There is a wide entrance lobby, backed by a mural designed by Augustus Lunn. The service centre, located between the display area and the fitting room, is arranged so that clerical work, wrapping of purchases and shoes for repair are kept out of view of customers. The screen dividing fitting room and storage area is faced with mirror glass. Colours used had to be related to the existing green carpet. Four shades of grey, with a fairly wide separation of tones, and lime, provide the general background on walls and partitions. The suspended heating panels in the display area are painted yellow and are in contrast to the deep blue ceiling, as well as acting as light reflectors. (All colours are based on the Munsell range.) Mahogany framing is black french polished; the display trays are verde antico, black and gold, Swedish green and Bois jourdan marbles and $\frac{1}{4}$ -inch polished plate glass. The seating units have loose covers in striped satin on latex foam upholstery. The glazing of the fitting room laylight is reinforced glass ply.



WORLD

LONDON'S SOUTH BANK

The reconstruction scheme for the South Bank area, previously occupied by the central exhibition of the 1951 Festival, was approved by the LCC last month and represents a notable victory for imaginative planning. It is a great advance on any of the previous official proposals for treating this key area of central*

London. Not only is the area designed as a whole (in marked contrast to, for example, the City, where sites are being developed piecemeal with little regard to the overall picture or the effect of each building's height on its surroundings); but the area has also been designed with proper regard for the moving viewpoints provided by the curve of the river, from which a lively, changing, three-dimensional composition of vertical and horizontal planes will be obtainable. The conception is an exercise in *townscape* in the best sense in which the REVIEW customarily employs the word, and as such has clearly been influenced by the lay-out of the South Bank exhibition, highly praised in 1951 as an example of informal planning in the best English picturesque tradition.

The LCC architects and planners, who are responsible for the design, had as the one fixed element in their scheme (apart from the line of the river front, with its garden promenade, and the layout of roads and bridges bounding the site) their own Royal Festival Hall, completed nearly three years ago. The freedom with which they have now planned the rest has only been made possible by the decision of a year or so ago not to build Government offices next to County Hall and the consequent and more recent decision to remove the projected National Theatre from the site, first booked for it, between the Festival Hall and Waterloo Bridge, where there was not enough space to prevent these two monumental buildings competing with each other, and where their adjoining building-lines would have set in train a two-dimensional building frontage, making more difficult the development of the area in depth.

The National Theatre has been given a new site at the upstream end of the area, near County Hall, where it can play the useful part of an isolated element in the

whole composition and where the probability of its not being built for some years will not endanger the visual effectiveness of the whole scheme as it progresses.

The basic conception of the composition is a series of inter-connecting squares and enclosed areas, providing spacious settings for a number of important civic and commercial buildings, and giving the greatest variety of views of the river from all parts of the site.

A promenade connects the buildings at first-floor level and gives freedom of movement for pedestrians without interference from vehicular traffic. Below this horizontal plane is a layout of gardens and paved areas, and over it rise the various buildings which are asymmetrically placed about the site. It will be these buildings that will provide the changing composition as the viewpoint moves, on which the scheme's quality as townscape will depend. The climax in height is provided by a 25-storey office block closing one end of the broad open space leading to the river. This will be occupied by the Shell Petroleum Company who have taken a 199-year lease of the site.

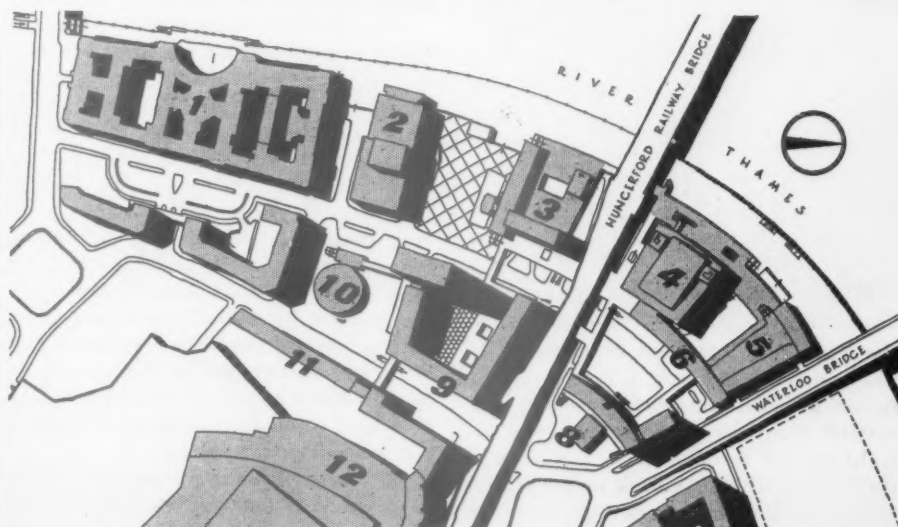
The first floor promenade is only one of several horizontal planes. At ground level there is the riverside promenade; at a lower level is the entrance forecourt east of the Festival Hall, which will now provide access also to a Government reception centre alongside the Waterloo Bridge approach and to an exhibition gallery linking the reception centre to the Festival Hall. To reach this forecourt traffic passes under the exhibition gallery. There is another forecourt upstream of Hungerford Bridge, approximately on the site of the main 1951 exhibition concourse. This links with the road levels at the

back of the site, and from it begins the traffic circulation system of the air terminal fronting York Road, the airline buses descending by means of a ramp curving beneath the promenade to an underground station and parking place.

Between County Hall and Hungerford Bridge the National Theatre and a hotel are sited on either side of a paved piazza. The hotel is magnificently placed overlooking the Thames with views over Westminster beyond. Its public rooms are spread out over a fairly large area, and their flat roofs will provide a public terrace extending the plane of the terrace in front of the Festival Hall and linked with it beneath Hungerford Bridge.

This upper terrace, laid out on top of the main floor of the hotel, from which the two bedroom wings of the hotel will rise to four and eleven storeys, will allow of an effect of great openness in the design, and ingeniously reconciles the LCC's early promise that much of the South Bank area would be preserved as public open space with the need to build over as much of it as possible, because of the high value of the land.

Similar planning on several levels, with maximum public access, is used at the back of the site, where new permanent air terminal buildings are planned, and where there will also be more office buildings, bringing the total office population on the site to about 12,000. By open planning of the ground floors of the office blocks, views of the river will be obtainable even from York Road. The plan requires the demolition of the present National Film Theatre surviving from the exhibition, but reserves space for the erection of another one nearby. The plan tentatively shows the roof of Waterloo Station used as a helicopter air-stop.



Keys: 1, county hall, 2, national theatre, 3, hotel, 4, royal festival hall, 5, reception centre, 6, art gallery, 7, 8, 9, offices, 10, airway terminal, 11, railway offices, 12, Waterloo station (possible helicopter air-stop).

* See the drawing by D. Dewar Mills on page 354.

This reconstruction scheme, important enough as a move towards the rehabilitation of a vital part of central London, and as setting a precedent for a style of planning suited to the London landscape, is made even more so by the fact that it is only the first stage of an even larger project. The next will be the development of the area downstream from Waterloo Bridge as the much-heralded Government science centre, which it is to be hoped the Ministry of Works will plan in full consultation with the LCC in order to carry on the promising planning principles that have been established in the first stage.

J. M. Richards

LETTERING

CLASSICAL IN PRACTICE

Once the tyranny of Trajan is discarded, all sorts of variations in the field of classical lettering can be used.¹ It can then be suited to place, mood and purpose. If we define classical lettering as that which is executed with the idea of finding a perfection in each particular letter-form as well as in the whole—an alphabet based on relations to the circle and the square, and which has historically been formulated in terms of shaded curves and serifs—what in practice is the difference between this idea and conformity to Trajan? It means that the proportion of height to width in the mainstroke can be varied, and that of the width of stroke from thick to thin. That



the letter forms too can be varied. The Trajanic G for instance, 1, is to my mind rather a mean letter; why should the vertical limb be so straight and come so high? Should it not end in a spur or a curl? C too, which can have so sumptuous or elegant a curve, looks unpleasantly square and prosaic: the even-armed E was

as Mr. Morison has pointed out early abandoned by typographers, and in the eighteenth century the centre arm was often carved very short, and the others long. But perhaps that is an ungainly letter. R and S too offer possibilities of wide variation in a strictly serious gambit. We need to look at more examples; for instance at Carolingian drawn and painted



lettering, 2, to my mind the most beautiful of all classical lettering, combining at its best majestic dignity with curves of exquisite sensibility—executed, one might remember, by artists with the tradition of Anglo-Hibernian eccentric letter-design behind them. Or think, too, of the mosaic inscription at Santa Sabina in Rome.² Superbly classical in its stability, though almost awkward in some letter forms.

But when does experiment overstep the mark? When is a letter too fat or too thin, shading too exaggerated, forms too individual, to be classical? The final criterion, it seems to me, is one's recognition of the intention of the artist; but it is immediately noticeable how commonly the Roman letter slips off the narrow ridge of perfection. It can fall, we know so well, into a complacent meanness (is not the inevitable consequence of using classical letters without classical intentions, pretentiousness?) but that is not I think the only possibility. Why should not the exalted mood be tempered with awareness of the limitations of actual circumstances or with kindred but less rarified emotions?

Such semi-classical lettering is surely what we want to-day. 'What is universal and international should in accordance

² Ibid., page 299.



with the judgment of Dr. Johnson be couched in Latin—and we would add engraved in classical characters.³ What is not, is surely unsuitably so recorded. As for instance a pub name; what cold comfort is suggested by the anæmic lettering of *The Rising Sun*, 3; how much more inviting (and suitable, too, architecturally) must have been, one imagines, the original art-

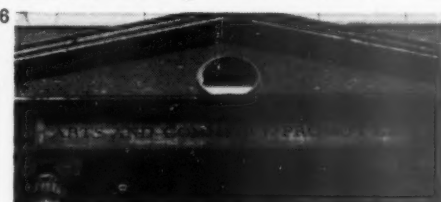


nouveau lettering suggested by the inscription of 1897. Whereas *The Clarence*, 4, has exaggerated Roman forms, which though handsome (what nice types of C and R) have a certain swagger which carries a cheery message across Whitehall,



or again while the generous proportions of Chemist and Druggist, 5, make an effective pattern on the shop front, the slightly compressed forms convey a modesty appropriate to its message.

To classical architecture, classical lettering? That is obviously suitable, but the modern world no longer builds temples to the Olympian Gods. And it seems to me that our lettering should match both the



purpose of the building and its variation on classical architectural forms. The inscription on the Royal Society of Arts, 6,

³ Stanley Morison.

¹ See *Theory of Classical Lettering*, AR, November, 1963.

BUILT BY SUBSC

7

does not take itself too seriously, both R and S are rather too gay and swagger and the cutting almost too lively and bold for perfection, but how delightful they look on that façade in a London street. *Built by Subscribers*, 7, is, if one looks too closely, rather coarse, like much Regency lettering, but how well it tells from a distance in our grey light, and how excellently the variation in section and the bulbous curves correspond with the fluted pilasters and Ionic capitals. Whereas the excessive and dreary

8



refinement of *Canada*, 8, neither corresponds well with the architecture nor reads well from a distance.

10

9



Street lettering is sufficiently permanent perhaps to call for Roman lettering. But again one sees that where mere orthodoxy is the intention the results are so apt to be lamentable, 9; if competent they are dull and rather irritating, if not they seem completely pointless. In contrast how delightful is *Trim Street*, 10, where the intention of the mason has so clearly been concentrated not on doing the letters the right way, but in cutting each time something generous and lively and pleasurable.

Nicolette Gray

EXHIBITIONS

PAINTING

During the summer the Tate Gallery and the Arts Council exhibited the finest group of Gainsboroughs ever to be brought together. The Renoir exhibition which followed was less ambitious; only the Courtauld *La Loge*, which we know so well, seriously rivalled the best of the Gainsboroughs, and the empty space in the middle of one of the end walls symbolized the absence of large compositions. The art of both masters sprang from an elated response to Nature, Rubens and Watteau, and, although Renoir is without doubt the greater of the two, his slighter representation at the Tate had the curious effect of making his show no more than an afterglow of the other.

Julian Green has remarked in his *Journal* that Renoir's 'obsession with the beauty of human flesh is so overwhelming that it appears even in his landscapes, in

TRIM STREET



1 which the soil sometimes has flesh tints,' and many works at the Tate confirmed his observation. Its most exquisite and joyous expression is to be found in the paintings of his first impressionist period, in *Lady with a Parasol*, 1, for instance, where flesh, grass and dresses become one fluid, translucent substance. In works of the linear phase, represented in the exhibition by a charming picture called *Young Girls Playing Battledore and Shuttlecock*, the obsession is temporarily in abeyance, and flesh is given the colder lustre of porcelain. But in the last, least charming, most powerful phase of all, the phase of the florid nudes—fairly well exemplified at the Tate by *Seated Bather* (1914) and *The Cup of Tea* (1916)—the obsession assumes monstrous proportions; the sanguine complexion of his favourite model spreads to the far corners of his canvases, and woman becomes a kind of huge torrid-pink dynamo at the centre of a flushed, tumescent world.

The nicely arranged exhibition of John Martin's rediscovered fantasias at White-



chapel Art Gallery would have had more point if it could have been held in 1936, the year in which the surrealists staged an international exhibition in London. It has little to do with the art of painting, but presents an interesting dossier on a somewhat jejune yearning for magical know-

ledge. His visions of colossal architecture are commonplace, and his figures are badly drawn and inefficient 'modulars,' but occasional details in the imaginary landscapes—the gruesome automatic paste smeared over the foreground of *The Last Man*, the queer, detachable high-lights on the rocks of the 'red' version of *Sadak in Search of the Waters of Oblivion*, which resemble the dripping flesh in early Dalis—suggest a genuine experience of evil. The 'blue' version of the *Sadak* picture, 2, with rocks like solid architectural follies, was the most coherent picture in the show.

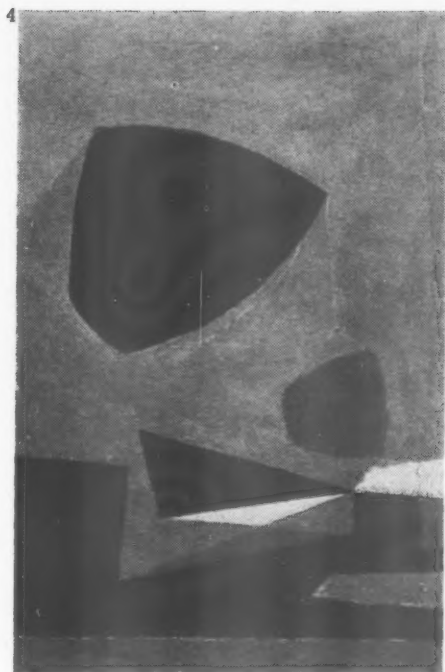
L. S. Lowry's paintings of the industrial towns of the North are stranger than Martin's fantasias. Nothing could be more macabre than the agglomeration of buildings in *Ashton-under-Lyne*, 3, one of the largest pictures in his recent one-man show at the Lefevre Gallery. According to my gazetteer, Ashton houses over 50,000 people, but the people in the picture are lilliputians, too small to run the factories, and the dislocation of scale imparts an active malevolence to the buildings. Lowry is a cross between Avercamp and the Sunday painters, a *genre* painter with a twist. He does not seem to have much of an opinion of humanity, and when we obtain a close view of his figures they turn out to be rather horrid manikins as ugly as the towns they inhabit. They are more plausible when he sees them from a long way off, in swarms or straggling herds, but they stream so constantly through his pictures that it is a shock to see him suddenly wipe the slate clean. This happens in a very odd picture called *Seascape*. It is composed of two horizontal rectangles of colourless colour—lead-

sky and flat sea—and it is as non-figurative as possible, but only because he is capturing an extreme effect of dreary emptiness. Malevitch, one of the fathers of modern abstract painting, used to speak of the tyranny of 'things,' and of the need to go out into the 'desert,' and it seems clear that Lowry was violently reacting against 'things' when he painted his *Seascape*; but, unlike the work of the abstractionists, the picture expresses a state of revulsion rather than a sense of release.

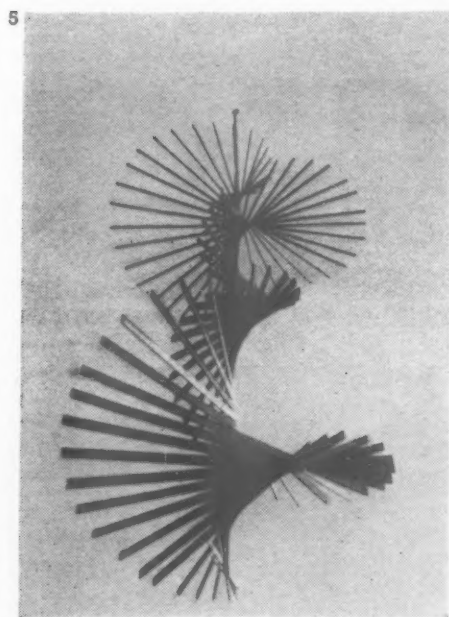
Adrian Heath, whose exhibition of abstracts, 4, at the Redfern coincided with the publication of his charming essay on the early masters of abstract painting (it has some of the piety of a little album of saints) is absolutely at home in the 'desert.' He has reached his present excellence by slow degrees, and his pictures are more self-contained, more elegant and beautiful than Lowry's, but sometimes things happen in a Lowry—I am thinking at the moment of a rose-pink plume of smoke, from a battery of stacks, expanding in one of his opaque skies—which are more apt to haunt the memory.

Dr. Simon Yudkin, of Whittington Hospital, recently invited Kenneth Martin to display his mobiles in one of the children's wards. Most of the children in the ward were convalescent and less interested in the mobiles than in the unusual influx of visitors, but one child who was gravely ill watched the dreamy movement of the mobiles with a touchingly remote pleasure, and they might well serve a most valuable purpose in wards for serious cases. Martin included two recent mobiles which were a departure from his familiar wire and disc constructions. He calls them screw mobiles, 5,





and they are composed of fanned-out strips of brass, spiralling round a central rod. They are less sensitive to air currents than the others, but a single turn keeps them in motion for a long time, and according to the direction of the turn



present the illusion of a rising or falling movement.

The Victoria and Albert has been exhibiting the Calcutta bazaar paintings of the Kalighat school, which lasted from about 1830 to the beginning of the present century. Characterized by bold calligraphy and brilliant colour, they were an extraordinary lively and unexpected 'retort,' in the same medium, to the conventional nineteenth century watercolours which were brought in by the British

community. Imports from Britain enabled Indian artists, for the first time in their history, to work on large, cheap sheets of paper, and to change from tempera to watercolour, and they sold their work in the bazaars in vast quantities at prices ranging from a farthing to a penny each. They make a much more effective 'show' than the smaller works of the traditional



Indian schools, and not the least remarkable thing about them, as can be seen in this *Seated Musician*, 6, is their anticipation of the simplified tubular forms of Léger and Metzinger.

Robert Melville

PLANNING

SPACE BETWEEN HOUSES

It is encouraging that the waste of land and money resulting from the style of layout practised in most new towns and housing estates (and the lack of urbanity¹ that goes with it) is now acknowledged by the Government department responsible for planning policy. A new handbook², issued by the Ministry of Housing and Local Government as a supplement to the *Housing Manual*, is devoted wholly to this question. Its purpose is the guidance of local authorities, and it is especially in their housing schemes that so much unnecessary

¹ See first article (page 355) 'Failure of the New Densities.'
² *Houses 1953*. H.M. Stationery Office, 3s.

space has been given to roads, pathways and verges, often because of the indiscriminate adherence to standard practice on the part of local surveyors. May the attention drawn to this in the handbook lead to a more sensible attitude on the spot.

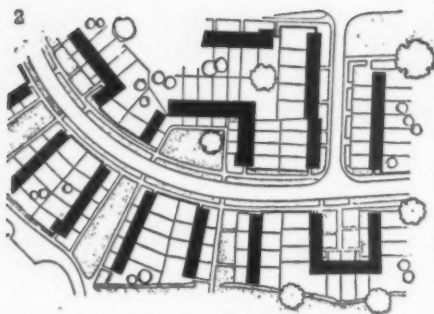
Another way of encouraging less lavish road-planning is by methods of layout that make greater use of footpath access, and the handbook illustrates this possibility fully. It discusses questions like road widths and the spaces between houses on their merits rather than in relation to generally accepted standards. The illustrations suggest various ways of grouping houses more economically, while still giving them adequate privacy and convenient access. Comparison with typical post-war schemes suggests that by these means between £35 and £50 could be saved on the cost of each house.

The handbook emphasizes that the architect who designs the houses should also be responsible for their layout, and drives home this point by putting forward a number of new type-plans, designed to economize land and road construction by reducing the width of each frontage. These are based on a style of layout that gives access from both sides of a terrace, thus eliminating the need of a way through. Other type plans show two-storey flats

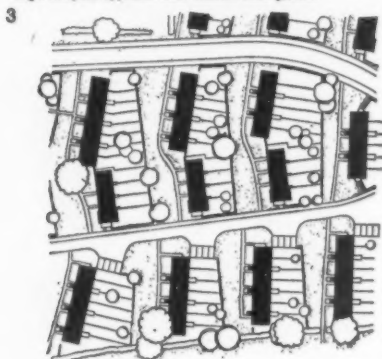


planned round a central staircase and flats and houses planned to make economical use of corner sites, 1, where land is often wasted and unsightly gaps left open.

The second part of the handbook deals with the grouping of houses and terraces, and illustrates various ways of using culs-de-sac and footpath access to economize road construction. The third part deals with the design and construction of the roads themselves. In a final section, which is clearly based on considerable research, an actual, but as yet undeveloped, site in Harlow new town is shown laid out according to four alternative principles in order to illustrate their relative merits: the conventional type of layout with direct access to each dwelling from the street, the 'service cul-de-sac' type (a modification of the American 'Radburn' system which has special advantage from the point of view of road safety), the single-footpath access system with enclosed back gardens, 2, and a relatively new type of double-footpath access system in which houses are



single footpath approach with enclosed back gardens



footpath access on both fronts

arranged in parallel rows facing the same direction, 3.

A most informative table at the end of this chapter compares the area of road per dwelling, the area of footpath per dwelling, the road frontage per house and the building frontage per house for each of the four layouts illustrated with the average figures for 48 post-war housing schemes that have been analysed for the purpose. Remarkable savings are shown. For example the area of road per dwelling, which is 378 square feet in average current practice, is reduced respectively in the four suggested layouts to 264 square feet, 257 square feet, 227 square feet and 230 square feet. The difference between the building frontage and the road frontage per house—largely wasted—has been almost eliminated in the single footpath access layout; it has been cut by over half in the 'service cul-de-sac' layout and by over three-quarters in the other two layouts.

J.M.R.

BOOKS

THE HISTORY OF THE ROYAL HOSPITAL OF ST. KATHERINE BY THE TOWER OF LONDON. By Catherine Jamison. Geoffrey Cumberlege, Oxford University Press, 1952. 25s.

Three of the great hospitals serving main roads into London, those of St. Bartholomew, St. Thomas and St. Katherine, were originally dependent on Houses of Augustinian Canons. St. Thomas's broke from St. Mary Overie in 1215 through the intervention of Peter des Roches, Bishop of Winchester. St. Katherine's, founded by Matilda, Stephen's Queen, in 1147, was detached from Holy Trinity, Aldgate, by the energy of Eleanor, Henry III's Queen, in 1273, and was

thenceforth under the direct patronage of the Queens Consort. Much has been written on this remarkable institution, which adjoined the Tower of London eastward, but the thrilling story of its rise and fall has only now been given in adequate detail, through the skilful researches of Catherine Jamison. The highlights of its history: Queen Eleanor's triumph, Queen Philippa's ordinances (1351), Henry VI's Charter (1442)—which converted the precinct into a Liberty, free from the jurisdiction of the city and the bishop—the foundation of the Guild of St. Barbara by Henry VIII and his Queen, Catherine of Aragon, the survival of the hospital from the perils of the Reformation, its reform by the vigorous action of Lord Somers (1698) and the final obliteration of the whole precinct when St. Katherine's Docks were formed in 1825, are all vividly described and fully documented.

The author expresses regret throughout that there is not more evidence of the detailed life of the hospital, but she has gathered much to illuminate it. One detects here and there some uncertainty of touch, due, perhaps, to unfamiliarity with the general history of medieval hospitals, which normally started with a staff, living under semi-monastic rule, serving the sick, the poor and the needy traveller, and gradually changed into an almshouse, which in the case of St. Katherine's, was also charged with important civil and ecclesiastical functions. One misses a much needed elucidation of the topography of the precinct, and the great church, its priceless monuments and fittings; and the other hospital buildings still await a proper study.

Walter H. Godfrey

WESTERN PROVINCIAL: AN ALBUM OF PAINTINGS AND DRAWINGS OF THE WESTERN CAPE. By Desirée Picton-Seymour and R. I. B. Webster. Maskew Miller, Cape Town. 26s.

Mention Cape Town to any architect who has not actually been there, and instantly through his mind—as though through some darkened lecture hall—will pass, jerky and unrelated, those familiar slides we all know of kraals, Herbert Baker banks and Cape Dutch gables. Missing, because unpublicized, from this collection will be the oriental caperings of the Malay Quarter and the even more rewarding appearances of Cape

Georgian, Cape Victorian and Cape Edwardian. It is these fascinating periods which form the most interesting part of 'Western Provincial'—a picture book in which the authors go for what they call 'an unplanned walk' round the city and its province, and return with a splendid haul of organ lofts and villas, of minarets and pubs and railway stations. Here at long last due tribute is paid to Messrs. Macfarlane's, of Glasgow, whose cast-iron verandahs, brackets and porches covered so many buildings of the Empire seventy or so years ago. And how practical these features were—as well as decorative: providing shelter and shade over the sidewalk and a first-floor viewpoint from which to watch the evening parade. There are not many of these lacy elegancies left in the big cities today, and some of the illustrations in this book, alas, are epitaphs as well as tributes.

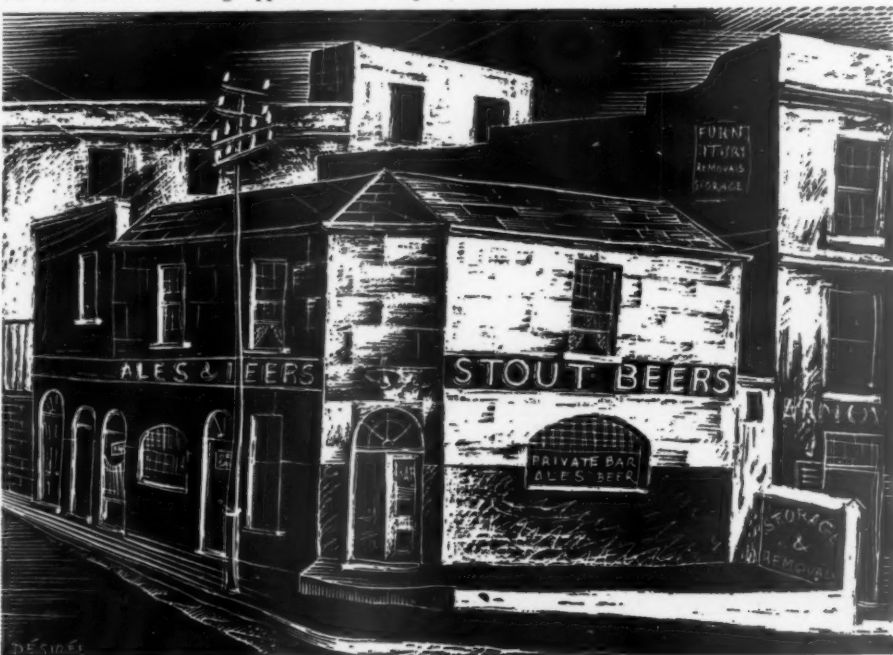
Miss Picton-Seymour's drawings are well-reproduced but uneven in quality. The watercolours have the naive flatness of ballet backcloths, and the scraper-board drawings, done with great assurance, are more successful with details—such as chimneypieces, lettering, urns, and furniture—than with buildings. This scraper-board is a solemn and flat-footed medium (I defy anybody to do a really witty lino-cut) and its use is out of key with the otherwise faintly amused and affectionate spirit of the book. The text—really no more than captions—is excellent: informative, witty and concise, never afraid to deal out a sharp rap on the shin if cant or complacency are to be observed, and only occasionally brushing too close to archness.

But how admirable that this book should have appeared at all—particularly at a time when officialdom prefers to remember only the birth of a nation and not its equally interesting adolescence—and how encouraging to learn that the authors plan a second volume on the Transvaal. May it be only the second of many such.

Hugh Casson

Books Received

DANSKE ARKITEKTURSTROMNIGER, 1850-1950. By Kay Fisker. Rasmus Navers Forlag, Copenhagen.
NEW COLLEGE AND ITS BUILDINGS. By A. H. Smith. Oxford University Press. 21s.
THE STORY OF GLOUCESTER CATHEDRAL. By G. H. Cook. Phoenix House. 6s.
THE FACE OF LONDON. By Harold P. Clunn. Phoenix House. 30s.



The Waterford Arms, Loop Street, Cape Town.

SKILL

A MONTHLY REVIEW OF BUILDING TECHNIQUES AND INDUSTRIAL DESIGN

In the past the REVIEW distinguished between the art and the technique of building by calling one Design, the other Craftsmanship.

Our portfolio of craftsmanship lapsed during the war and hasn't been—can't be—revived under the same title because the word 'craftsmanship' has become hopelessly dated. Why? From its association with handicrafts? From its unsuitability as a definition of precision building and manufacture? Possibly.

And yet the craft of building in the wider sense remains vital to any decent architecture and was never in greater need of encouragement by word and deed.

The editors feel the time has come to discuss the issues involved with a good deal of frankness if only to award all possible publicity to those who are keeping the flag of quality flying. They believe that the architect, and the manufacturer, will welcome a new, a bolder and a more critical approach to the whole subject. Hence this monthly feature, SKILL.

UK Furniture 1953

DESIGN REVIEW

Neville Ward and Frank Austin

It has become fashionable to refer to all furniture which does not derive its superficial detail from furniture of earlier times as contemporary, as though this denoted a single style. Furthermore, the idea has grown up that if it is contemporary it must be good. This is due to the over-simplification of some propaganda in past years.

Until recently all but a few progressive and far-sighted manufacturers maintained that furniture that did not evoke a vicarious memory of baronial halls or the super cinema would not sell. It is significant of the change that has taken place since the war that this review can be confined to furniture stocked by normal retailers.

This does not mean, however, that a victory can be claimed for any one style. On the contrary, under the all too loose cloak of the name contemporary, we find designers working in the Italian, American or Scandinavian vernaculars. We also find imitators who work in clichés rather than ideas, and a very few designers who can be said to have a personal style.

There is a danger that bad imitation may discredit a movement which is barely established. Designers are only too

conscious that anything on tapered legs will now pass as good furniture. Perhaps the more subtle danger is that designers may be stampeded into tricks and novelties in design. One can only hope that out of the present rather chaotic situation there will come furniture in the English tradition: furniture which enables us to do the homeliest things elegantly, and which has style but no affectation.

Since we in this country have always borrowed freely from abroad this is not a plea for isolationism, but that an enjoyment of work from other sources should not blind us to those pleasures which are peculiarly our own.

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15	16	17
18	19	20



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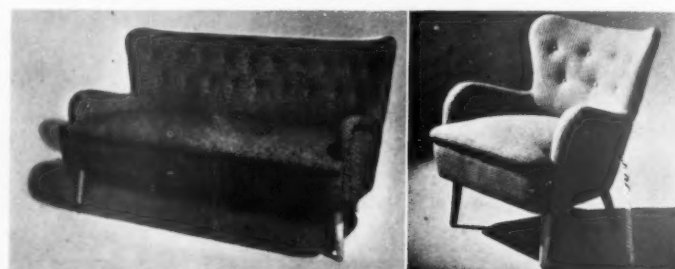
Ernest Race's DA6 Settee, 1, has a comfortable and unselfconscious elegance. It costs from £30 14s. 9d., and there is a tub chair, 2, DA1/L at from £18 13s. 9d. which goes well with it and occupies a small space.

H. K. Furniture's Trouper chair, 3, at £17 16s. 10d. in standard covers, has an air of solid comfort which would make a wet afternoon a positive pleasure. So has their 3-seater Pandora settee, 4, costing £39 3s. 9d., as large a piece of furniture as most designers care to tackle nowadays. Dunn's of Bromley's 'C' Day Bed, 5, is 6 feet 4 inches long, so that one can really lie down on it and would make a useful seat for a party, or several ranged along a wall would be excellent in hotels or waiting rooms. It costs £45 plus 4½ yards of covering material. Another seat which can be grouped to form a long seat is the low Telechair, 6, designed by Robin Day for Hille, and this is obviously a useful small chair for the fireside or as a bedroom chair. The price is £9 5s. 0d. The reclining chair, 7, of Messrs. Hille & Co., with stove enamelled steel frame and ash shelf arms costs £25 10s. 0d. The shape of seat and back are carefully worked out to give maximum comfort. Whether this comfort could be fully enjoyed except in a centrally heated space is open to question, and the same is true of Nigel Walters' little beetle chair, 8, formed of thin plywood and latex foam on steel frame, and with a loose cover held in place by a draw string, made by Andrew A. Pegram, 183, Royal College Street, N.W.1, £9. These objections may well be psychological for 9, the D1435 desk chair with rubberized hair stuffed seat and back, covered with linen and cotton union, £20, designed by A. J. Milne for Heal & Sons, looks comfortable enough for bridge, or an extra chair round the fire, and does not somehow fill one with the same anxiety about draughts.

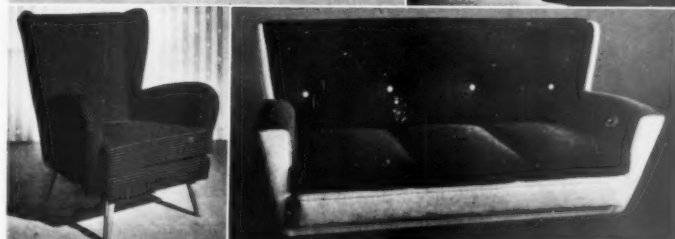
The PK734 Langdale chair, 10, in natural or brown beech or walnut or mahogany finishes, costing £14 10s., is made by Parker Knoll. The wings seem a little inelegant in shape, otherwise this is a very satisfactory chair of a rather conservative type. Morris of Glasgow's chunky chair, 11, is available in African walnut and four alternative covers, and costs £12 18s. The Stevenage Units, 12, designed by R. E. Long and Ronald Avery for R. S. Stevens, 209, Wood Street, London, E.17, are a pleasing version of an old idea, revived partly for television viewers. Corner Unit £20 8s. Centre Unit £13 2s. 6d.

One of the results of an improved market for new furniture since the war is that it is now commercially possible to market unit case furniture. After the provision of prefabricated built-in units by the architect, this use of units is probably the most economical solution to the storage problem from the point of view of space and production costs. A number of these arrangements are based, not on a strict module but on dimensions more or less customary in the furnishing trade for standard pieces, such as a sideboard or bookshelves.

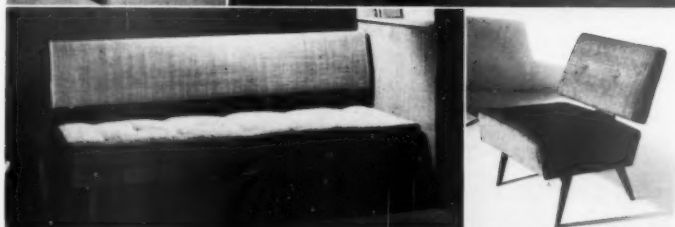
The three units, 13, designed by Professor R. D. Russell, for Gordon Russell, comprise a sideboard, cupboard and bookshelves. These are designed with plinths and removable legs. In the arrangement illustrated the sideboard, with legs removed, is placed on the cupboard unit making a drinks cupboard and a bureau with storage cupboard underneath. The bookshelves which



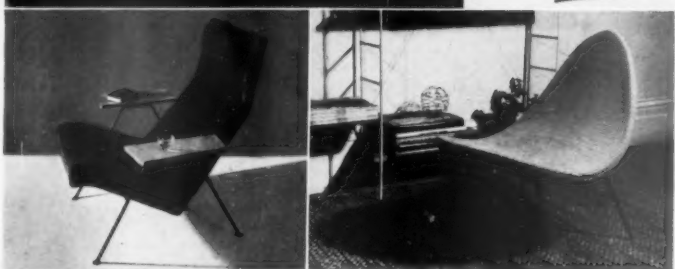
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3, 4



5, 6



7, 8



9, 10, 11

stand separately can also stand on either of the other pieces or all can be paired vertically. Dimensions and prices are as follows: Sideboard in Japanese elm with rosewood drawer fronts, 4 feet 6 inches wide and 1 foot 6 inches deep, height without legs 2 feet 2½ inches, or on short legs 2 feet 8 inches, or on long legs 3 feet 1¼ inches, price £29 3s. approx.

The storage unit in Japanese elm with two sliding doors, veneered rosewood, is 4 feet 6 inches wide and 1 foot 6 inches deep, and its height without legs is 1 foot 9¼ inches, or on short legs 2 feet 2½ inches, or on long legs 2 feet 8 inches; price £21 6s. 6d. approx.

China cabinet or bookcase in Japanese elm with sliding glass doors 4 feet 6 inches wide and 1 foot deep; height without legs 2 feet 2½ inches, or with short legs 2 feet 8 inches, or with long legs 3 feet 1¼ inches; price £21 11s. 6d. approx.

Shown with these units, which were arranged by Dunn's of Bromley, are an extending dining table, the R.109, 3 feet 6 inches by 2 feet 6¾ inches, price £15 10s. approx., and the R.202 single dining chair at £5 1s., and R.303 arm chair at £6 13s., all in Japanese elm to match units by the same maker.

14, 'Hilleplan' bedroom units—drawer fronts veneered walnut, elm or cherry, removable legs. The 4 feet 6 inches wardrobe costs £57 10s., the 3 feet ward-

robe costs £41 6s., and the chest of drawers £23, the storage unit £23, the 18 inches drawer unit £15, and the dressing table £43. The unit furniture, 15, designed by Clive Latimer, Hilly Court, Merton Lane, Highgate, N.6, is a more strictly modular system. The shelves and storage units may be built up as required on metal tubing. Prices are: Cabinet sliding doors £12; cabinet drop flat for cabinet writing or cocktails £13 10s.; shelf 9 inches wide £1 5s.; shelf 14 inches wide £1 15s.; slatted magazine rack £2 10s.; tubes 2s. 6d. per foot run; battens 2s. 9d. and 3s.; normal module 45 inches to centres of tubes; available in mahogany and beech.

16, are units made by G. W. Evans, Hackney, veneered in walnut; dimensions 2 feet 6 inches wide, 3 feet high. D.62, cupboard chest, £19 16s., and D.67 chest with top drawer fitted for use as writing and dressing table £23 6s. 6d. The excellent little set of bedroom furniture, 17, designed by John and Sylvia Reid for the Stag Cabinet Co., though it has a certain standardization of carcasses, is closer to the usual sort of bedroom. It is very suitable for small bedrooms and for hotels and hostels. The following pieces are available: Wardrobe, height 72½ inches, width 36 inches and depth 22 inches, price: £21. Four-drawer chest, height 37 inches, width 30 inches, depth 18½ inches, price: £13 17s. 6d. Three-drawer chest, height 30 inches, width 30 inches,



depth 18½ inches, price: £11 18s. Bedstead, 4 feet 6 inches, price: £5 19s. and bedstead, 3 feet, price: £4 11s.

A more luxurious suite but still reasonably priced is, **18**, No. C5054, made in scented guarea and mahogany by Heal's, and designed for them by A. J. Milne. Prices are: 3 foot chest of drawers, £18 2s. 6d.; 2 foot 9 inches cupboard chest, £24 4s.; bedside cupboard, £9 11s. 6d.; 4 foot dressing table, £35 15s., and dressing stool £3 10s.; 3 foot bed £15 1s. and 4 foot 6 inch bed £16 9s. 6d.

Two pieces with points of functional interest, **19**, are the dressing table and dressing chest designed by Harford and Long for Heal's. They are made in a combination of cherry and albur. The woman's dressing table, 3 feet 6 inches, has a concealed well for cosmetics and cupboards behind the mirrors, price £35 15s. The man's 2 foot 6 inch dressing chest has a hinged top with mirror over a well for dressing things, price £28 10s.

There is also a delightfully unaffected bedroom suite, **20**, designed by W. H. Russell for Gordon Russell, veneered in natural walnut; the 4 foot dressing table costs £29 18s. approx.; the 3 foot tallboy costs £26 11s. approx., the 4 foot wardrobe costs £41 10s. approx. and 3 foot bed £10 2s. approx.

Dining furniture in commercial production remains at least as conventional in type as bedroom furniture. The sideboard, with all its storage accommodation so low that one must crouch before it, still remains, and the extending dining tables at which when six people sit down the guests must each sit with a table leg between their own, are still the standard pieces. Within these limits the, **21**, D5508 furniture by A. J. Milne for Heal's is pleasant, though it seems a pity to have used the chequered veneering in addition to the strongly expressed legs and shaped rails. 4 foot sideboard £26, dining table £16 5s., arm chair £6 17s. and single chair £4 8s.

The oak dining-room furniture, **22**, made by Messrs. Meredew, of Letchworth, was designed for them by A. Loebenstein, and is part of a range of 90 pieces covering a wide range of requirements. Illustrated are No. 268 sideboard 3 feet 9 inches wide, price £16 3s. 6d.; No. 263 extending table, price £7 13s. 6d.; No. 262 bookshelves, 4 feet wide, price £16 2s.; No. 99 folding table, price £2 16s., and No. 4434G dining chairs price £3 8s. 3d.

The next group of furniture, **23**, made by Gordon Russell, contains a sideboard by Booth & Ledebor, made of mahogany and rosewood. This piece with its router cut decoration is one of the nicest things designed in recent years. The price is £22 15s. The chairs and table by W. H. Russell show the same restraint as the bedroom furniture already mentioned. Prices in mahogany for the extending table: £15 10s.; for the armchair: £6 13s.; for the single chair: £5 1s. The fixed-top dining table, **24**, made by Hille to Robin Day's design does not have awkwardness about the legs, and one wonders that this type of table is not more widely used—stove enamelled steel frame, walnut veneered ply top: £17 15s. The arm chair, **25**, by the same designer was designed for an American manufacturer and is going into production in the USA. Messrs. Hille are producing it over here. It has a stove enamelled steel rod frame, latex foam seat and back and arm unit of plywood moulded in one piece. In beech this costs £8 15s., in walnut £9 12s. 6d. Nigel Walters' chair, **26**, for Messrs. Andrew A. Pegram, Royal College Road, N.W.1, retails at £6 6s. in standard covers. The sideboard, **27**, which Robert Heritage has designed for Messrs. G. W. Evans, 80, Wallis Road, Hackney Wick, is known by them as DAO, the 4 foot 6 inch carcass being veneered in paldao, and the price £27 10s. approx. There are a number of well-designed desks on the market. The mahogany desk with walnut drawer fronts, **28**, designed by the Nicholson Bros. for G. M. Hammer, Crown Works, Hermitage Road, N.4, is 5 feet long by 2 feet 3 inches wide. The price is £24 7s. 6d.

The Hille desk, **29**, part of a series of office furniture, is 4 feet long and 2 feet wide and costs £62. The drawer carcass in, **30**, the D825 desk, designed by A. J. Milne for Heal's, slides to whichever side the user wishes to have it. The price of this is £52 10s., the timber natural mahogany, and the top measures 4 feet 6 inches by 2 feet. The D1401 chair shown with it, with natural hide seat, costs £18 15s.

Messrs. Hille have produced a stacking table, **31**, with drawer carcass slung below. The size is 4 feet by 2 feet. Materials beech frames with plywood tops, veneered elm, cherry, walnut or Waverite. Cost £18 veneered, or £20 12s. 6d. with Waverite top. The Hillestak chair costs £3 4s. 6d. in beech or £3 11s. 6d. veneered in cherry, walnut or mahogany.



21



22



23



24, 25



26, 27

[continued on page 409]



L. M. Furniture, 15, St. John's Road, Wallingford, Berks, make the excellent desk, 32, designed by T. M. Lupton and E. J. Morton. It is known as the A/1 desk, and may be had with various types of drawer pedestal, the one illustrated with solid beech frames and mahogany drawers and tops costs £24 5s. 11d. The A/6 chair, also illustrated, costs £7 14s. 7d. A smaller desk is the little one by Hammers, 33, designed by the Nicholson Bros.; it comprises a small table 3 feet wide, costing £8, and a pigeon-hole unit also costing £8.

Among the occasional furniture now available there is the table, 34, with canvas slings for periodicals, fitted with box for cigarettes, cards or working materials and sliding top for coffee or drinks. It is by Norman Potter Constructions, 40, Pickwick Road, Corsham, Wilts, and the price is £12 10s., plus tax. Another small table, 35, by L. M. Furniture, 15, St. John's Road, Wallingford, Berks, is made in mahogany and beech. Height 1 foot 7 inches, diameter 3 feet. This is a very pleasant handling of a simple idea, the cost is £9 17s. 2d. The small piano, 36, by Ward & Austin for W. Danemann is made in waxed mahogany with the perforated front veneered in rosewood. The price is 131 guineas. The magazine bin, 37, by the same designers for Primavera, Sloane Street, retails at 12 guineas, and is made in Honduras mahogany and hide in various colours.

Lastly, the small folding work basket, 38, designed and produced by Dennis Beytagh, 31, Parson's Green, London, S.W.6, has great charm. This is a quality rarely found nowadays, and which we have to recapture. The height is 18 inches and the length and width 15 inches. It costs £2 1s. 3d.



34, 35

36, 37

38

EXTERNAL FINISHES

Surface Finishes, Renderings & Paints

Philip Scholberg

The increasing interest in textured and coloured finishes which has developed steadily during the last thirty years or more coincides very roughly with the increasing use of concrete as a building material. Paint and stucco have been common for many generations, and traditional brickwork provides a wall finish which is pleasant to the eye and at the same time

weathers well. Normal concrete, however, gives a surface which is dull and uninteresting both in colour and in texture, and which needs some further treatment before it is acceptable in anything but large structures where size and structural methods are sufficiently impressive for surface textures to be of little importance.

In the smaller types of building the

surface of the concrete cannot very well be left in its natural state, for it faithfully reproduces the grain, nail heads and knots of the timber shuttering as well as the unevennesses between each board. Ideally the boards should all be matched in width, thickness and age, and should have the same degree of water absorption if differences in surface colour and texture are to be avoided. With present timber restrictions this is very much a counsel of perfection and boards are often used vertically or horizontally quite regardless

of appearance and in the interests only of timber economy, for it must be remembered that the cost of the formwork is a large proportion of the total cost of the structure.

The surface appearance of concrete may be improved in various ways:

1. By special shuttering to give a smooth or patterned surface.

2. By coloured cements, or coloured cements ready mixed with special aggregates.

3. By special units, slabs or blocks, which serve as shuttering for the external face.

4. By removing the surface film of concrete to expose the aggregate.

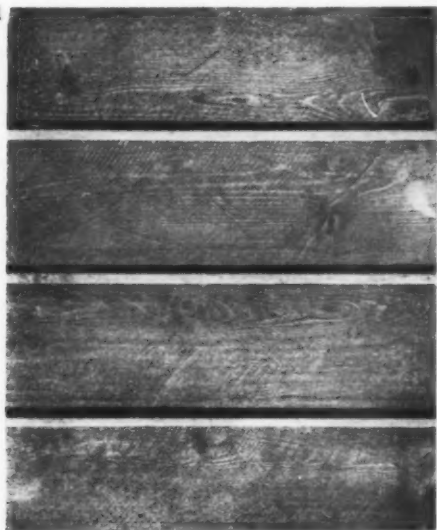
5. By applying paint, which will be specially compounded to resist the effects of new concrete or cement.

6. By spraying specially coloured cements on to the concrete.

7. By applied renderings of various types.

special shuttering

If the shuttering is lined with thin sheet metal or plywood or hardboard a smooth finish will be produced, but the surface, although it will be hard, is also likely to show a number of air bubbles, as these materials will not absorb any surplus water from the concrete. These irregularities can be avoided by using some form of absorbent lining such as insulating board, which will soak up a large proportion of the water near the surface of the concrete, thus reducing the water-cement ratio and giving a surface of even texture and great strength, and which resists the weather and should also prevent crazing.

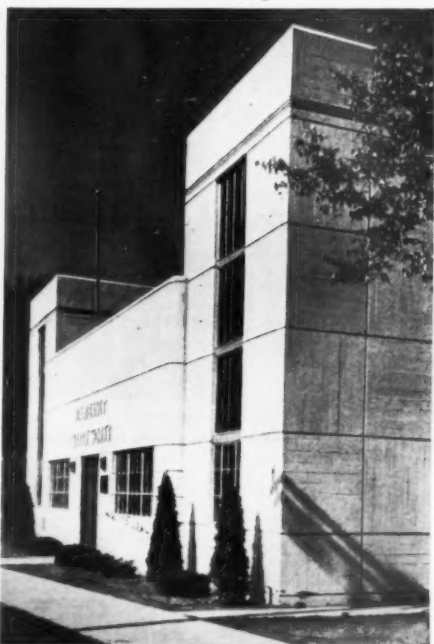


Triangular fillets in the shuttering board joints can be used either to produce ribs or grooves in the concrete face. Note how clearly the grain, knots and saw marks of the boards are reproduced in the concrete surface. (Cement and Concrete Association.)



A finish obtained by lining the shuttering with corrugated sheeting. (Cement and Concrete Association.)

An alternative method is to fix timber fillets or patterned strips to the inner face of the shuttering in order to emphasize the constructional joints rather than attempt to conceal them. There are also instances where the shuttering has been lined with corrugated sheeting or some similar material in order to give added interest to small areas such as balcony fronts or staircases. The trick of using moulds in the



Shuttering in rectangular panels with the boards running vertically and horizontally. (Cement and Concrete Association.)

shuttering in order to give the impression that the concrete surface has been carved has fortunately died out. Even the simplest form of treatment in this way was almost always unsuccessful.

coloured cements and special aggregates

Coloured cements are produced in a somewhat limited range of colours at a price low enough to allow them to be used throughout the whole thickness of the concrete in quite large structures, but cements in the more delicate colours, and in white, are more usually confined to facings. These cements are also supplied ready mixed with special aggregates, or, alternatively, coloured aggregates can be obtained to be mixed on the site. These may consist of marble chippings, coloured sands or gravels, while 'artificial stones' have reached a high degree of technical perfection. The cost of these materials is too high to allow them to be used through the whole thickness of the concrete, and it is usual to apply them as a facing only, the mixes being placed at the same time as the rest of the concrete, but kept separate from it by a thin metal plate inside the shuttering, the plate being lifted as the concreting proceeds so that the facing becomes monolithic with the main structure.

special facing units

Shuttering costs may often be reduced by using precast blocks as permanent shuttering which needs comparatively little support and avoids continuous timber panels. The units can be produced in almost any required colour or texture.

exposing the aggregate

Many of the aggregates in common use can give pleasing effects if the surface skin of cement is brushed off while the concrete is still green. Various types of cement retarder are produced which, when painted on the inside of the shuttering, will delay the



Bush-hammering a Cornish granite slab.

set of the surface of the concrete so that it may be removed easily. Other finishes include bush hammering, sand blasting and rubbing with carborundum discs.

paint finishes and cement washes

Ordinary oil paints are attacked by green concrete, but there are a number of specially compounded paints and washes,

[continued on page 411]



Cement paint on a terrace of flats in Bayswater. (The Adamite Co.)

giving a flat or glossy finish, which are specially compounded with various proprietary materials and can be applied to green concrete, plaster, new or old brickwork, asbestos cement or other materials. The range of available shades is quite large.

Silicate paints are produced in a range of colours and can be made with various finishes from high gloss to matt, while some of them are designed to give an anti-condensation finish having a porous and absorbent surface.

Stone paints contain some coarse filler,



Exterior damp-proofing combined with decoration. One coat of primer and one finishing coat applied early in 1947. The house (at Strand-on-the-Green) photographed in August, 1953. (R.I.W. Protective Products Co.)

which is often ground stone, to give a rough stone-like finish, and can be applied to most materials. Apart from the stone finishes a number of colours are available: the surfaces are weather resisting.

Cement washes are mixtures of water and white or coloured cements. They are easy to apply and provide one of the cheapest waterproof coloured finishes.

renderings

Renderings can be applied to a number of different materials, from concrete via brickwork and lightweight slabs to the comparatively resilient materials such as wood wool building slabs.

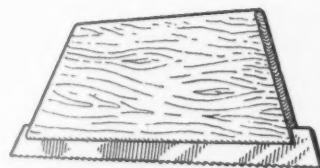
In the years between the wars a good deal of trouble arose from the desire to provide a smooth impervious surface. Strong cement-sand mixes were used and

the result was a good deal of shrinkage cracking and crazing through which water could pass into the backing material, when it was then prevented from escaping again by the denseness of the rendering. Moreover the smooth renderings were found to become streaked and patchy through uneven weathering. The present day tendency is to use weaker and more porous mixes based on lime and to adopt a textured rather than a smooth finish. The Building Research Station, in a survey of successful Continental practice, suggests that a further factor is the adoption of a 'throwing on' instead of a trowelling technique for application.

Before considering mixes and textures, however, it is as well to consider the steps which may be taken at the detailing stage to ensure that the rendering will weather as uniformly as possible. Moisture will inevitably penetrate the rendering and enter the wall to a certain extent, and damp-proof courses and flashings must be so designed that any moisture is returned to the outer face of the wall as soon as possible, by the most direct route. An adequate overhang of the roof will protect the top of the wall, but parapets should have copings with a damp-proof course immediately beneath them, extending across the wall and projecting to form an inconspicuous lip over the upper edge of the rendering. Sills should project beyond the face of the wall to a distance of two or three inches for the rougher textures; they should be provided with good drip grooves and detailed at the jambs so that all water is led over the face and not the edges of the sills. It is worth noting that independent scaffolding is to be preferred, as it is virtually impossible to make good putlog holes so that they cannot be seen.



The texture produced by a line of stiff bristles embedded in a handle: similar effects can be produced with other tools such as brushes, corrugated rubber, or even with a loosely screwed up ball of newspaper. (The Cement Marketing Co.)



Simply made tools for producing a scraped finish for renderings. (Callow & Keppich)

Textured finishes may be pebble dash or rough-cast, machine applied or scraped. Smooth finishes, when required, are best made with a wood float and a minimum of working, as excessive trowelling brings



Applying Tyrolean finish with a hand-operated 'flicking-on' machine. Two textures applied with the machine. (The Cement Marketing Co.)

a layer rich in cement to the surface and increases the tendency to crazing. Plain renderings may be textured with specially made tools or even by pressing the wood float firmly on the still wet surface and removing it with a sharp horizontal movement, the suction of which will produce an interesting shallow pattern. Simple tools include hack saw blades or the edge of a steel trowel, while more elaborate tools are easily made by mounting hack saw blades or nails in a wooden block to provide combs of different patterns.

Mechanical application of textured finishes may be done by hand-operated machines which have a flicking-on action or by cement guns or sprays, the flick-on machine tending to produce more satisfactory work and being generally used with specially prepared mixtures.

The choice of mix depends not only on the backing material but on the degree of exposure to the weather. Recommenda-

tions based on the *Housing Manual* are shown in the table below.

Apart from the firms acknowledged in the photographs, thanks are also due, for information supplied, to the following:—Joseph Freeman, Sons & Co.; John Ellis & Sons; Stic B Paint Sales; Sealocrete Products; The United Paint Co.; Per-manite; W. Hawley & Co.

MIXES FOR EXTERNAL RENDERING*

(S) 1 : 2 or 1 : 3 cement : sand
(A) 1 : 3 cement : sand.
(B) 1 : 1 to 1½ : 5 to 6 cement : hydrated lime : sand
(C) 1 : 2 : 8 to 9 cement : hydrated lime : sand } by volume.

Types of Background	Examples	Severe Exposure	Moderate Exposure	Protected Rural Exposure	Protected Urban Exposure
Strong and dense	Dense clay bricks or blocks, dense concrete blocks and structural concrete	Spatter-dash (S) followed by : Pebble-dash (A), Roughcast (A or B) or Textured (B)	Spatter-dash (S) followed by : Pebble-dash (A), Roughcast (A or B) or Textured (B or C)	Spatter-dash (S) followed by : Textured (C) Roughcast (A or B) or Pebble-dash (A)	Spatter-dash (S) followed by : Roughcast (A or B) Textured (B or C) Smooth (B) or Pebble-dash (A)
Moderately strong, porous	Most bricks	As above, but Spatter-dash treatment not so important in most cases.			
Moderately weak, porous	Lightweight concretes poured or cast in situ, or soft weak bricks	Roughcast (B) or Textured (B)	Roughcast (B) or Textured (B or C)	Textured (C) or Roughcast (B)	Roughcast (B) Textured (B or C) or Smooth (B)
Open textured	No fines concrete	Roughcast (A or B) or Textured (B)	Textured (B) Roughcast (A or B) or Pebble-dash (A)	Textured (B) Roughcast (A or B) or Pebble-dash (A)	Roughcast (A or B) Textured (B or C) or Pebble-dash (A)
Weak, resilient	Wood wool building slabs	Textured (A) Roughcast (B) or Pebble-dash (A)	Textured (A) Roughcast (B) or Pebble-dash (A)	Textured (A) Roughcast (B) or Pebble-dash (A)	Textured (A) Roughcast (B) or Pebble-dash (A)

- Notes : 1. Spatter-dash is thrown on with no subsequent smoothing, and should be applied in just sufficient quantity to cover the surface and level up the suction of the background.
2. Textured finishes include machine applied, scraped or ornamental finishes.
3. Except where otherwise stated the mixes given above are normally used for both undercoats and finishing coats. A strong mix rich in cement should not be applied to a weaker undercoat.

* Based on 'Housing Manual 1944. Technical Appendices': Appendix H [34]. Published by HM Stationery Office, price 1s. 6d.

HEATING

HEATING BY OIL

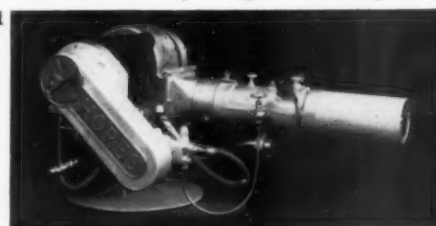
The root of the argument for improved standards of fuel utilization in this country is that coal is the major source of power, from which the two chief ancillary forms of power—gas and electricity—are both obtained. Coal is, therefore, our most important source of raw material for industrial and domestic uses.

There remains the possibility of obtaining power from imported raw materials, the most important of which is oil, and the new production by the Fawley and Isle of Grain oil refineries is clearly going to change the oil fuel supply situation as compared with a couple of years ago. To meet this, manufacturers of heating plant are increasing their marketing of oil burning equipment, particularly for central heating.

The advantages of an oil burning appliance lie in its smokeless operation, its cleanliness in use and in the handling of the fuel; it is more economical in storage space than solid fuels, requires far less

labour in operation and lends itself to the use of automatic control. Its average operating efficiency is high, 80 per cent and better, while appliance efficiency is also in the region of 70 per cent on the average.

A case in point is the Hope oil burner, manufactured by Hope's Heating and



Hope's No. 4 light oil burner.

Engineering, Smethwick, Birmingham. It is designed for firing water heating plants of domestic central heating boilers and upwards, and for steam raising boilers. It is of the pressure-jet atomization type with an electrical drive for the oil pump and air pump and electrical ignition for starting. It may be had for use with light oil fuels of the gas oil and diesel oil types or alternatively for use with fuel oil when a pre-heater is supplied. Opera-

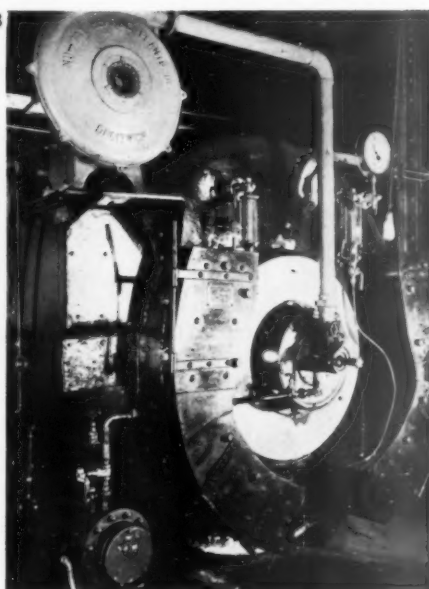


A typical domestic installation.

tion is fully automatic and the burner is quiet in action.

The oil burner is manufactured in four sizes with (a) a 4-inch burner of 100,000—400,000 B.T.U. per hour capacity, (b) a 5-inch burner of 400,000—900,000 B.T.U. per hour capacity, (c) a 6-inch burner with a 900,000—1,600,000 B.T.U. per hour capacity and (d) a 7-inch burner of 1,600,000—2,250,000 B.T.U. per hour capacity. Larger equipment is also manufactured.

Another range of oil burners is manufactured by Nu-Way Heating Plants, Droitwich, Wores. These include the Nu-Way light oil burners of varying capacities and designed on the pressure-jet atomization system for use for domestic heating systems or in churches, church halls, small hotels and similar places.



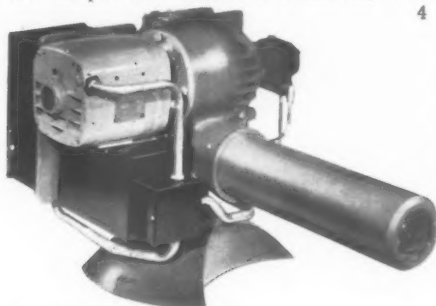
The Rotovac low air pressure burner.

The Nu-Way heavy oil automatic burners are designed for use with cheaper fuels of medium viscosity and are intended for

[continued on page 413]

SKILL

the greater heating capacities required in offices, schools and factories, for example. For industrial boiler firing, the Rotovac low air pressure burner is available, burn-



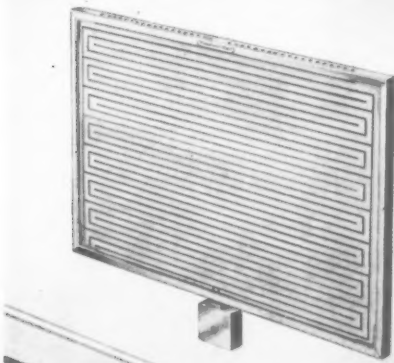
The Nu-Way light oil burner.

ing the heaviest, cheapest grades of fuel oil with high viscosities, and even Creosote Pitch and similar fuels. The Rotovac is a rotary burner made for hand operation, semi-automatic control on high-low flame, or for fully automatic operation with electric-gas ignition.

A GLASS PANEL HEATER

There is a steady tendency in this scientific age of ours for products gradually to lose their visual identity with the appearance of those from which they derive. A case in point is the space-heater, an independent heating appliance which at the dictation of various technical developments has now lost all identity with a fire.

That, at least, is one reaction to the new Thermo-panel 'Radiant Glass' electric heater recently marketed by E. K. Cole Southend-on-Sea, Essex. These panel heaters are intended for wall-mounting at a height of 9-12 inches off the floor, so the safety element has naturally been an important factor in their design. The heater comprises an armour plate glass sheet to the back of which is fused the element. There are no glowing wires and owing to the low conductivity of the glass, casual contact with it does not result in searing



E. K. Cole's type RG radiant glass panel.

or blistering. A built-in reflector restricts radiation through the back to the minimum and almost the whole of the electrical input is utilized to practically 100 per cent.

Two types of heater each in two sizes are available. The RGF model is intended for use where appearance is an important factor and is made with a wallframe. The RG model for industrial or commercial application has no frame. Dimensions and prices including purchase tax are as follows: RGF models (a) 750 watt loading measures 27 $\frac{3}{4}$ inches by 19 $\frac{3}{4}$ inches by 2 inches, weighs 18 lb., costs £13 3s. 3d. (b) 1 kW. loading measures 35 $\frac{3}{4}$ inches by 19 $\frac{3}{4}$ inches by 2 inches, weighs 24 lb., costs £15 9s. 9d. The RG models (c) 750 watt loading measures 24 $\frac{3}{4}$ inches by 16 $\frac{3}{4}$ inches by 1 $\frac{1}{4}$ inches, weighs 11 lb., costs £10 1s. 4d., and (d) 1 kW. model measures 32 $\frac{3}{4}$ inches by 16 $\frac{3}{4}$ inches by 1 $\frac{1}{4}$ inches, weighs 15 lb., costs £12.

WINDOWS

HOPE'S GEARING

The development of the metal window is probably both a result and a cause of the enormous extension of glazing in contemporary building design. But hand in hand with the problem of putting in great expanses of window goes that of arranging that quite a sufficient proportion of them should be capable of being opened and shut.

The variety of problems which this raises is made very evident in one of those typically exquisite Curwen Press produced handbooks issued by Henry Hope & Sons, Smethwick, Birmingham, entitled 'Hope's Gearing.' It is called 'a catalogue of modern methods of control for windows and ventilators of all types' which means that it deals with anything from a simple fanlight opener to systems capable of operating tiers of lights hundreds of feet long. There are five groups of control devices: 1, shaft and lever gear, 2, tension gear available with electrical control for ranges of opening lights 300 feet long, or as tension-rack gear for hand-operation without draw-ins, 3, cable gear for operating out of reach single lights and ventilators by remote control, 4, hydraulically operated gear used where hydraulic power is already required for other purposes and 5, special duty gear involving the use of special gearing to meet industrial require-

ments such as have arisen with a power operated lantern light over a swimming bath, the electrical operation of heavy doors and quick-release fusible switch gear for the instant opening of windows in case of fire.

LIGHTING

TWO FLUORESCENT LIGHTING INSTALLATIONS

Since the fluorescent lamp came into use its dimensions have given rise to a constant search for the best way to apply it in the variety of circumstances in which it offers advantages of economy and technical efficiency. Every new effort, therefore, which aims at freeing us from the bare tube and extends the value of the fluorescent lamp as a means of illumination is of interest.

Two installations carried out recently in buildings for entirely different purposes are contrasted. The first is in the rebuilt departmental store in Sheffield of John Walsh. The architects, J. W. Beaumont & Sons, have set out to provide a lighting system which caters for the special needs in a store for an extremely flexible lighting system. Departments change,



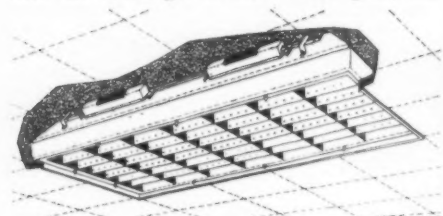
The flexible lighting system for John Walsh's rebuilt store.

displays are moved about, but the problem of lighting them to the best advantage can often restrict these possibilities.

In this case, a special honeycomb ceiling frame of 3-inch by 2 $\frac{1}{2}$ -inch timber ribs has been built at approximately 5 feet by 2 feet 10 inch centres, providing a grid of rectangular spaces. A standard type of fluorescent lighting fitting, specially designed by the architects for the purpose and manufactured by Smart & Brown (Engineers), 105, Judd Street, London, W.C.1, will fit into any of these spaces, wherever lighting is required. Several fittings may be grouped together or dispersed at will, and their position may

be changed whenever that be necessary. The unused spaces have been left open, and the concrete ceiling above and the services attached thereto, which are thus readily accessible, are painted black. Plenty of sockets are provided so that suitable connections are available in any desired position.

The fitting consists of a frame which fits into the rectangle of the timber grid, the



One of the individual lighting units.

louvre attachment which fits into the frame, and the lighting fitting itself consisting of a deep pan-shaped reflector with four 4-foot 40-watt fluorescent lamps of type white 3,500°K, equally spaced within the reflector. The edges of the louvres are pierced to present a sparkle of light to show from the sides. In addition, two architectural lamps are placed between the two outer fluorescent lamps a similar distance from the reflector to provide a blended light.

The second example concerns the illumination of an aircraft factory, carried out by Alliance Electrical Company with fittings and lamps supplied by Thorn Electrical Industries, 105, Judd Street, London, W.C.1. The wing assembly bay is 510 feet long by 180 feet wide and is fitted with 398 Atlas FK/2080 with twin 5-foot 80-watt white 3,500°K lamps.



The Atlas lighting installation.

The fittings are suspended at a 19 feet mounting height in twelve rows 15 feet apart, and are equipped with completely detachable reflectors to permit easy cleaning and also hinged to provide access to the control gear within the chassis. The total load is 73.5 kW. In the paint shop, which is 196 feet by 120 feet, fluorescent

lighting was not used since an entirely different approach to illumination was necessary in order to provide the best conditions for colour matching. 48 Atlas DD/0301 fittings with 300-watt tungsten lamps were combined with 48 Atlas CD/1501 fittings using h.p.m.v. lamps, and recessed in the roof behind protective glass screens.

FIREPLACES

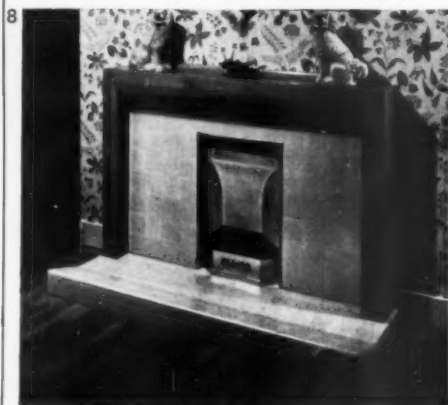
EXHIBITION OF FIREPLACES

Following shortly on their display of contemporary kitchens, Froys, of Hammer-smith, have mounted a small display of tiled fireplace surrounds. These are shown in a variety of furnished settings which have been designed by Messrs. Heals and which represent the different rooms of a house.

The fire itself appears to be the same model throughout. But as the emphasis of the Exhibition is aesthetic rather than technical it would be beside the point to question whether this heating method is likely to be the best for each 'room.'

The basic design, or at least the basic idea, of the fireplaces is virtually the same in each case; for the Regulations on the one hand and tile sizes on the other have long made the fire and hearth a familiar occasion for modular design. The immediate surround of the fire is steel and the edge framing wood. One small departure in a number of examples consists in the substitution of a ramped tile edging for the more usual curb—an arrangement which makes it easier to chase cinders into the dust pan.

All the fireplaces show the delicacy and refinement of the North European tile tradition. They are in the taste which we



One of the new Froy tiled fireplaces.

have come to call Swedish and within the limits of that taste are sure.

The examples shown fall within the price range £35-£45. A cost which is reasonable when we remember we are concerned with a piece of furniture which is the focus of the room and which must hold its own through many changes in soft furnishings. Architects would on the whole count themselves fortunate if they knew that the fireplaces they specified were to begin their use in surroundings as sympathetic to them as these here suggested.

ROOFS

WRITING ON THE WALL

No one in this country, outside the services and civil defence, bases his industrial, business, professional or private life on the problematical arrival of an atomic bomb attack. We accept the necessity to subscribe vast sums for political and scientific activities in order to render such an eventuality as unlikely as possible, since the consequences to our standard of life of such an attack would be disastrous. Nevertheless, we continue to ignore an equally reputable and expert body of politicians and scientists who warn us of a disaster which is much closer, much more easily calculable, much less expensive to avoid, yet would be nearly as devastating in its results. The reason this threat is ignored is that it does not threaten each individual pocket immediately to an alarming degree, its solution demands capital resources and it is only its accumulative effect over a long term that makes the threat alarming. Nevertheless, the writing is on the wall, if only we will see and read it.

The report, issued in the autumn by the Anglo-American Council on Productivity on Fuel Conservation, is a document of vital importance to everyone whose livelihood depends on Britain's industrial well-being. It hammers home methodically and irresistibly the wanton way in which our most priceless natural asset is being squandered, picks out one by one many specific instances of inefficiency in using it and finally presents forty constructive proposals for putting matters right. For the threat can be eliminated in time if a start is made now, and the first step is to kill the attitude of mind, which is still to be found everywhere, that coal is available

[continued on page 416]



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Hounslow 0171		Lichfield 2404		

continued from page 414]

at the pithead price of 10s. a ton. Efficient utilization of coal is a problem which impinges on the building industry, not only in general, but also in specific terms. All units of the industry use power derived directly or indirectly from coal in one form or another. On the average, the waste of heat in using coal is 80 per cent. Inefficient boiler house plants and methods of stoking account for an estimated waste of 10,000,000 tons of coal per annum.

One specific aspect is that of thermal insulation. To quote the Report 1 'In the conservation of fuel there is probably no single factor that has such common application in industry and is more important than insulation.' Particular emphasis is placed on the insulation of buildings since 30 per cent or more of British industry's fuel consumption goes for space-heating purposes. Since the cost of insulation represents an investment to the factory owner which is recoverable in terms of lowered fuel costs and a smaller capacity heating plant in a very short time, the incentive to carry it out is great. Proper insulation of domestic dwellings both of those in the construction stage or of existing dwellings will also achieve valuable returns for a small outlay.

A second specific instance relates to the design of heating equipment particularly of the automatic type and special forms of construction, inspected in the USA which combine insulation with heating so that the most economic installation is a form of air-conditioning.

A third point of great interest arises from experience in the bulk supply of heat and power from dual purpose generating stations in industrial areas, as a more economical alternative to a multitude of individual steam-raising plants in areas where many factories are located close to one another. Experiments are proceeding on the Slough Trading Estate and at Warrington, but it is pointed out that in the New Towns, where building has started almost from scratch, nothing has been done at all in this direction.

Perhaps one of the most interesting aspects of this problem is that not only do we, in this country, operate on a lower heat from coal efficiency than any other country in Europe, but that our average efficiency is lower than that ruling in the United States where there is no fuel conservation problem at all in terms of available sources.

H. McG. Dunnett

THE BUILDING INDUSTRY

BOOKLETS RECEIVED

Magnuminium Technical Data is issued by High Duty Alloys, 89, Buckingham Avenue, Trading Estate, Slough, Bucks, as a guide to assist designers in the selection of the most suitable Magnuminium Alloy for particular requirements. Full details of the mechanical properties of both cast alloys and wrought alloys are provided.

Angles, Purlins, Ties and Struts is a report on experimental investigations into the behaviour of these components, published as No. 7 in the series of booklets issued by the British Constructional Steelwork Association, Artillery House, Artillery Row, S.W.1. Three problems were examined: (1) Mild steel angles as purlins under corrugated roofing, (2) Angles in tension, and (3) Two mild steel lattice girders.

NEW APPOINTMENTS

Robert Kearsley & Co., York Road, Ripon, Yorks, announce the retirement after thirty-four years service of J. F. Grundy, General Manager of the company. He is succeeded by E. P. Frake Walters,

[continued on page 418]



This warm and lovely stone...

... was uncovered in the heart of Derbyshire 150 years ago; it still has no equal. Each new generation of architects has used it to enrich the finest buildings, for in its flawless and restrained beauty is found something of the character of England.

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AR 1



A Town House Window

BY ANTHONY GROSS

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THE CRITTALL MANUFACTURING COMPANY LIMITED

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continued from page 416]

who, until recently, was Assistant General Manager of Robert Ingham Clark & Co., and R. Gay & Co.

CHANGE OF OWNERSHIP

Hills (West Bromwich), Albion Road, West Bromwich, announce that they have acquired the controlling interest in Bryan's Adamanta, a firm specializing in high quality decorative fibrous plaster, and more recently in carrying out contracts in precast plaster work for schools, with Hills, in their Presweld construction. Bryan's Adamanta are installing additional plant for this purpose and at the same time carrying on their established class of business.

Contemporary Carpets: Correction

It was stated in an article 'Contemporary Carpets' in the September issue that S. J. Stockwell & Co. (Carpets) Ltd. recently commissioned John Grierson to design for them. This was incorrect and the name should of course have read Ronald Grierson.

CONTRACTORS etc

County Secondary School at S. Ockendon. Architect: Denis Clarke Hall. General contractor:

Leightons (Contractors) Ltd. Sub-contractors: Excavation, foundations, dampcourses: Leightons (Contractors) Ltd. Asphalt: Asphaltic (London) Ltd. Artificial stone: The Marley Tile Co. Structural steel: Sanders & Forster. Roofing felt: The Neuchatel Asphalt Co. Patent glazing: Williams & Williams. Woodblock flooring: S. Bennett & Son. Patent flooring: Semastic flooring: Semtex Ltd. Concrete tile paving: Marriott & Price. Central heating: Deane & Beal. Electrical work: Essex Electrical Installations. Sanitary fittings: Associated Clay Industries Ltd. Door furniture: James Gibbons Ltd. Metal windows: Crittall Mfg. Co. Iron staircases: D. Rowell & Co. Balustrades and handrailing: General Constructional & Eng. Co. Joinery: Blackboard units: R. Cattle Ltd. Library shelving: George M. Hammer & Co. Tiling: Carter & Kernahan. Textiles: Gerald Holton. Cloakroom fittings: Cloakroom Equipment Ltd. Railings and gates: B. Finch & Co.

School at Southampton. Architects: E. D. Lyons and L. Israel. General contractors: R. H. Lynn & Co. Sub-contractors: Structural floors: The Bath & Portland Stone Firms Ltd. Steelwork: Matthew T. Shaw & Co. Domestic hot and cold water and heating: Young, Austen & Young. Asphalt and substructure tanking: Faldo Asphalt Co. Electrical services: Newport Electrics Ltd. Carda windows: Holcon Ltd. Built-up bituminous roofing: General Asphalt Co. Ironmongery: Nettlefold & Moser Ltd. Sanitary ware: W. Dibben & Sons. Artificial stone: Enfield Stone Co. Metal windows: Crittall Mfg. Co. External site fencing: Durafencing Ltd. Wall and floor tiles: Carter & Co. Roller shutters: G. Brady & Co. Asphaltic tiled pavings: Gabriel, Wade & English Ltd. Metal balustrades: Clark Hunt & Co. Teak wood block floor: Acme Flooring and Paving Co. Linoleum pavings: Cellulin Flooring Co. School cabinets, furniture, etc.:

Elington Industries Ltd. Photograph by E. G. Patience.

School at Redditch, Worcester. Architects: Richard Sheppard & Partners. General contractor: Espley & Co. Sub-contractors: Excavation: Espley & Co. Dampcourses: Astos: Ruberoid Co. Laid by: Espley & Co. Asphalt: J. Hadfield & Sons. Bricks: Facing bricks: Ibstock Brick & Tile Co. Supplied by: A. H. Herbert & Co. Artificial stone: Standard Pavement Co. Structural steel: Matthew T. Shaw & Co. Special roofings: Universal Asbestos Mfg. Co. Roofing felt: William Briggs & Sons. Partitions: Flexo Plywood Industries Ltd. Glass domes: T. & W. Ide Ltd. Patent glazing: Williams & Williams. Woodblock flooring and cork tiles: J. Gerrard & Sons. Patent flooring: Linoleum: Resilient Tile & Flooring Co.; Granwood Flooring Co. Central heating: Weatherfoil Heating Systems Ltd. Stoves: Raeburn solid fuel cookers: Allied Ironfounders Ltd. Electric wiring: Booth & Bomford. Electric light fixtures: Best & Lloyd Ltd.; Troughton & Young Ltd.; Merchant Adventurers Ltd. Street lighting: A. C. Adamson & Co. Plumbing: David F. Wiseman & Sons. Sanitary fittings: William E. Farrer Ltd. Door furniture: James Wood. Casements, window furniture: Williams & Williams Ltd. Telephones: Worcester County Council and G.P.O. Rolling shutters: Shutter Contractors Ltd. Sunblinds: Artistic Blind Co. Plaster: Brooks. Metalwork: James Wood. Joinery: Braziers Ltd.; Espley & Co. Tiling: Bryon & Co. Textiles: Gerald Holton. Wallpapers: Cole & Son (Wallpapers); John Line & Son; Arthur Sanderson & Sons. Furniture: Worcester County Council. Shrubs and trees: Supplied to the County and planted by them. School fittings: Worcester County Council supply. Cloakroom fittings: James Gibbons Ltd. Water supply: David F. Wiseman & Sons. Signs: J. Fowler.

[continued on page 420



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SPECIAL NOTE

Make sure that your frames are of sufficient width. Details can readily be obtained from Pilkington Brothers Ltd., or your window frame manufacturer.

"INSULIGHT" Double-Glazing Units are relatively less expensive when bought in large pane sizes.

PILKINGTON BROTHERS LIMITED

ST. HELENS, LANCs.



DG.3.

continued from page 418]

Offices at Clackmannan, Scotland. *Architect:* E. Riss. *Principal assistant architect:* J. B. Bell. *Assistant architect:* I. T. Brand. *General contractor:* James Laidlaw & Sons. *Sub-contractors:* Asphalt: Rock Asphalt Co. *Artificial stone:* G. W. Bruce Ltd. *Glass:* James Thow Ltd. *Central heating:* G. N. Haden & Sons. *'Ideal' boilers supplied by:* G. N. Haden & Sons. *Electric wiring:* David Reid & Co. *Electric light fixtures:* Merchant Adventurers of London Ltd. (special fluorescent); General Electric Co. (fluorescent); F. Thomas & Co. (ceiling light). *Plumbing:* James Young. *Sanitary fittings:* Shanks & Co. *Stairtreads:* North British Rubber Co. *Door and window furniture:* Fletcher, Parker & MacAlpine. *Plaster:* Thomas & Bell. *Metalswork:* Barony Construction Co. *Terrazzo, tiling:* Toffolo Jackson & Co. *Painter:* A. Fraser.

Health Centre at Sighthill, Edinburgh. *Architects:* Robert Gardner-Medwin, former chief architect, Department of Health for Scotland; Robert Morton, deputy chief architect for special buildings; John Ogilvie and George Lawrence, senior architects responsible for development of design and supervision; Eric Hall, assistant architect; R. J. Walker, D. A. MacGillivray, R. E. A. Eadie, assistants. *Clerk of works:* R. Harkess. *Consultant structural engineer:* W. A. Fairhurst (F. A. Macdonald & Partners). *Consultant heating engineer:* Oscar Faber & Partners. *Consultant quantity surveyor:* P. W. Dixon (James D. Gibson & Simpson). *Contractors:* *Excavation and reinforced concrete work:* Fram Reinforced Concrete Co. *Masonry and brickwork:* John Martin & Co. *Asphalt:* Neuchatel Asphalte Co. *Copper roofing:* F. Braby & Co. *Metal windows:* Williams & Williams Ltd. *Carpentry and joinery:* Nathaniel Grieve. *Glazier:* James Thow Ltd. *Plaster:* D. & J. Borthwick. *Plumbing work:* William Barton & Sons. *Electrical installation:*

Drake & Gorham (Contractors) Ltd. *Electrical floor heating:* Electric Panels Ltd. *Ironwork:* Thomas Hadden and James Blake & Co. *Painting:* T. W. Scott. *Roads and paths:* H. V. Smith. *Garden layout:* Young & Thomson. *Sub-contractors:* *Steelwork:* Ayrshire Dockyard Co. *Steel erection:* M. Barr. *Precast concrete work and facing slabs:* Edinburgh Cast Stone Co. *Dampcourses:* Wm. Briggs & Sons. *Reinforced 'Gypklith':* Gyproe Products Ltd. *Wood block flooring:* A. M. Macdougall & Son. *Cork floors:* Armstrong Cork Co. *'Colterro' lath for suspended ceilings:* W. H. Colt (London) Ltd. *Linoleum:* Korkoid Decorative Floors. *Terrazzo:* Toffolo Jackson & Co. *Thermoplastic tiles and cement rubber latex flooring:* Semtex Ltd. *Water tank:* Braithwaite & Co. *Structural Ltd. Furniture:* George M. Hammer & Co.; Russell Furnishings Ltd.; Ernest Race Ltd.; S. Hille & Co.; The Scottish Co-operative Wholesale Society Ltd.; Rowan & Boden Ltd. *Soft furnishings:* Martin & Son (Edinburgh).

Primary School at St. Paul's Cray, Kent. *Architect:* Elie Mayoreas, in collaboration with S. H. Loweth, County Architect. *Consulting Engineers (Structural):* Malcolm Glover & Partners. (Services): J. Stinton Jones & Partners. *Quantity surveyors:* C. John Mann & Son. *Clerk of works:* L. V. Robinson. *General foreman:* Mr. Rogers. *General contractor:* R. Corben & Son. *Sub-contractors:* *Reinforced concrete, stair-treads, shell concrete roof over canteen, Truscon precast floor and roof units in main buildings:* The Trussed Concrete Steel Co. *Bricks:* Wills & Packham (facings); Ryarsh Brick & Sand Co. (sand-limes). *Structural steel:* Bracketing, Centering & Lathing Ltd. *Roofing felt, waterproofing materials:* William Briggs & Sons. *Woodblock flooring:* Horsley Smith & Co. *Central heating:* Bearfoot & Bryett Ltd. *Electric wiring:* David Thompson Ltd. *Sanitary fittings:* Stitson's Sanitary Fittings

Ltd. *Door furniture:* Lockerbie & Wilkinson Ltd. *Window furniture, casements:* R. E. Pearse & Co. *Rolling shutters:* G. Brady & Co. *Metalswork:* Jos. Sankey Ltd. (pressed steel door frames); Fulham Art Metalworks; Light Steelwork Ltd. (balustrades). *Stonework:* Liverpool Artificial Stone Co. *Plastic tiling:* Armstrong Cork Co. *Textiles:* Gerald Holtom and David Whitehead Ltd. *Wallpapers:* John Line & Sons; Arthur Sanderson & Sons. *Cloakroom fittings:* B. Finch & Co. *Chain link fencing and gates:* A. J. Binns Ltd. *Terrazzo slabs:* Zanelli Ltd. *Tar paved playing pitches:* A. C. W. Hobman & Co. Ltd.

Showroom in New Bond Street, London. *Architects:* Chamberlin, Powell & Son. *Assistant-in-charge:* Robert Ashdown. *Mural painter:* Augustus Lunn. *General contractor:* King's (B.D.J.) Ltd. *Sub-contractors:* *Metal lathing and plaster:* Byron & Panter Ltd. *Terrazzo, marble, granite door handles:* Fenning & Co. *Metalswork:* Stedall & Co. *Glazing of showcases, mirror wall:* C. Clifford Ltd. *'Phyglass' in laylight, armourplate door:* T. & W. Ide Ltd. *Steelwork:* Enterprise Metal Co. *Paints:* W. & J. Leigh Ltd. *Upholstery:* Lynwood Upholstery. *Curtain:* Story & Co. *Cleaning and relaying carpet, new carpet to staircase:* Maple & Co. *Plants:* West End Flower House Ltd. *Display fittings (shoe supports):* William J. Cox Ltd. and Frederick Sage Ltd. *Electrical wiring:* John Hearson & Co. *'Medrac' heating panels:* Dulrae Ltd. *'Thermolare' storage heaters:* Aberdare Electric Co. *Lighting fittings (George Forrest):* Thorn Electrical Industries Ltd. *Fascia lettering:* Pearce Sign Ltd. *Lift repairs:* Waygood-Otis Ltd.

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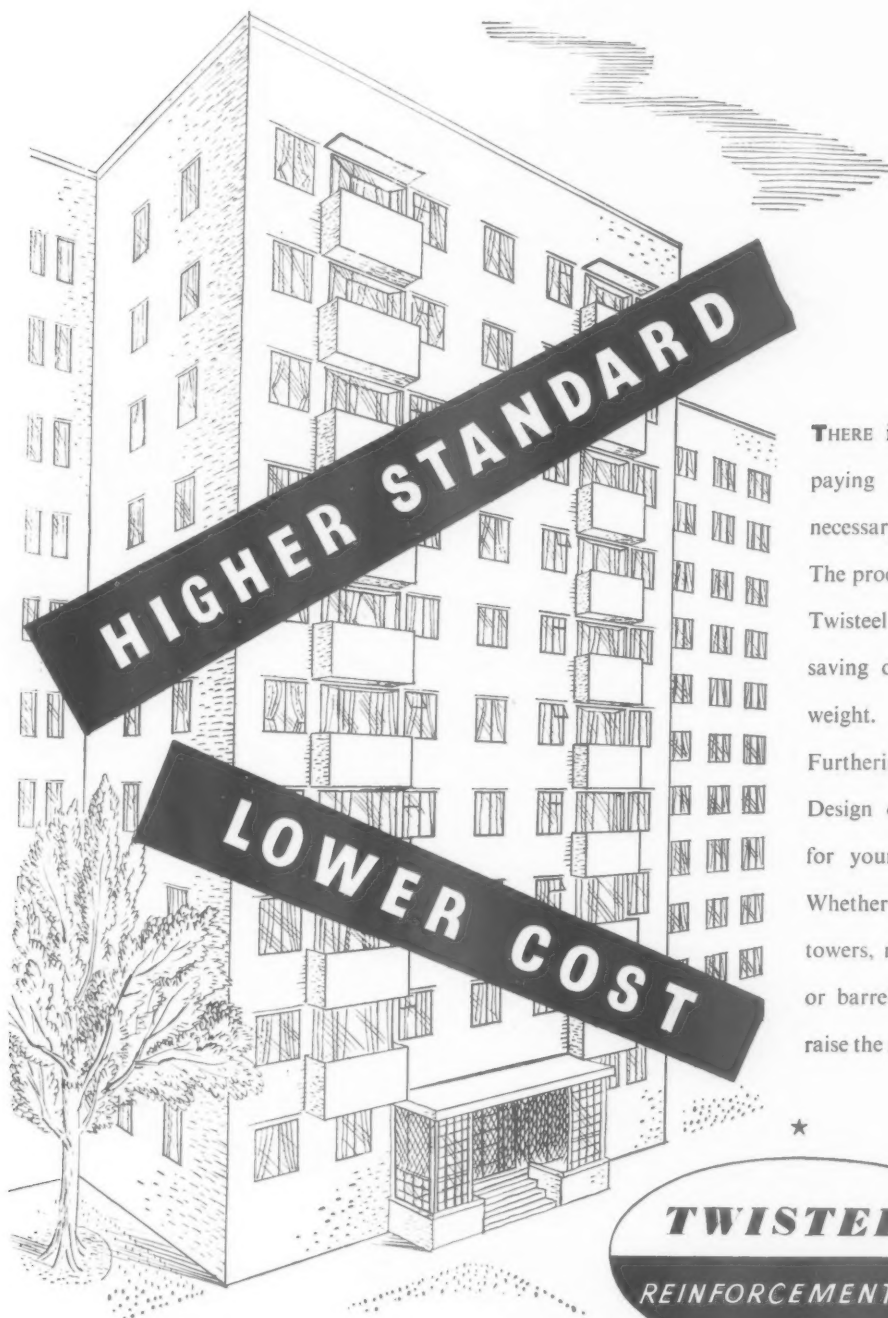
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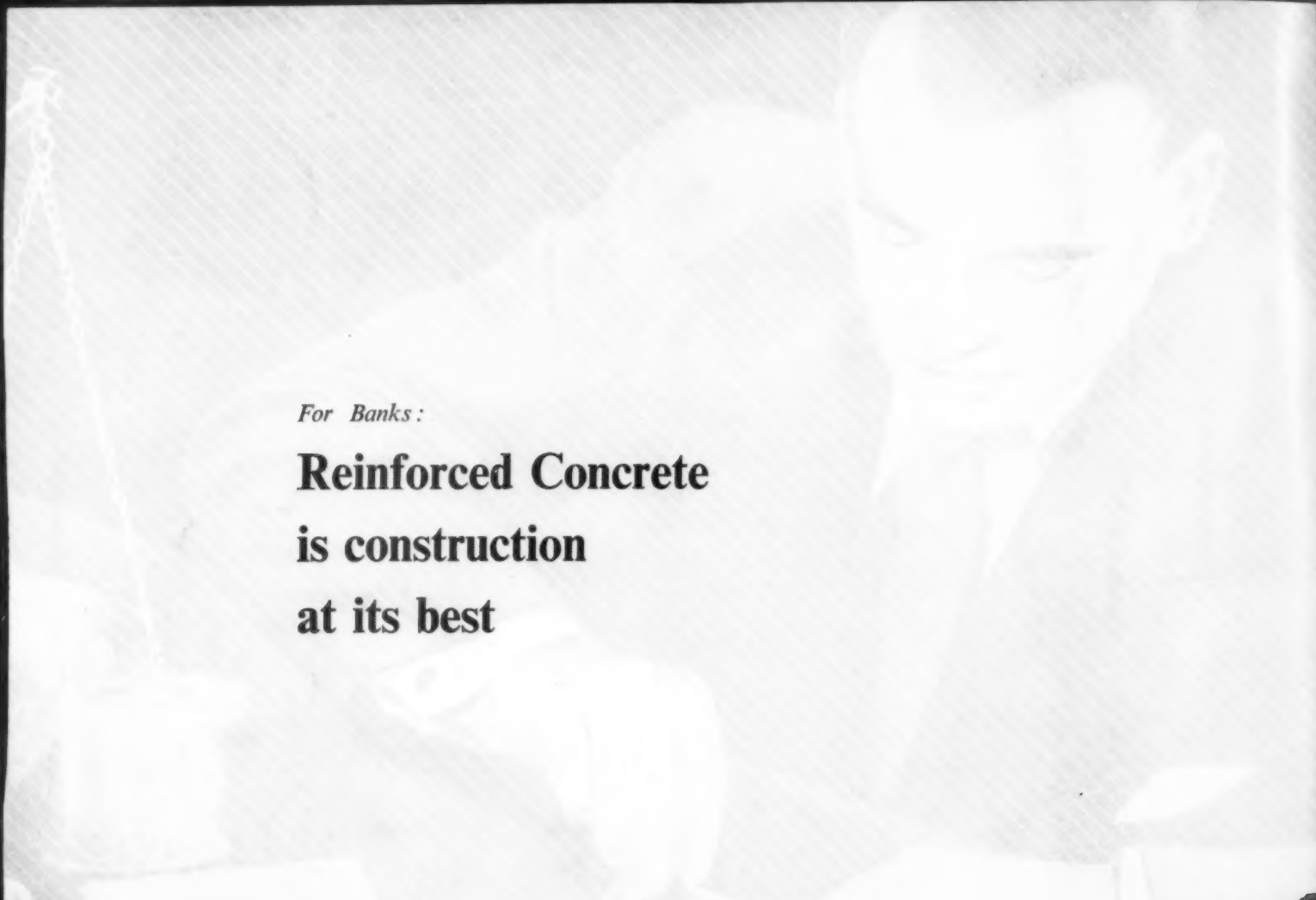
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