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THE ARCHITECTURAL REVIEW

A Magazine of Architecture & Decoration



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Vol. XCI

June 1942

No. 546



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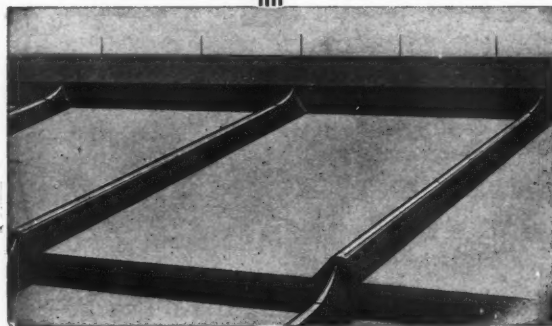
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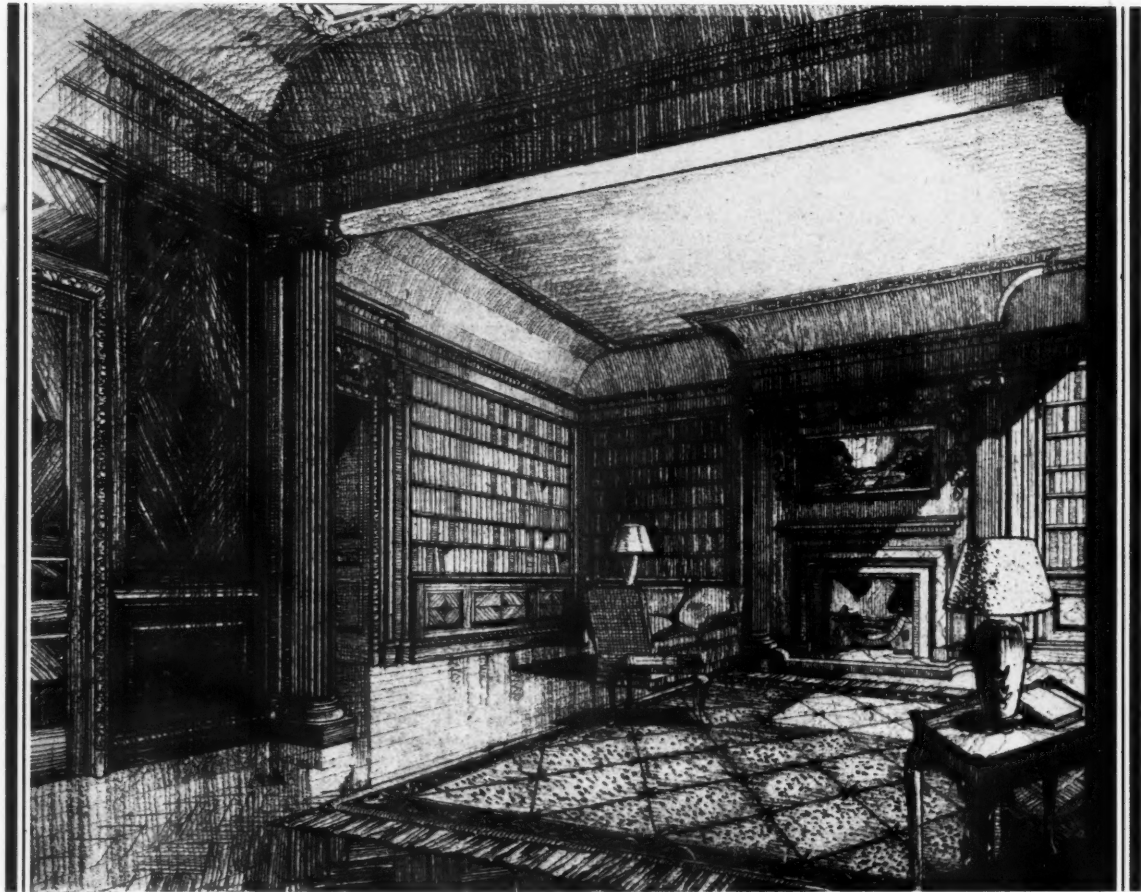
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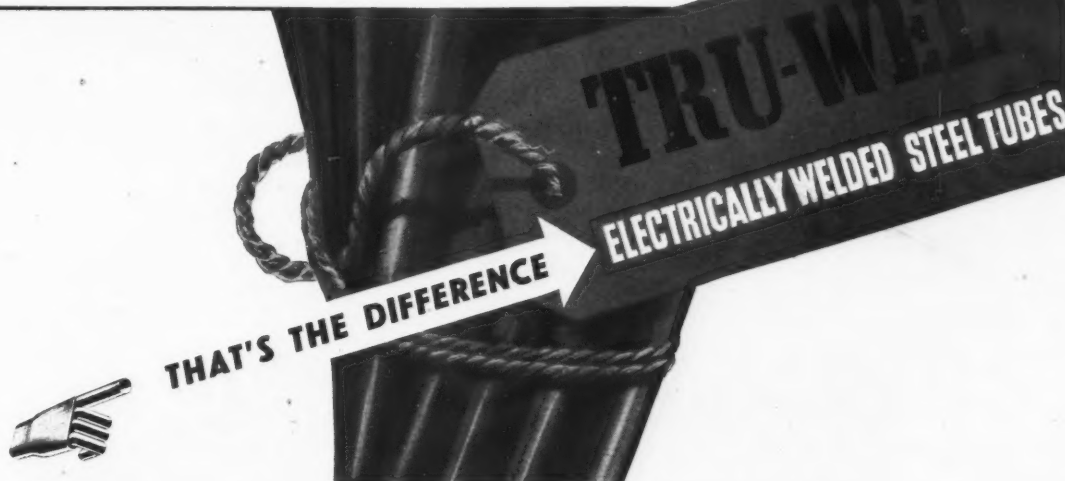
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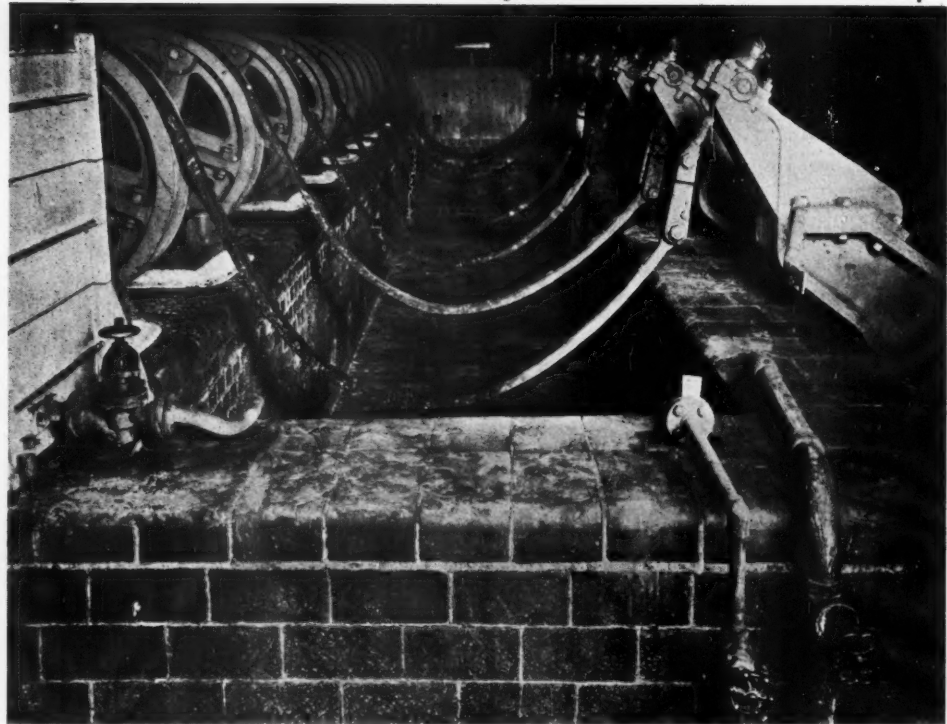
Where will the morrow lead — in art, science, mechanics — how shall we engineer the domains of peace? The answer as we, within this organisation, see it lies in the solidity with which man places his stepping stones in the tide of events. To us this means, as it has meant for over 140 years, the harnessing of yesterday's experience to the technique of today, the ability so to perfect today's product that it shall be acceptable tomorrow; to watch, absorb, to plan, to foresee even if dimly — these are and always have been stepping stones of N.C. progress.

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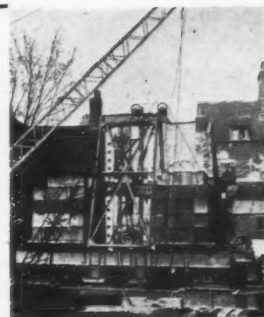
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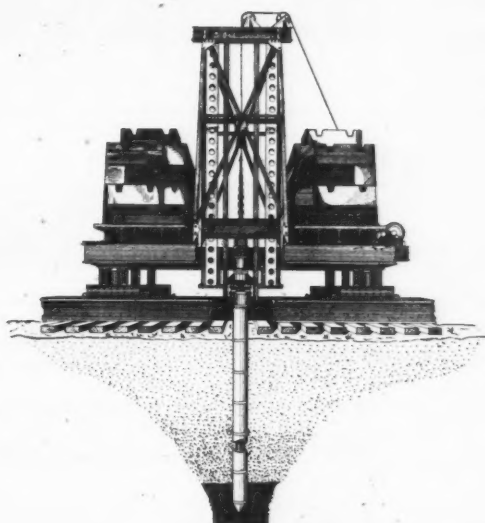
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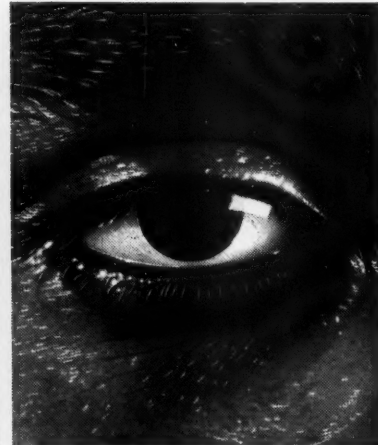
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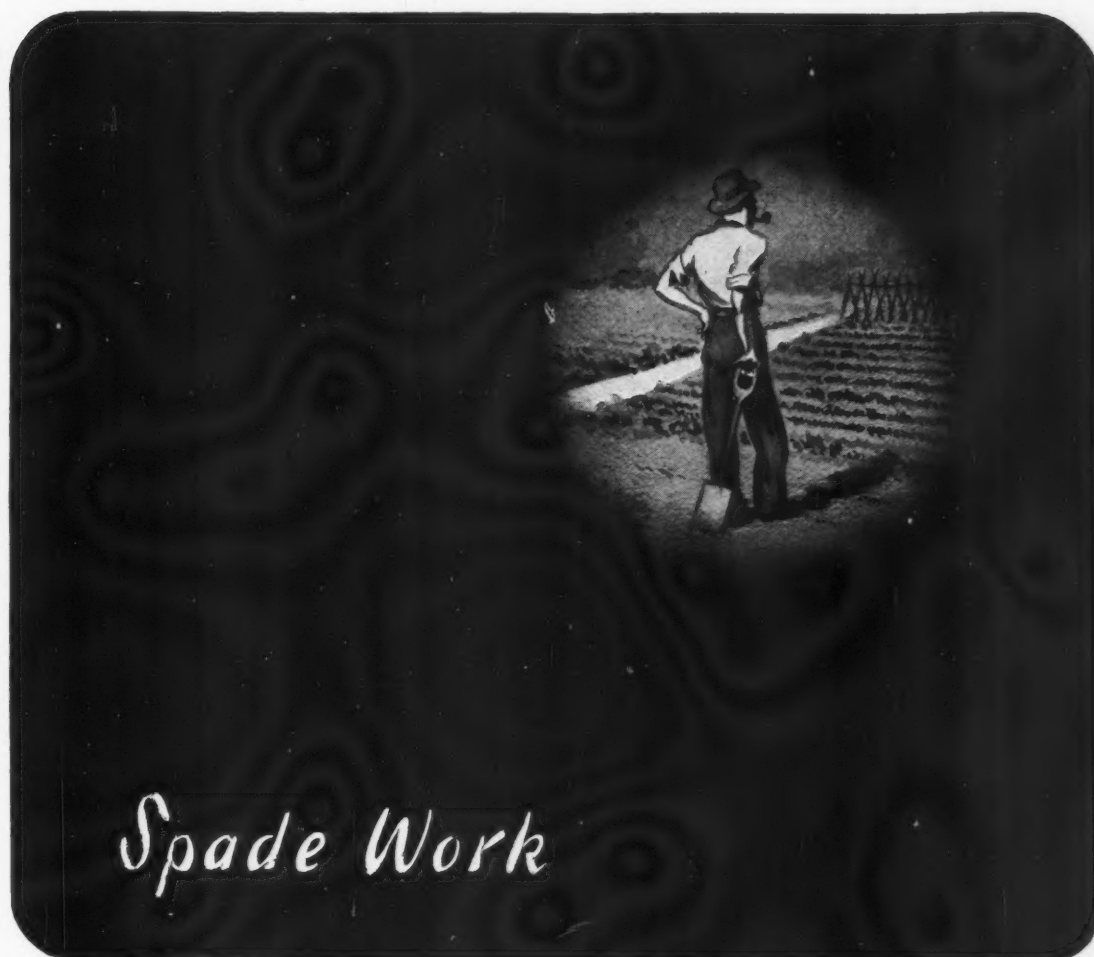
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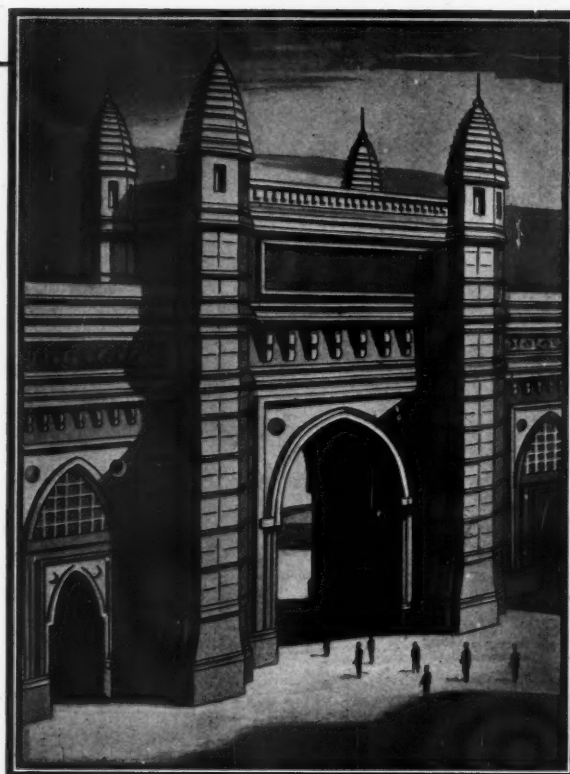
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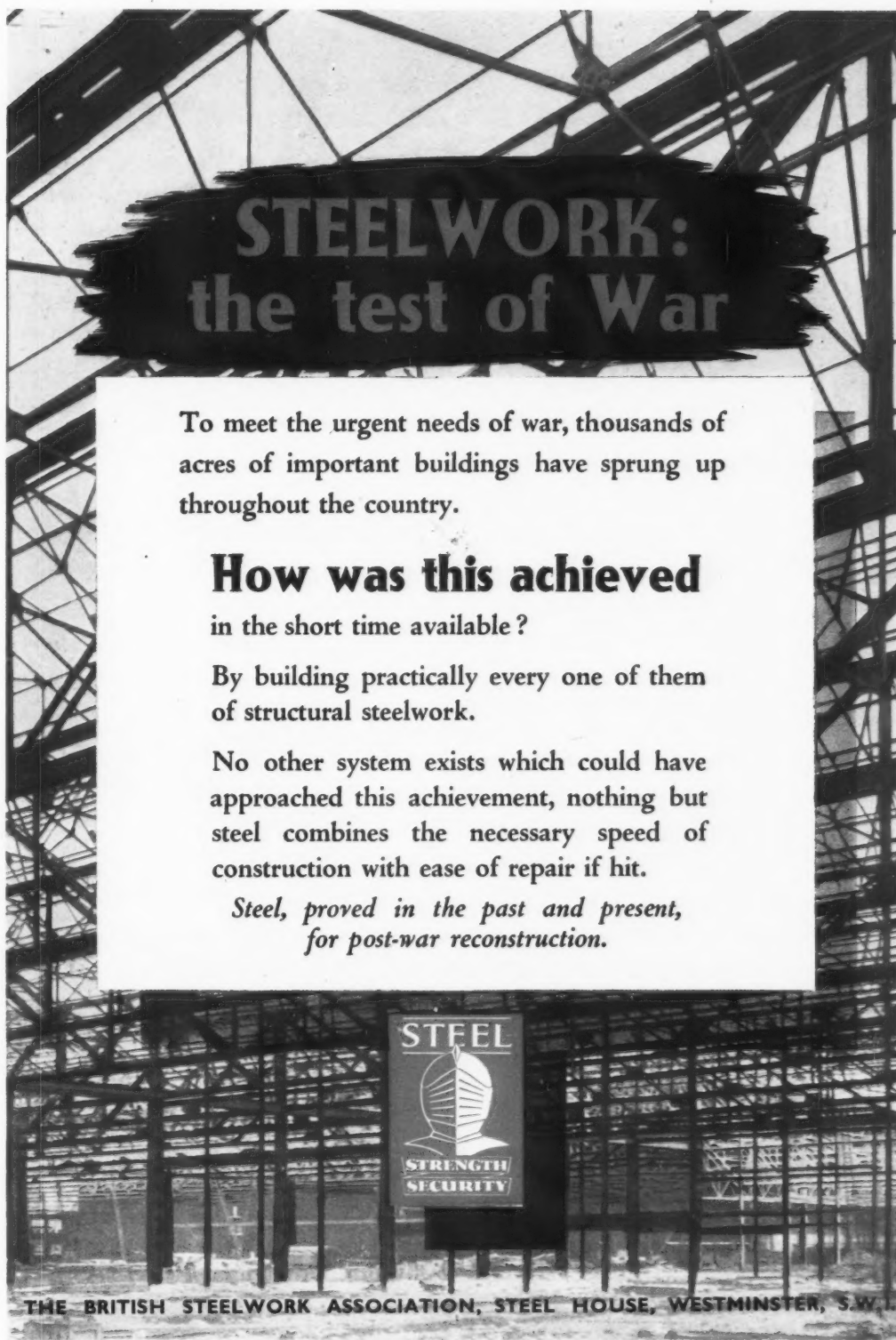


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in the short time available?

By building practically every one of them of structural steelwork.

No other system exists which could have approached this achievement, nothing but steel combines the necessary speed of construction with ease of repair if hit.

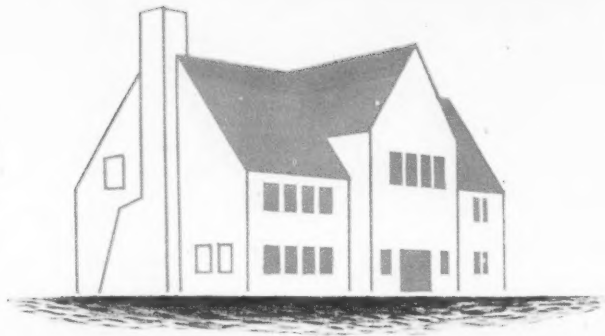
*Steel, proved in the past and present,
for post-war reconstruction.*



THE BRITISH STEELWORK ASSOCIATION, STEEL HOUSE, WESTMINSTER, S.W.1.

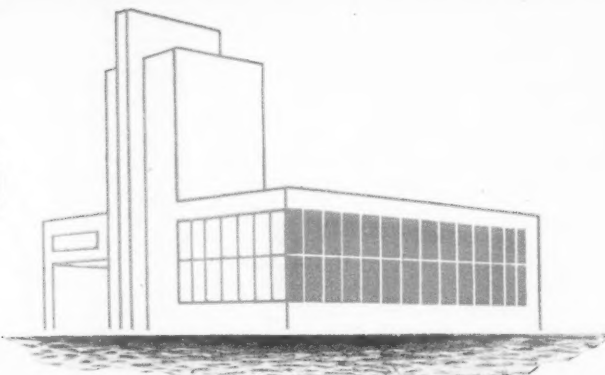
Modern construction without special treatment means heavy transmission losses

1



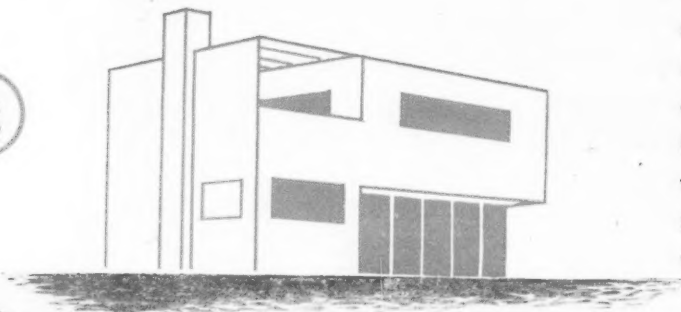
Former type of construction produced warm buildings. It is doubtful if "heat losses" worried our ancestors. Buildings of former times were, in general, well insulated by methods of construction then employed — thick brick and plaster walls, thatched roofs, etc. Houses for gentry and middle-classes in 18th and 19th centuries are generally solidly built with thick walls capable of retaining heat. The "heat conservation" problem was automatically solved.

2



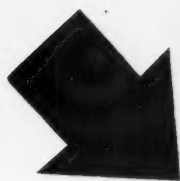
Modern construction often involves heavy transmission losses. Modern utilitarian buildings make great use of highly conducting materials, such as concrete and glass. To save costs, walls are often of minimum thickness. Concrete walls of factories, and extensive window spaces involved by modern design, and often placed in the roof, allow rapid transmission of heat. This means — excessive use of fuel, a vital war material. Man-hour output may be reduced by inadequate heating.

3



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FUEL IS A MUNITION OF WAR



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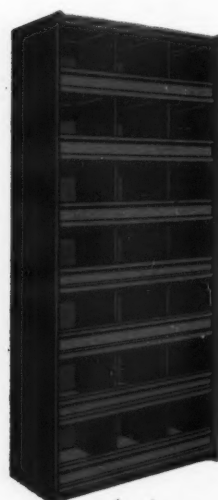
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*from the ruins will rise the **NEW!***

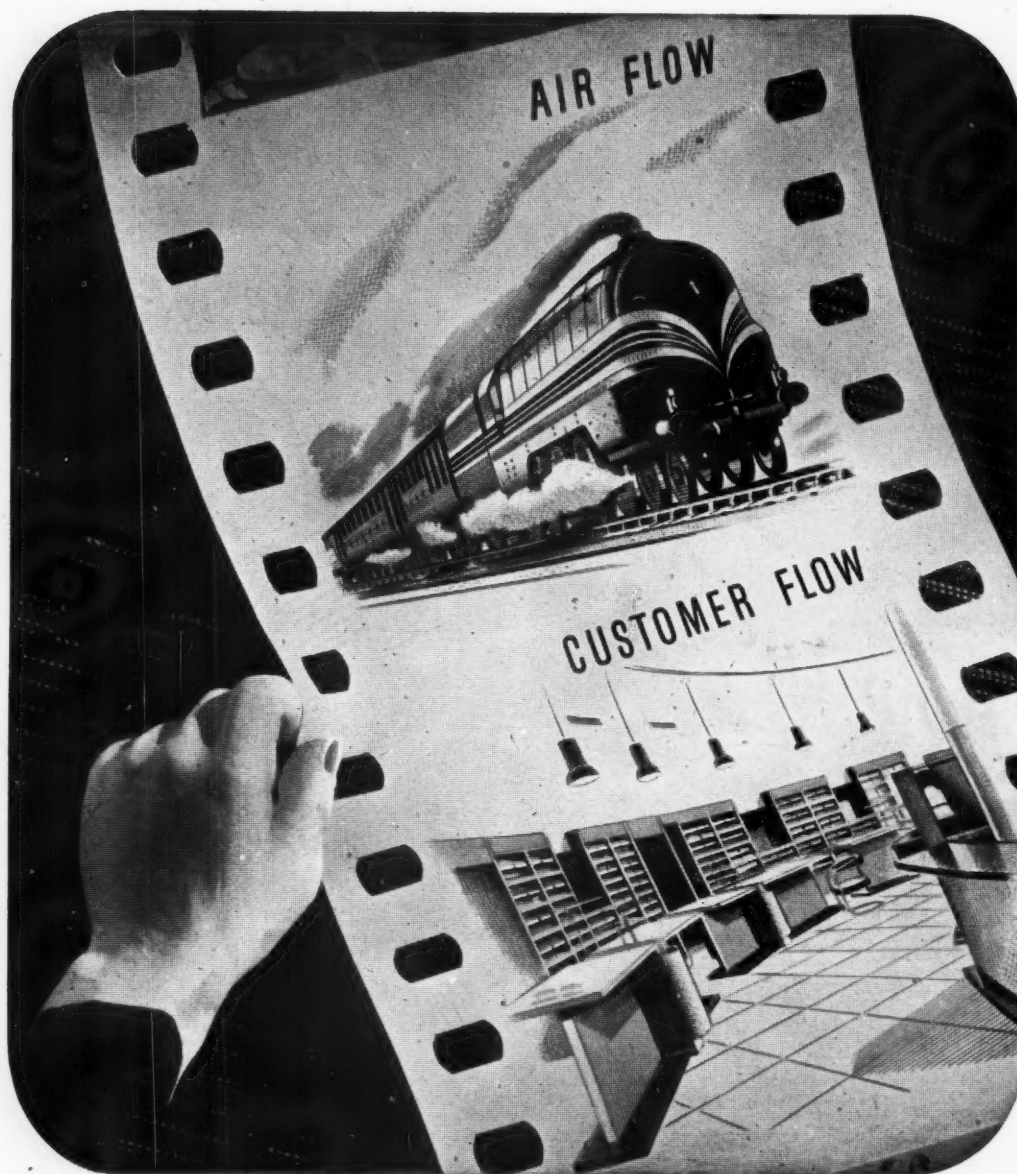


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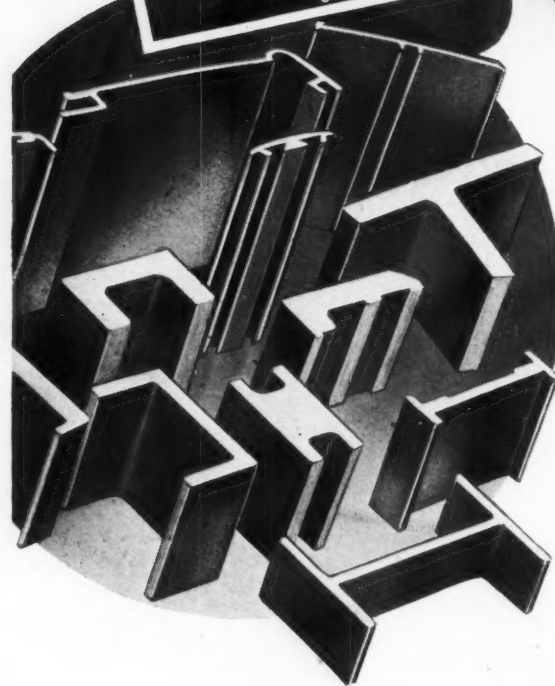
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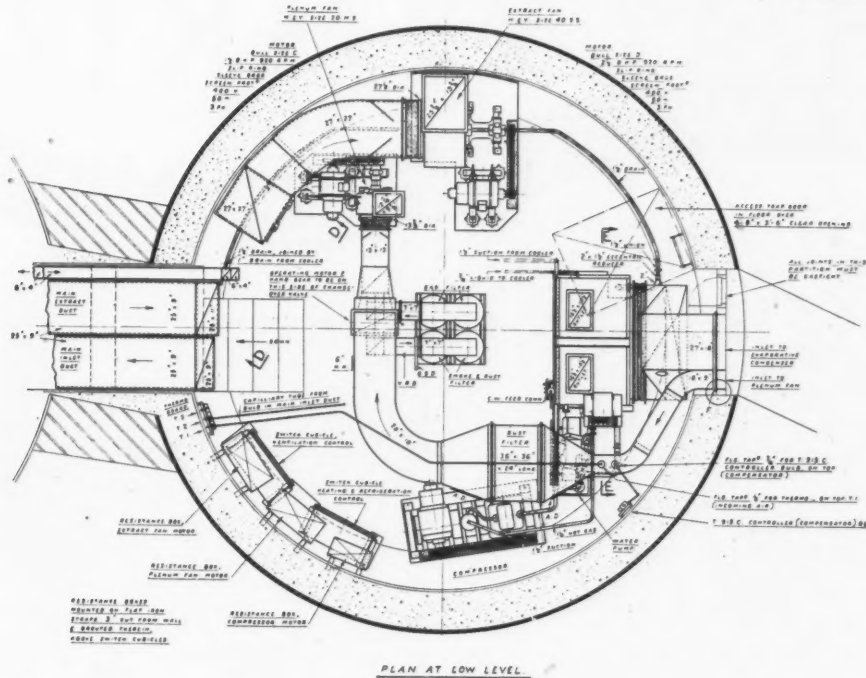
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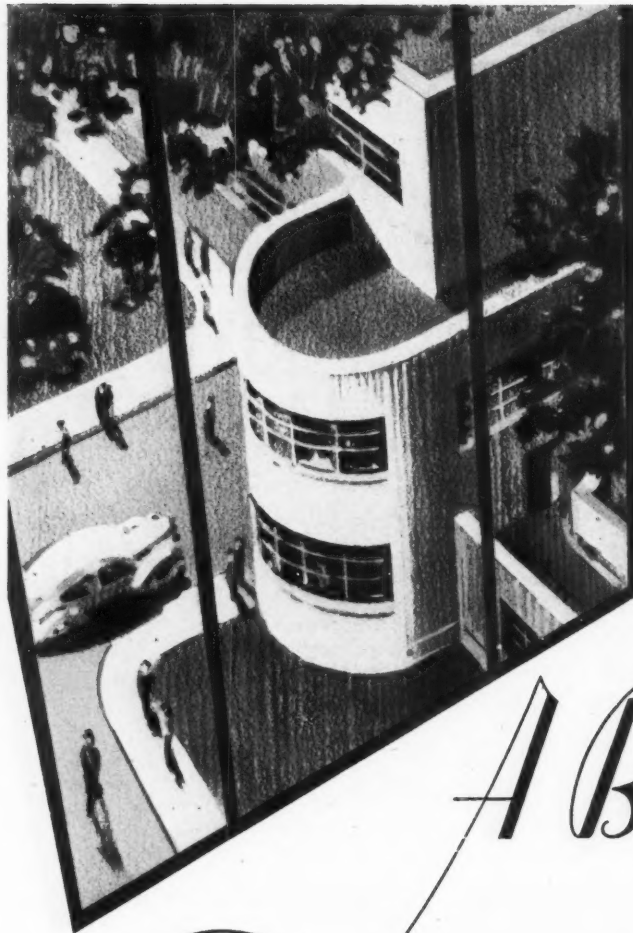
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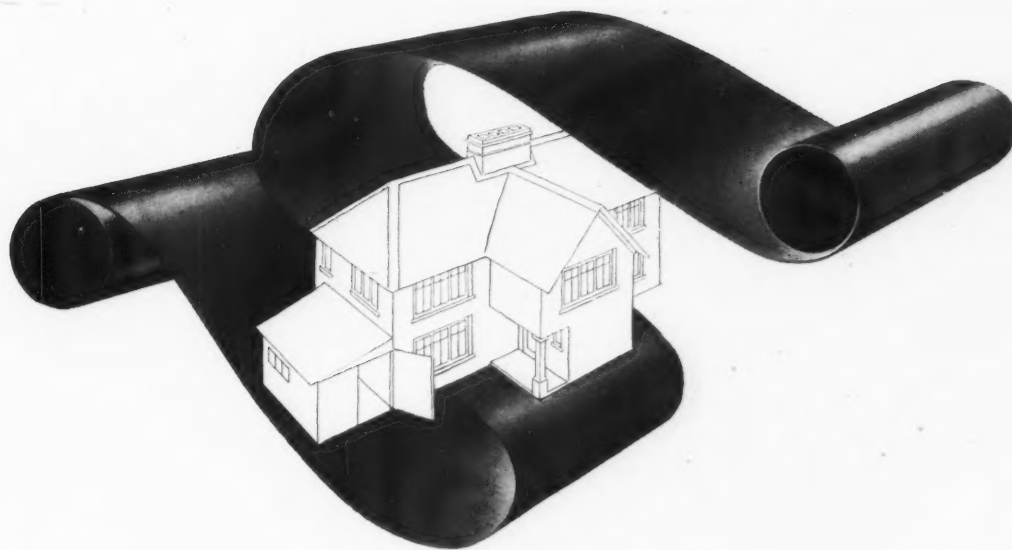
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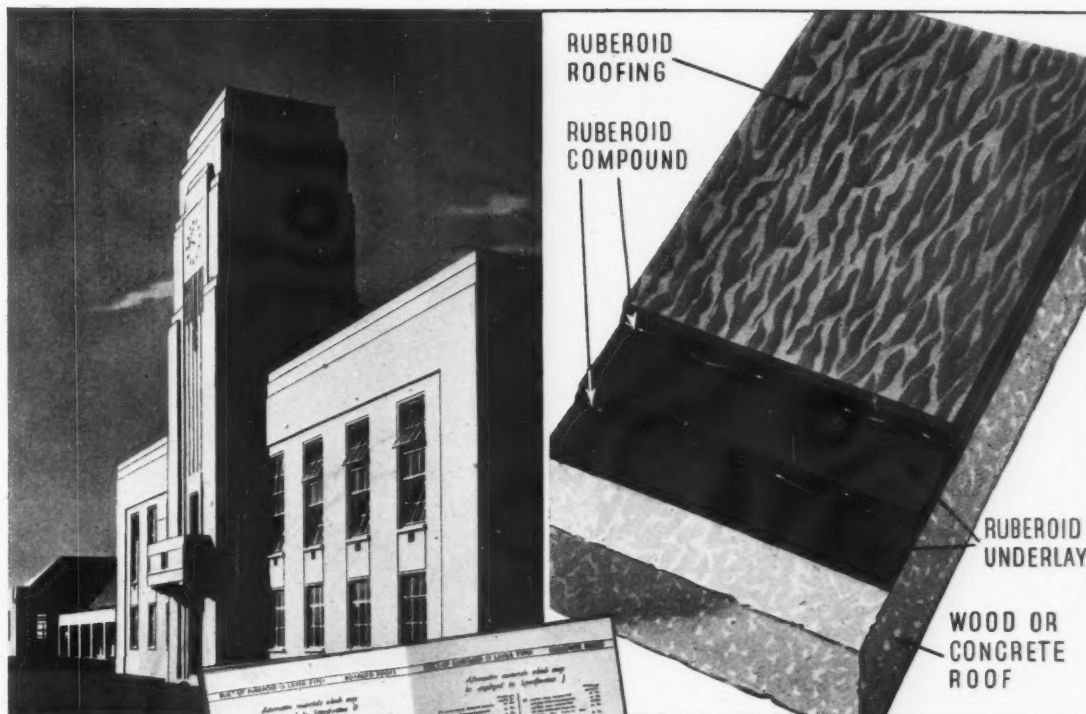
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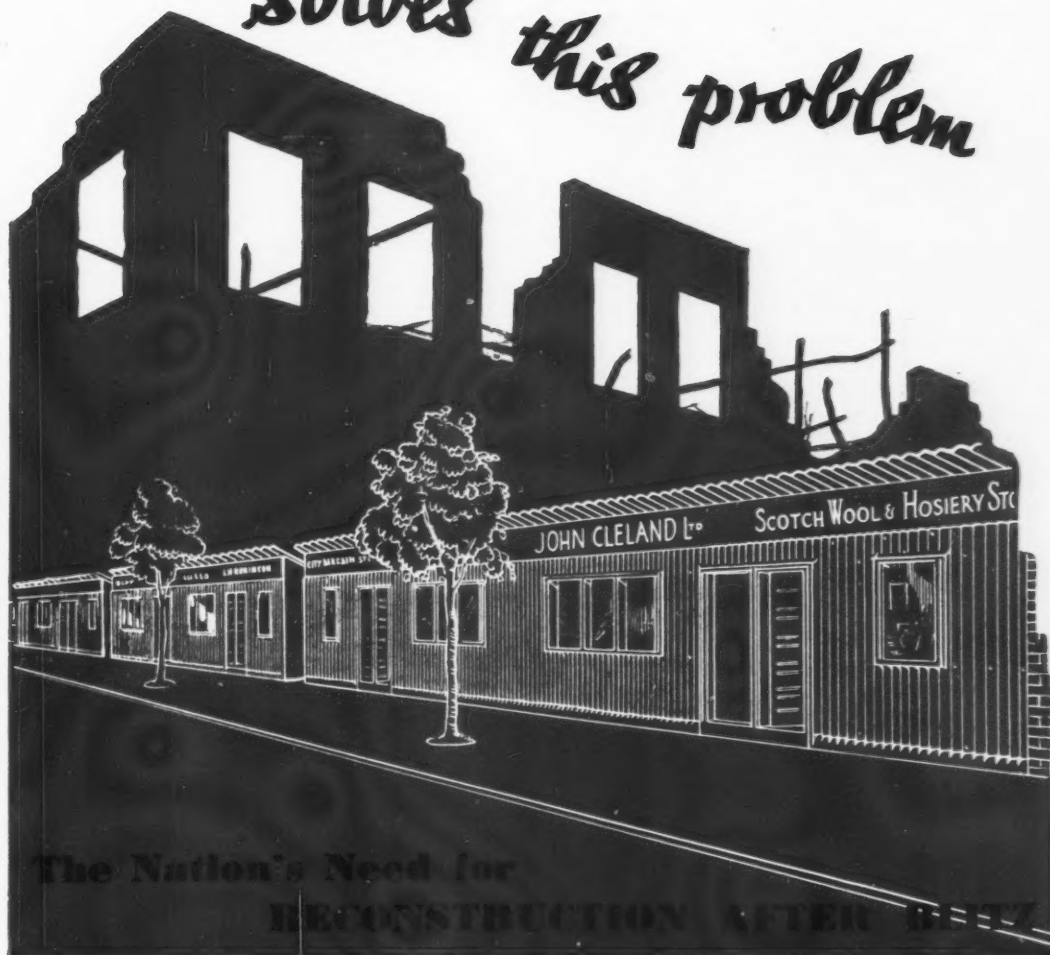
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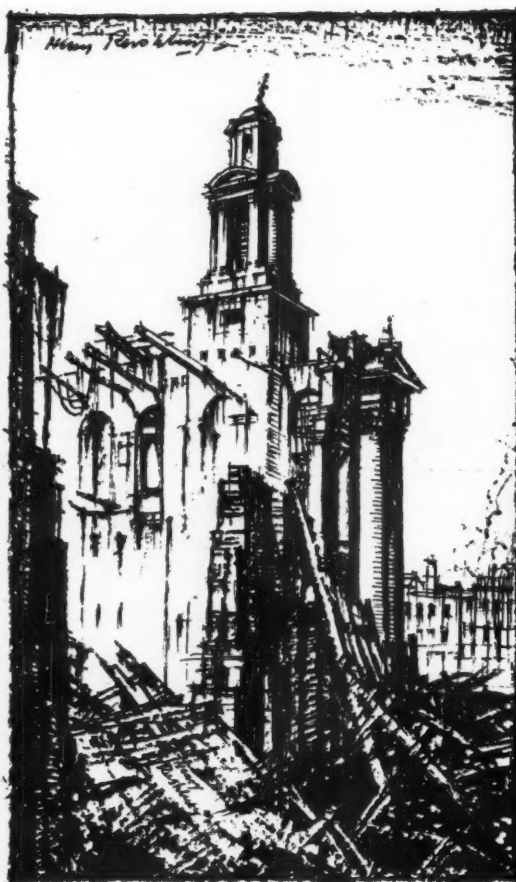


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Vol. XCII

No. 546



Railway architecture of a hundred years ago conforms to the romantic get-up typical of the time, but it is so consistent in all parts of the country and exhibits such a marked fluency of style and sureness of touch that it is clear it results from a deep-seated romantic impulse connected with the whole enterprise of railway building, not from mere architectural eclecticism. The article beginning on the facing page discusses the real nature of this romantic impulse, and the illustrations accompanying it are chosen to summarise the characteristics of the resulting idiom. A distinction is made between the kind of romanticism they exemplify and the spirit which animated the designers of the noble railway engineering works of the same period, which are

romantic in another sense. The latter were super-human in scale and express a sense of achievement and of conscious mastery over the new machines. The romanticism of the buildings discussed in this article was domestic in scale and, instead of proclaiming a new world, aimed at assimilating the products of the new machines into the familiar picture of the humanised landscape of the old world. This signalman's house successfully exploits the rustic charm of the cottage ornée by incorporating the new and otherwise outlandish elements of railway equipment—gates, signals, bells and lamps—in the familiar make-believe of ornamental architecture. Note particularly the way the colour scheme of the half-timbering is repeated in the gates in the foreground.

R A I L W A Y

R U S T I C I T Y

Domesticating the Iron Horse



"The Railway Dragon," drawn by Robert Cruikshank.

By J. M. Richards

"There is not a quiet valley in England that you have not filled with bellowing fire."

John Ruskin (*Sesame and Lilies*, 1865.)

IT is very difficult for us, to whom railway travel is a commonplace, to understand the variety of strong emotions it aroused a hundred years ago. The sense of power the Victorians felt in the pursuit of such a breath-taking enterprise as railway building we can understand to some extent, since it is clearly expressed in the scale and purposefulness of railway engineering, and we ourselves experience something like its counterpart when we link up an Empire with a new air line, transport an army across the world or open up a new heaven of convenience by some technical invention. But it is the literal terror which railways provoked in their early days that is

now so hard to imagine and impossible to recapture—a terror which caused the railway monster to be personified into a kind of demon, of dubious tractability and offering a very real threat to life and property.

Observe the tone of this traveller's account of his first ride on the Liverpool and Manchester Railway, opened in 1830:

"Although the whole passage between Liverpool and Manchester is a series of enchantments, surpassing any in the Arabian Nights . . . yet there are epochs in the transit which are peculiarly exciting . . . At the instant of starting, or rather before, the automaton belches forth an explosion of steam, and seems for a second or two quiescent. But quickly the explosions are reiterated, with shorter and shorter intervals, till they become too rapid to be counted, though still distinct. These belchings or explosions more nearly resemble the pantings of a lion or tiger, than any sound

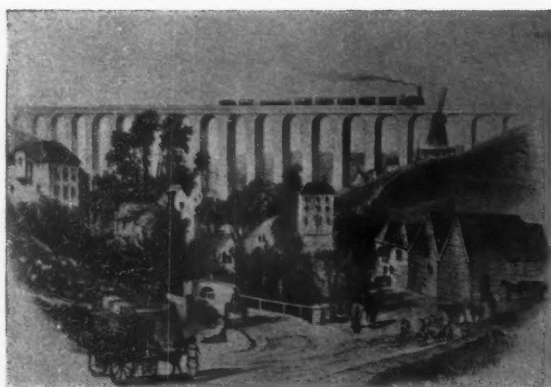
that has ever vibrated on my ear. During the ascent they become slower and slower, till the automaton actually labours like an animal out of breath, from the tremendous efforts to gain the highest point of elevation. . . . With the slow motion of the mighty and animated machine, the breathing becomes more laborious, the growl more distinct, till at length the animal appears exhausted and groans like the tiger, when overpowered in combat by the buffalo. . . . A man may travel from the Pole to the Equator, from the Straits of Mallaca to the Isthmus of Darien, and he will see nothing so astonishing as this. The projections or transits of the train through the tunnels or arches are very electrifying. The deafening peal of thunder, the sudden immersion in gloom, and the clash of reverberated sound in confined space combine to produce a momentary shudder or idea of destruction—a thrill of annihilation which is instantly dispelled on emerging into the cheerful light."

The traveller's sense of wonder at a new experience was often thus overshadowed, if not by actual alarm, by this very "idea of destruction," and by the, at that time, quite novel sensation of helplessness in the grip of a machine, albeit one of his own making. The habit of describing trains and locomotives in biological terms is itself a symptom of the undercurrent of fear with which the triumphs of railway building were accompanied; for it is the commonest way, at any period of human history, of reducing the alarming character of something not understood to human dimensions: that of giving it the shape, and thus imposing on it some of the susceptibility to reason, of man or beast.

Whether we observe the ancients naming the winds as gods and thereby rendering them more capable of propitiation than incalculable natural phenomena, and drawing them as such



In prints of the railway-building age the new machines were often depicted in a threatening and alarming character. One of a series of satires by Henry Heath, entitled "Pleasures of the Rail-road" and published in 1831 (From the Phillimore Collection.)



Romanticism in railway architecture is of two distinct kinds. Top picture, the sublime (Folkestone viaduct, completed in 1843), superhuman in scale, purposeful and inspired by mastery over new techniques. Bottom picture, the ornamental (Pangbourne station, 1839), domesticated in scale, aiming at assimilation into the existing humanised landscape.

in the corners of maps, blowing gusts of air from genial and not too tyrannical countenances; or whether we observe the popular nineteenth century conception of the railway train as a demon devouring live coals—and, again, drawn as such in contemporary prints—looming above the landscape in which the peaceful, antlike human race pursues its industrious activities, we are looking at the same simple instinct, to personify* the apparently ungovernable as a necessary preliminary to bringing it under control.

The significance, however, of the demonic conception of the railway menace of a hundred years ago is that it was not confined to the machine itself. It may have reached its greatest intensity and picturesqueness in the idea of the locomotive plunging across the countryside enveloping everything in its wake in a cloud of sooty smoke, but the sense of menace was associated with the whole railway enterprise. The ruin of thousands of shareholders in the hysterical railway speculations of 1845 was another of this predatory demon's ways of devouring his victims. The relentlessness with which his tentacles spread over the landscape inspired a feeling of helplessness and frustration similar to that which we ourselves feel when we observe tract after tract of quiet countryside eaten up by sporadic building, but more intense because the threat came from new sources; for the railways brought the industrial revolution to people who had not hitherto concerned themselves with it, to

* It is not, perhaps, an accident that the earliest railway engines were named Vulcan, Neptune, Perseus, Apollo and so on, for the machines themselves were the new gods of the nineteenth century. It is a sign that the old awe has been conquered that we now name our engines Sir Edward Elgar or Tottenham Hotspur.

people, that is to say, other than those who deliberately courted its strangeness for the sake of the rewards it offered. The railway menace was, in fact, the menace of industrialism itself, made universally visible for the first time; the first widely evident herald of a coming upheaval—social, economic and aesthetic.

There is no doubt that much railway architecture reflects this sudden awareness and fear of imminent change, and does so in the only natural way: in attempts to impose on it some of the outward character of familiar things and thus reduce the violence of its impact—in just the same way as its personification as a demon was an attempt to make the fearsome locomotive more amenable to control. I have already remarked how the engineering achievements of the railway builders reflect some of the sense of power they must have felt the new science had put into their hands. The noble simplicity of the Britannia bridge, the Wharnccliffe and Folkestone viaducts and King's Cross station—their, at that time, rare acceptance of architectural drama without frills—are founded on the inspiration and stimulus of a genuine victory of mind over material difficulties. Like the great medieval cathedrals or the barbaric fortresses of the Welsh marches—with whose superhuman attributes they have much in common—they represent a coming together of technical achievement and unity of purpose, reflecting a profound sense of the dominant position held by the element of society that created them.

The architectural expression of railway engineering is thus simple and straightforward. It is when we look at railway architecture's more domestic aspect, when it is catering for ordinary people on a scale that permits the individual to be considered, when it is insinuating itself into the thoroughly humanised countryside, that we find it decked out in a fancy style and made to partake in a ritual of make-believe designed to ease the terror with which the railway's advent would naturally be greeted. This is where the predatory monster had to be first appeased and then domesticated; above all, this is where the timid traveller had to be reassured that this monster, so alarming at first sight and sound, was in fact a normal part of the familiar world—which, in Victorian times, was more successfully roped off from the wild vagaries of nature than any world man has ever contrived.

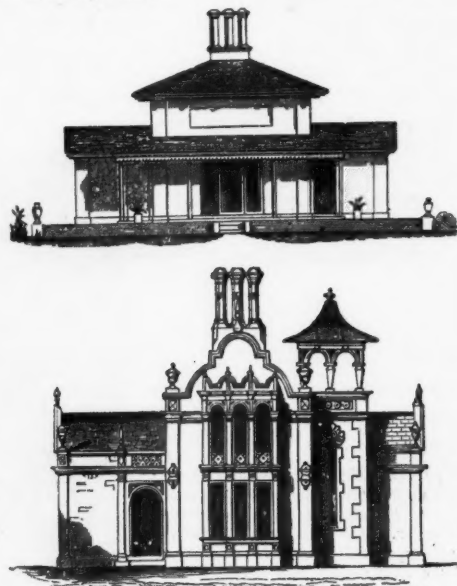
The intruder must be made to seem an ogre in manner only, like the wicked uncle in the Pantomime who momentarily frightens the children but really has a heart of gold like everyone else. His soft heart (despite his gruff voice and bellowing laughter) is most easily believed in when he is found sitting in an antimacassared chair like an ordinary being, with his feet in carpet slippers in front of the fire, with familiar brass knobs on the fender and ornaments on the mantelpiece. Let some of the ornaments be from his own cranky collection, but let them be ranged prettily on the mantelpiece in a familiar way—the momentary alarm will be dispelled. Hence the romantic prettiness of the country railway stations, the perky signal-boxes and the other railway appurtenances illustrated on these pages.

The way they were to be looked at was not as the lurking places of this new monster that had left its iron trail all over the pastoral landscape, but as symbols of the monster's submission to the landscape's own rules of conduct. The country railway station of the kind illustrated here takes its place naturally as just other ornament added to a gentleman's

park. Its pictorial character is identical with that of the new gate-lodge, the keeper's cottage,* the model dairy, the new pigeon-house at the corner of the cider-orchard. And the resemblance is not only one of architectural get-up; it is also to be found in their relation to the landscape—for instance, in the planting. Notice the way several of the stations and other buildings illustrated are richly set about with flowering trees and shrubs, how cosily they are embedded in groves of vegetation on which thought and care has obviously been lavished and which create the illusion that if in a moment a figure should emerge from the shadow of one of their fretted canopies, it will not be that of a grimy signalman or porter but that of the squire himself, strolling through his grounds with his retriever at his heels, on his way to inspect the improvements with which he is amusing himself just round the corner. The practice of neatly cultivating—often with carpet bedding and other decorative effects—the square plots ranged down the

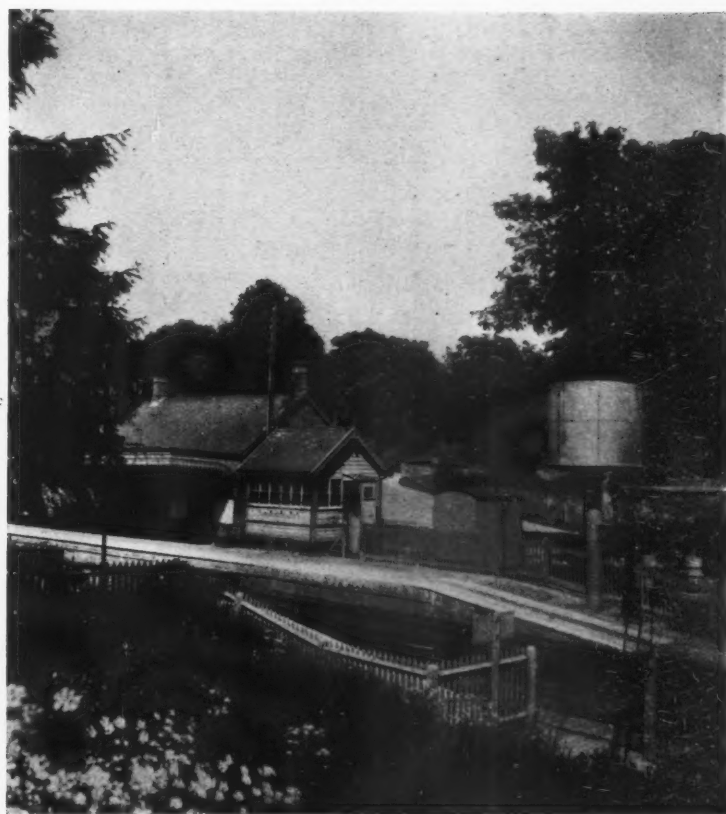
[continued on page 135]

* For a literal illustration of this point, see Loudon's *Encyclopædia of Architecture*, 1833. In the section devoted to "Designs for Ornamental Cottages," four of the examples are entitled respectively, "Cottage in the Style of the Wingfield Station-House, on the North Midland Railway," "Cottage in the Style of the Eckington Railway Station," "Cottage in the Style of the Belper Railway Station," and "Cottage in the Style of the Ambergate Railway Station," all by Francis Thompson, Esq., architect. Mr. Thompson was apparently the author of many of the rustic conceits with which the Midland Railway was—and, to a certain extent, still is—adorned. Loudon, in illustrating these designs, says of them: "They appear to us admirably adapted for the dwellings of persons connected with public or national works, such as railroads, canals, public parks, promenades, gardens, etc.; and they would also be very suitable for country public-houses along main roads. With an additional room or two, any one of them might be rendered fit for the occupation of a gentleman with a small family. We cannot sufficiently express our admiration of the public spirit of the directors of the North Midland Railway, in causing the erection of such architectural gems along their line of works. They are great ornaments of themselves, and as they will be seen by many thousands of all ranks, and remain, it is to be hoped, for several generations standard models of cultivated design, they can hardly fail greatly to improve the general taste of the country. Even the mechanics who have worked at their construction must have had their ideas enlarged, and their taste more or less refined by them. We wish we could see the same spirit actuating the directors of all railroads, the result of which would be, provided some attention were paid to the verdant scenery on the banks, the most interesting public ways in the world." Two of Mr. Thompson's cottage designs, those in the style of the Wingfield and Ambergate stations, are reproduced immediately below.





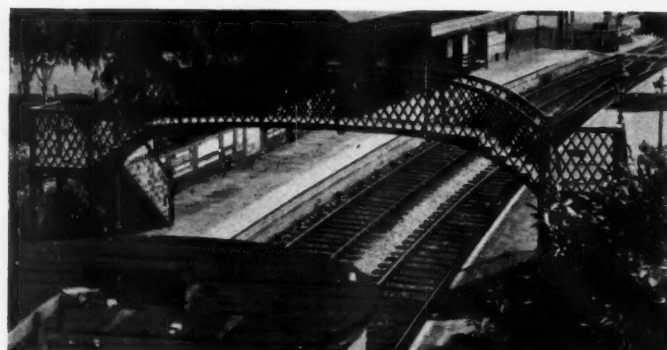
Besides illustrating several of the characteristics of romantic railway station architecture, these three photographs show how it embeds itself in pastoral landscape by providing itself with a rich setting of vegetation, emphasising thereby the particular character these country stations aim at : that of the ornamental appendage to a gentleman's park. In keeping with this role is the modest formality of the example above and the informal grouping of those below, which incorporate several familiar railway-style ingredients : fretted verandah roofs, a lattice bridge disappearing in a grove of trees, a rustic signal box, a cylindrical water tank and pointed wooden palings that follow the undulations of the ground.



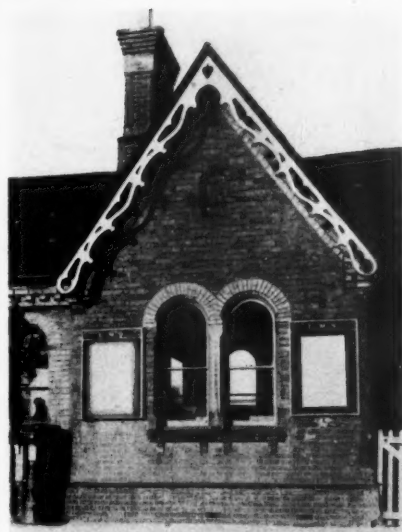
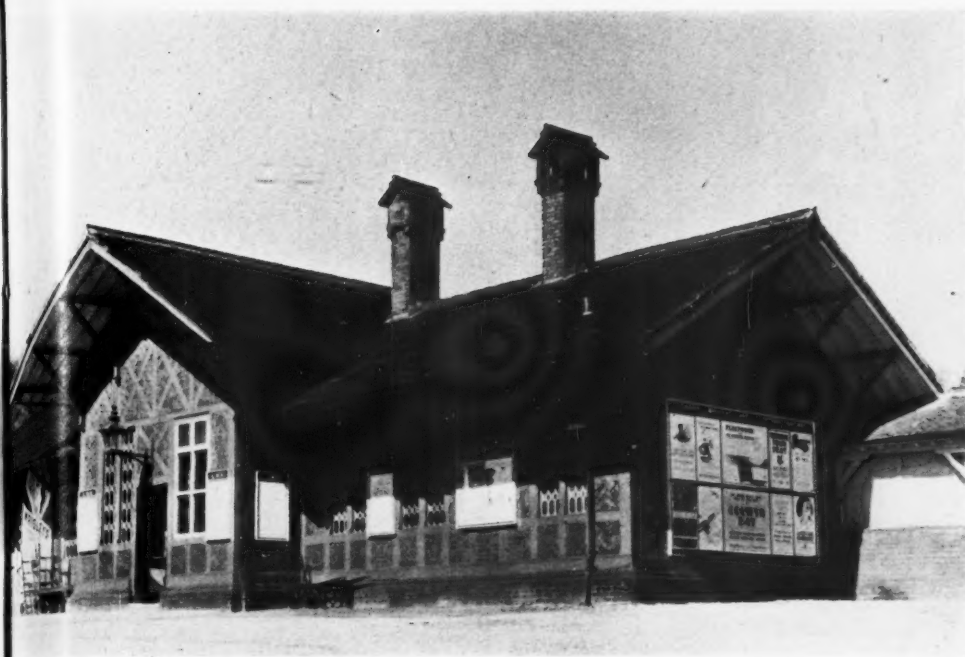
Railway character is most strongly brought out in detail. Below, two details from the platform of the same Derbyshire station. The lower one includes several characteristic ingredients, among them a robustly modelled cast-iron lamp-standard and drinking fountain, Tudor style brick and timber walling and the ubiquitous pointed wooden paling—to say nothing of the ivy romantically twined about its base.



Perhaps the most notable of the new elements the railway introduced into the romantic architectural style was the footbridge, but even in this case adaptation was contrived with so much grace and fancy that neither intimacy nor rusticity of character was lost. Here are four representative examples from East Anglia and the Midlands: two open ones of the iron lattice type and two covered ones, with the fretted canopies that railway architecture has made all its own, and applied particularly to station roofs. On the left is an elaborately detailed signalman's house from Staffordshire.

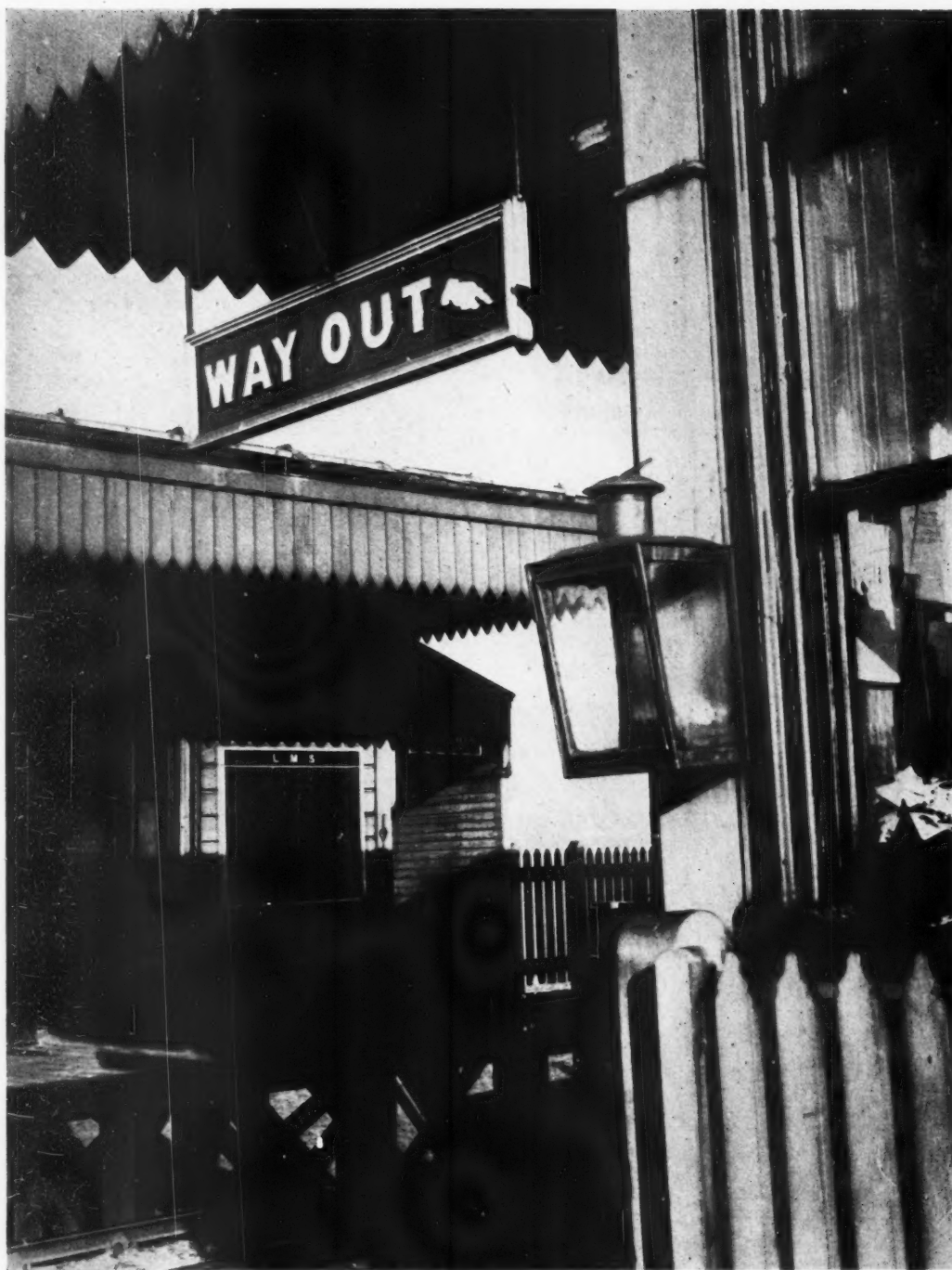


RAILWAY RUSTICITY

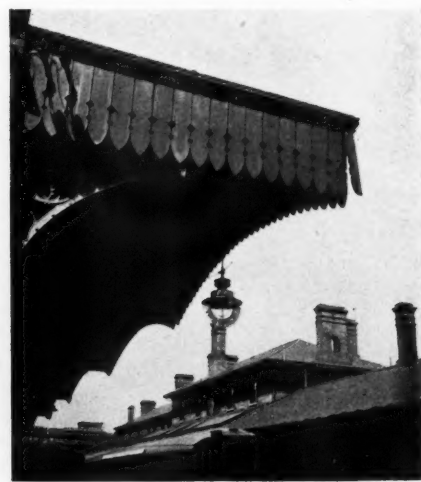
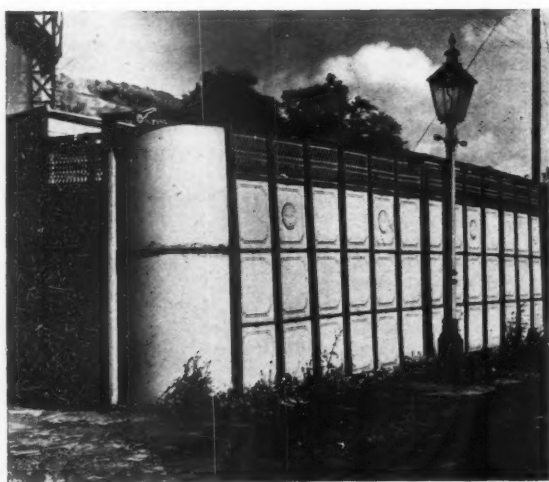


The rustic idiom of the mid-nineteenth century country railway station, though very consistent in spirit, was yet able (like the ornamental architecture with which the pastoral landscape was then being embellished, and in the guise of which the railway was in the process of introducing itself) to draw its motifs from various countries and periods. The Derbyshire station at the top has a Swiss flavour, due to its widespread eaves, despite the elaborate use of Tudor brick-nogging for the walls. The second one is more a law to itself, though there is no mistaking the Gothic origin of chimneys and doorway. The fish-scale tiles on the roof, with ornamental ridge, are typical of the rustic architecture of this period in general and of railway buildings in particular. The bottom examples (both from the Midlands), exhibit the favourite fretted barge-boards of this style and an exceptionally graceful version of the canopy ornamented with a wooden edging and supported on slender iron columns. The small photograph above shows a typical grouping of station buildings, unquestionably at home in their park-like setting.

The photographs on these pages are by John Piper and J. M. Richards.



Left, the simplest version of the railway style: an all-timber wayside station perched on a Derbyshire embankment. Though not furnished with any of the period embellishments or richness of ornament characteristic of the romantic style illustrated elsewhere on these pages, it shows that the style does not only reside in surface ornament; for here is the same sprightliness of manner emerging from pure geometrical abstraction, all the effect being contrived from the typical railway use of overhanging roofs, diagonal cut boarding and lettering. Below, three examples of a more decorative use of materials, even more typical of the railway style: a platform convenience in stamped metal sheeting from Derbyshire, storage sheds on a station in the Home Counties in corrugated iron with sheet metal crestings on the roofs, and an East Anglian instance of the effective combination of bold curves with intricate detailing of timber edging and iron brackets. All the examples on this page also get much of their effect from the characteristic hot buff colour which they are painted, a colour that contributes to the effect of "cheerful light" the early traveller was so pleased to be greeted by on emerging from the tunnel—see the quotation in the second paragraph of the accompanying article. This colour is contrasted in the case of the station at the top with the cool black and white of relief lettering and in the case of the convenience (being on the old Midland) with the plum-coloured paint of the framework. The station roof on the right, however, being on the old Great Eastern, is painted a sage-green.





New style ornament for a gentleman's park.

[continued from page 130]

centre of the island platform and the sloping banks formed behind the platform by the steep gradient of the station approach, besides providing a spare-time occupation for the station staff also helps to create this same illusion. For the degree of care with which the station is tended represents also the degree of domestication achieved—the success with which the alarming newcomer has been incorporated in the intensively humanised landscape and thereby rendered as incapable of disruption as any other of its inhabitants.

The following description* of a signal-box on the Settle and Carlisle line of the Midland Railway suggests a well-kept domestic interior, the setting of a family group by Wilkie or Maclise, rather than a nerve-centre in the new transport system that was revolutionising England even as this encomium was composed:

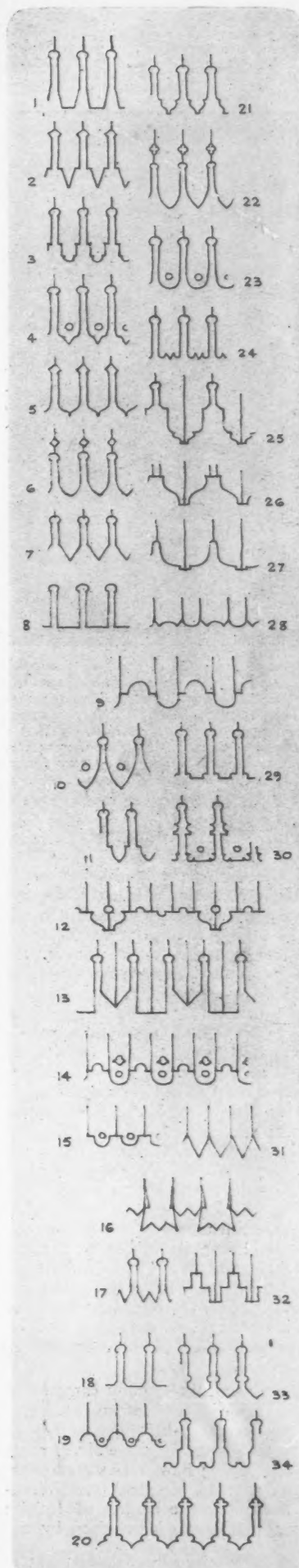
"It is on a bank in a beautiful ravine in Derbyshire. The hills are covered with trees, in which the light spring green of the young wood contrasts with the deep umbrageous foliage of the pines. Ivy and ferns grow over or around the limestone rocks. Rocks settle on the ballast. Jackdaws whirl high overhead. The Wye brawls along the hollow, where one lonely fisherman is casting his line. Up and down the valley are signals, sidings, lines, junctions, and a tunnel mouth. The box itself is a picture of neatness. The floor is cleanly washed; the signal flags are folded together in the corner; the twelve levers are as bright as steel; the petroleum lamp can at any moment be lighted; the Company's books, with their broad yellow leaves on which the signalman makes his entries of everything that happens, lie open on the desk; sundry notices and instructions hang upon the walls; the row of twelve signal lamps for the semaphores are in their places; and, even in that lonely spot, scarcely a minute passes without there being some work to be quickly and accurately done or some record to be entered."

Substitute twelve burnished copper pans for the signal levers and as many texts for the "sundry notices and instructions" hanging on the wall and, while waiting for the lamp to be lit, we might well imagine ourselves in the comfort and security of a Victorian kitchen, with the virtue implicit in the cleanly washed floor only exceeded by that implicit in the state of scarcely a minute passing without there being something to do. That Victorian war-cry of escapism about the devil finding mischief for idle hands indicates at once the spirit in

which the scene is depicted. In fact a "home from home" was the impression that had to be created. It need not surprise us to learn that, according to Taine, a mid-nineteenth century visitor from France, in some English railway stations Bibles were to be found chained to lecterns in the waiting-rooms.

Thus to analyse the escapist—or, more properly, defensive—origin of railway romanticism, does not, of course, imply that it is not still one with the general architectural romanticism of the period—rather the reverse; for its success as a form of protective colouration, by which an intruding factor might be absorbed into the background, depended on its conforming to the common idiom. This is not the place to go into the origins of this idiom in detail. Some of them are well known, others are only hinted at in the motifs employed to adorn the buildings themselves, motifs variously derived from the literary enthusiasms that inspired all the early phase of the Gothic Revival—from the Waverley Novels above all—from an idealisation of the rustic architecture native to the countryside and rediscovered during the wave of sentimental pseudo-rusticity that inspired sophisticated ladies to play at being dairymaids, from fleeting foreign fashions picked up, jackdaw-like, on the Grand Tour by connoisseurs with a keen eye for the picturesque and deposited on their return on top of the growing heap of nineteenth century eclectic styles, to glitter there for a time while their novelty lasted—Swiss chalets, Italian peasant homesteads, Rhenish castles, even the *yalis* of the Turkish Bosphorus—or again from quite arbitrarily invented forms aimed only at picturesqueness of effect.

That is all part of the history of romantic architecture. What peculiar versions of it do we find in these country railway stations and the like? I have already said that although the aim is that the ogre shall be envisaged sitting in front of the fire like an ordinary mortal, there is no harm in his having his own cranky ornaments on his mantelpiece, and it is these, utilised within the framework of current romanticism, that constitute the characteristic railway style. This style is so familiar that it does not need describing, and the photographs that accompany this article define it better than words can do. One thing, however, they cannot show is its colour, which is an essential part of its quality: the hot ochre paintwork, sometimes varied with plum-colour or terra-cotta and blended with dark red brick, the grey slate roofs—perhaps with red picked up again in a tile cresting—grey asphalt platforms and the clear white on sooty black of nameboards and announcements, but the ochre woodwork dominating all. It dominates especially in the verandah roofs. It is natural that the character should be strongest in the parts most closely related to the function of a station, and these roofs with their fancy fretted edges are the essence of station architecture. The ingenious variety contrived for these edges is remarkable. On this page over thirty different patterns are noted, and they are only the product of chance observation by the author during a few railway journeys. It is fitting, as I say, that so much fancy should be lavished on the ornamentation of station roofs—for ornament this fretwork is, in spirit, though the diagonal cut on which it is based presumably springs from the mere need to avoid exposing the end grain of soft timbers—since their roofs give much of the character to stations. Their great overhang sometimes gives them quite a tropical flavour. Or deep eaves provide the justification for an excursion into a Swiss chalet



1. West Druwch.
- 2, 3. Clapham Junction.
4. Penge East.
5. Balham.
6. Ipswich.
7. Acton.
8. Crystal Palace.
9. Lowestoft.
10. Chalk Farm, L.M.S.
11. Romford.
12. Mark's Tey.
13. Westbourne Park.
14. Redhill.
15. Coldham.
16. Leatherhead.
17. Wandsworth Common.
18. Sydenham Hill.
19. Lavant.
20. Warnham.
21. Wembley.
22. March.
23. Taplow.
24. Herne Hill.
25. Chapel-en-le-Frith.
26. Wembley.
27. Willesden.
28. Berwick, Sussex.
29. Brentwood.
30. Camden Town, L.M.S.
31. Parsley Hay.
32. South Kensington.
33. Ealing, G.W.R.
34. Wellington, Salop.

Some variations on a typical railway theme: wooden edgings to station roofs.

* From *Our Iron Roads*, by Frederick S. Williams, 1858.

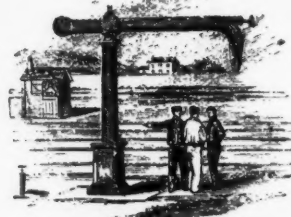


The great railway pioneers are often depicted in masterful, Napoleonic character, but here they can be seen in a disarmingly benevolent guise—one in keeping with the conciliatory nature their rusticity gives to railway buildings. This Stephenson family group suggests no activities more revolutionary than a rural picnic, and the background suggests the most domesticated style of railway architecture. (From an engraving after Lucas, published in 1862, in the Phillimore Collection). George Stephenson is seated, and his son Robert is on the right.

style. And the use of the cantilever—made possible by the introduction of iron roof trusses, and unknown elsewhere in the domestic architecture of the time—provides a new lightness of structure and transparency of volume. In addition to these fascinating new effects of partial enclosure provided by such timber, iron and glass roofs,* the special ingredients contributed by railway buildings to the romantic style are generally to be noticed in the station equipment: in cast-iron seats, corrugated conveniences with sheet-metal crestings, lamps and lamp-standards of all kinds, water tanks and those water cranes (I believe they are called) with leather elephant trunks from which locomotives are supplied. Also in lettering—the latter of a condensed Egyptian or sans-serif form raised in white on a black background. To the foregoing must be added one new element almost exclusive to the railways: the pedestrian bridge, usually in iron lattice with or without a fretted wooden edging like the platform roofs, and often provided by chance or design with a silhouette of charming fantasy, once more reminding us of an ornament in a gentleman's park.

How all these elements actually came to be designed is a subject that deserves careful research in such railway-building records as survive: who, that is to say, were Mr. Francis Thompson's colleagues; how much standardisation was employed; how central (or, alternatively, how local) was the control of design; how much was left to be improvised by the

* Perhaps it is the country railway station (together with the tropical bungalow), not the Frank Lloyd Wright house, that should be given the credit for first breaking down the firm distinction between indoors and out.



No country gentleman would think a railway station as fancifully designed as Woburn, left, an intrusion into his landscape. Nor would he be ashamed to ask his friends to admire this new object, right, in the same spirit in which they admire the ornaments in his own park.

builder of the individual station or other structure; how much one set of details was confined to one Company or one locality—and so on. That historical and factual aspect of the subject cannot be embarked on here. Very little, I think, is known about it. What is significant for our present purpose is not the local variations in the romantic railway style, but its consistency in the face of the natural tendency such romanticism has to indulge in whims and idiosyncrasies.

For despite small differences, the country railway station is astonishingly consistent in idiom throughout the whole of England. I have already mentioned the consistency of its colour schemes, and similarly the character—in the whole and in detail—of its long, low silhouette with flat-pitched roof emphasised at eaves level by the deep shadows of its overhanging platform roofs, its clustered chimneys, artfully grouped windows and fretted woodwork, is as familiar as it is ubiquitous. So is its richly domestic style of planting, though this naturally varies more with the locality. In fact, railway architecture is another example of a true vernacular idiom, to be classed with the idiom (which has already been dealt with in these pages*) evolved during the same period by the rococo "gin-palace" type of Victorian pub and the Nonconformist chapel. Each of these is naive yet expressive in character and unselfconscious in the sense that it is free from the influence of the individual architect's personality. Its style is that of a

craft tradition coloured—especially in the case of the Victorian pub—by the extensive use of ready-made elements standardised by manufacturers.

One might also compare it with our own vernacular found in the neo-Tudor building estate, with its imitation oak beams, ingle-nooks, cottage porches and privet hedges, which is just as surprising in its consistency throughout the country. It may not seem to have such character and charm, perhaps because it is more shoddily built, perhaps because it does not carry quite the same conviction, perhaps only because it is newer—who can predict the influence of time on our affection for architectural styles? But speculative-builders' Tudor has this in common with railway station rustic: their popularity and universality can both be considered as the result of the same urge to retreat into rosy make-believe from the alarms and uncertainties of a changing world. Whatever interest we take in the decorative achievements of the railway style, this is what we come back to. In the face of the threat of the newfangled monster lurking in the tunnel, waiting to rush out from the bowels of the earth, the achievement is that as the ferocious headpiece of the locomotive emerges, it is seen framed in the romantic Gothic of the tunnel mouth, and is then no more alarming than Father Christmas when he issues from the nursery fireplace. When the train draws into the rustic station it means that the ravaging monster has been successfully lured into an environment where it can no longer cast doubts on the Victorian's ability to twist the universe round his little finger.

* THE ARCHITECTURAL REVIEW, March, 1940, and December, 1940.



NEW WORK AT OXFORD

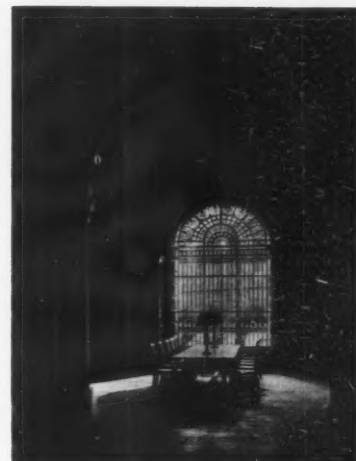
HUBERT WORTHINGTON, ARCHITECT

There is no town in England, and naturally so, over which tradition has such a firm hold as over Oxford. A strictly contemporary idiom, such as Caius College, Cambridge chose for its new buildings in the market place some years ago, has never been attempted. Nor would it be easy to find sites in Oxford so untouched by the college atmosphere as is the market place in Cambridge. At Nuffield College such a site exists, and it will be for Oxford to show after the war what the University can make of it. In most positions a synthesis or compromise between old and new is justifiable. This applies unquestionably to the sites of the new work here illustrated. They dictated to a large extent the architect's views and his methods.



BODLEIAN LIBRARY

THE BODLEIAN LIBRARY. By the completion of Sir Giles Scott's building, across the Broad, the old Bodleian gained ample space for new reading rooms on the first floor, and offices and other special rooms on the ground floor. Most of the restoring and rearranging will be done after the war, but the council chamber here shown was recently completed. It is 43 ft. by 23 ft., 16 ft. high, and lined with the oak panelling contemporary with the building that was found behind late eighteenth century bookcases. On the right are the Savilian cupboards which had been tucked away in a mezzanine of later construction.



RADCLIFFE CAMERA

THE RADCLIFFE CAMERA. After the rearrangement of the upper reading room, the undercroft has now been restored. This was designed by Gibbs to support the main floor above. It had open arcades, a central saucer dome and stone vaults to the bays. In course of time the arcades were glazed, and the space converted to library use as a book store. The walls and the vaults, which are amongst the most interesting of the eighteenth century in England, have been cleaned and are now as fresh as when they were first built. The crowded book-stacks have been removed. It is now a spacious reading room and is illuminated by concealed lighting and table lamps.

LIBRARY AT NEW COLLEGE

THE NEW LIBRARY, built because the existing one was considered unworthy of the College in beauty and convenience, came into being under the guidance of the late warden, the Rt. Hon. H. A. L. Fisher, O.M., and Professor J. L. Myres, librarian.

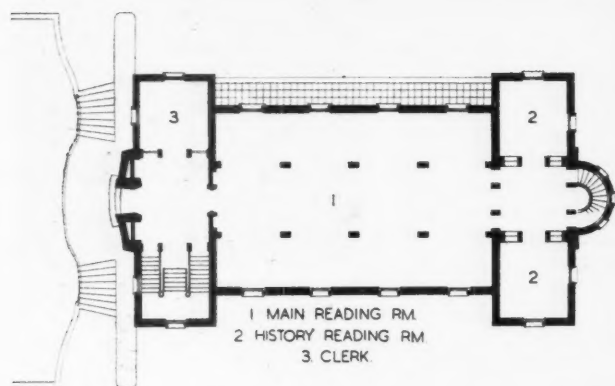
The site is at the western end of the Holywell Quadrangle, between the Bell Tower and the cloister on the south, and the old Holywell houses on the north. The new building was kept as low as possible to line with the city wall, and to avoid competing with the dominating masses of the mediaeval hall and chapel. It has been planned as an island building set in a garden, an extended garden and not a curtailed one, for the site was largely obtained by the demolition of small buildings, and the clearing of backyards.

From the front the library has the appearance of a single storey building, but advantage has been taken of a sunk garden along its side to contrive a lower storey, on which the main floor is raised some five feet above the lawns. The central entrance has a double outer staircase with slightly radiating steps, leading up to a platform. The retaining walls on either side are capped with flower beds that give formal lines of colour.

For the foundation, piles going down some forty feet were necessary, and the walls had to be built on a reinforced concrete

base, the new library at the western end of the Holywell Quadrangle, between Bell Tower and cloister. The facade appears one-storeyed, though the building could, owing to a sunk garden along its north and south sides, be developed on two floors. The walls are of Bladon stone with Clipsham dressings. The keystone over the main entrance bears William of Wykeham's arms.





2, the front of the library, with the gently curved, projecting centre. 3, the long south side with the city wall on the right. The building lies outside the wall, over the old ditch. Foundations were therefore complicated. 4, the entrance hall with the glass-fronted librarian's room.



frame supported by these piles. To avoid the danger of shaking the ancient foundations of the chapel and ante-chapel, the bell tower, cloisters and city wall, pressure piles were necessary, and these called for much ingenuity.

The buildings are of stone, with Clipsham dressings and Bladon walling. The entrance front has a curve in plan which gives interesting modelling. The keystone to the deep-set main doorway has the arms and mitre of William of Wykeham, the founder of the College, and the arms of Warden Spooner and Warden Fisher, who were mainly responsible for the scheme, are carved higher up, on the return of the central block.

The walls are capped by a strong ashlar moulding and the roofs are of copper, at a flat pitch, to echo the Perpendicular roofs on the mediaeval Hall and Chapel.

The entrance hall has piers of creamy travertine. The walls are also lined with this beautiful material. The metalwork is bronze, the floor of Lunel Uni marble. Behind a bronze and glass screen is the librarian's room, with beech desk and bookcases and ebonised tops. A double stair leads down to the stack, and the history, law, and rare-book rooms, with tutorial studies.

Opposite the entrance is the main reading room, with a wide central space, four cubes long, and four spacious book-lined bays on either side. Bookcases, panelling, and furniture are of English oak. The ceiling is of sycamore, giving a pleasant light reflection. The tall windows flood the readers' tables with light. The artificial lighting is indirect. On the south is a terrace which readers can use in summer.

Beyond the main reading room a western hall, or crossing, with slender oak piers, leads by a semicircular staircase to the lower floor, which is lined with travertine in facets, and has the founder's crozier as the motif for the balusters.

On either side of the western hall are the two history rooms, also of oak. In the law library mahogany is used, in the classics library sycamore, and in the rare-book room walnut, of a particularly soft figure and tone, with bronze grilles protecting the *incunabula*.

Along the main length of the north side is the book-stack, with metal cases, café-au-lait in colour, and walls of cream-coloured tiles, a desirable factor in a stack, for cleanliness and light reflection. At the end of each bay is a *carrel* table under the windows.



5



6



7



8

The main reading room, 5, has a central space, four cubes long, with four spacious bays on either side, 6, and a terrace along the south side for readers' use during the summer. The furniture, bookcases and panelling are English oak, the ceiling sycamore. Lighting is indirect. 7, the curved back staircase to the lower floor. Its graceful railing has the crozier of the founder of the college as its motif. 8, the rare-book room with furniture of English walnut and bronze grilles to protect the *incunabula*.

L I B R A R Y A T N E W C O L L E G E

GARDEN BUILDINGS

MERTON COLLEGE

GARDEN BUILDINGS is erected on an independent site, but within easy reach of the college. It provides twenty-four undergraduates' sets, a common-room, two fellows' houses and a porter's lodge.

The site was a market garden behind an old wall that bordered on Rose Lane. Opposite are the Botanic Gardens. At the back, parallel with Rose Lane, runs the City Wall, supporting the Fellows' terrace, and behind this is the Fellows' garden of the college, with Merton Street adjacent.

The general layout is somewhat reminiscent of the English Palladian tradition. It is centred on a main axis through the archway under the common-room block, which lines with the side gate of the Botanic Gardens on the east, and a new archway in the city wall on the west. From this spine the building extends towards north and south with four subsidiary blocks in the corners. It was important that the building should be kept as low as possible so as not to block the view of Magdalen tower from Merton Street and the Fellows' terrace. The low-pitched copper roofs helped to meet this need.

The foundations (as also in the case of the library for New College) offered a formidable problem, and consequently piles of nearly twice the height of the building had to be driven over this considerable area. The piles are tied in by reinforced concrete beams on which the walls rest.

The building has a frontage of 285 feet. The Bladon walling, with Clipsham dressings to quoins, doorways and window surrounds, is capped by a strong horizontal moulding.

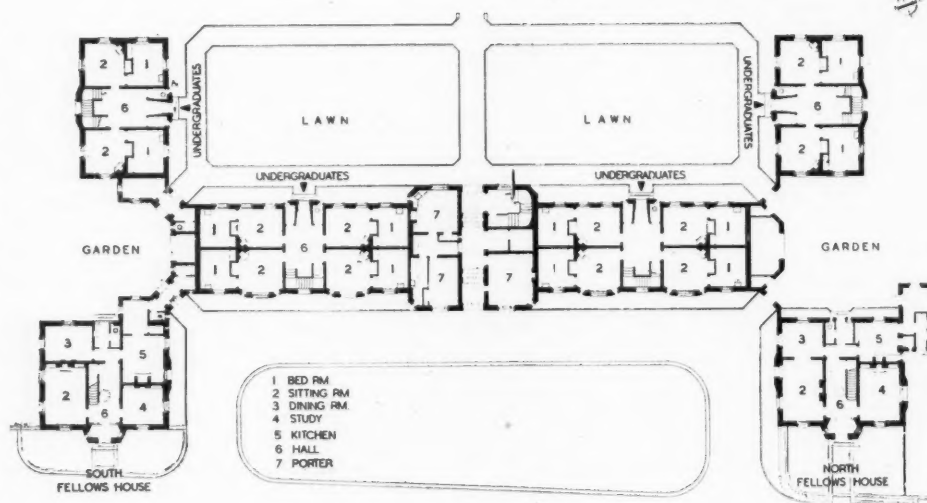
The common-room is in the centre of the first floor, above the archway. It is lit by three tall and two narrow windows, and has fireplaces at each end. Breakfasts are served here from a small kitchen, lunches and dinners being taken in college.

For the undergraduates' sets the traditional Oxford staircase principle was thought to be both the most economical in planning, and the most satisfactory in use. Eight sets are served by each staircase in the centre block, and four in the two wings. Each set has a comfortable sitting-room with a bedroom opening off it. Bedrooms have running water, built-in clothes cupboards, and small safes, the size of a brick, concealed in the wall surface. All the internal woodwork is of oak or teak to reduce upkeep costs. The rooms are light, with a pleasant outlook over flower-beds, large expanses of lawn and fine old trees. Bathrooms and showers are at first floor level over the entrance lobby.

The Fellows' houses differ in plan to suit aspect and prospect. They were built for married Fellows with children, and have a sitting-room, dining-room, study and five bedrooms each.



Garden Buildings, 1, lies between the Botanic Gardens and the city wall, close to the main buildings of the college. It has a frontage of 285 feet and contains twenty-four undergraduates' sets, a common-room (on the first floor of the centre block above the main entrance) and two Fellows' houses. These, 2, come in the projecting wings on the Rose Lane side and have three living-rooms and five bedrooms each. The undergraduates' sets are served by four staircases on the traditional Oxford principle, with a central staircase to the common-room. Each set has a sitting-room, 3, with a bedroom off it. The woodwork is oak or teak.



GROUND FLOOR PLAN



DESTRUCTION AND RECONSTRUCTION

THE ARCHITECTURAL REVIEW SUPPLEMENT: JUNE 1942

BOMB DAMAGE TO NOTABLE BUILDINGS HULL



THE CHARTERHOUSE is a building in the excellent taste of 1780, with a chapel in the centre and lodgings for the brothers and sisters on either side. The foundation dates from the 14th century when the hospital was established outside the Carthusian monastery from which it takes its name. The present building has suffered badly from blast but is not beyond repair. The illustration shows the porch to the chapel. Above the pediment is a well-designed cupola; there is a remarkably fine pulpit inside and the rooms retain their original combination grates for heating and cooking.



THE PILOT OFFICE was built in red brick shortly after 1832, on the quay overlooking the Ferry Pier. Administered by commissioners under the Humber Pilot Act, it was originally staffed by forty-six pilots, who took duty in rotation in the observatory on the top floor. The building has been badly damaged by blast and the decorative masonry has fallen from the window over the columned entrance.





TRINITY ALMSHOUSES, designed by the Hull architect, Richard Mountain, in 1834, were scheduled for demolition before the war. This was one of several fine buildings for which the Trinity House of Hull was responsible in the 18th and 19th centuries. It comprised thirty-six apartments for decayed mariners and wives and widows of mariners. The stucco façade was considerably higher than the structure warranted and absurdly out of keeping with the bare simplicity of the rooms within. Nevertheless, it supported the dignity of Trinity House and was a striking adornment of the not very beautiful city of Hull. Excellent and more appropriately designed brick almshouses, built a few years later, survive along two sides of the site of the main building, which has been entirely destroyed.



ALBION STREET, Hull's principal Georgian street, was part of a spacious development of the town, dating from about 1790, and comprising also Kingston Square and Jarratt Street. The houses are of the dull red brick common in the north, and most of them have porches. On the north side, the monotony of the street was broken by a series of large houses (left and centre) with pediments filled with medallions and swags. Right, part of Little Humber Street, the south-westward continuation of Hull's ancient High Street. This building incorporates the Little Lane archway, belonging to the 17th century or earlier and originally forming a water-gate to the Humber.



WAREHOUSE behind Wilberforce House Museum, in High Street. This had been transformed into an extension to the Museum and contained a street of old house fronts transferred from different parts of the country and including, for example, an exceptionally fine Georgian shop front from Lewes, Sussex. Its chief interest, as seen in the illustration, is that it was typical of the brick and cast-iron warehouses built in the 19th century in the gardens of the old merchants' houses between High Street and the Humber. Wilberforce House itself, dating from Charles I's time and containing excellent wood and plaster work typical of 18th century Hull, has luckily survived intact.



THE CONGREGATIONAL CHAPEL stands in the severely bombed Albion Street (see above) and has been gutted. It was the work of H. F. Lockwood, 1842, the architect who, with the Mawson brothers, designed the City Temple, London, thirty years later. The Chapel was denominated Independent on its foundation, but like other Independent chapels, eventually became Congregationalist in character.

H U L L

A Master Plan for London

BASED ON RESEARCH CARRIED OUT BY THE TOWN PLANNING COMMITTEE OF THE M.A.R.S. GROUP

Analysed and described by Arthur Korn and Felix J. Samuely

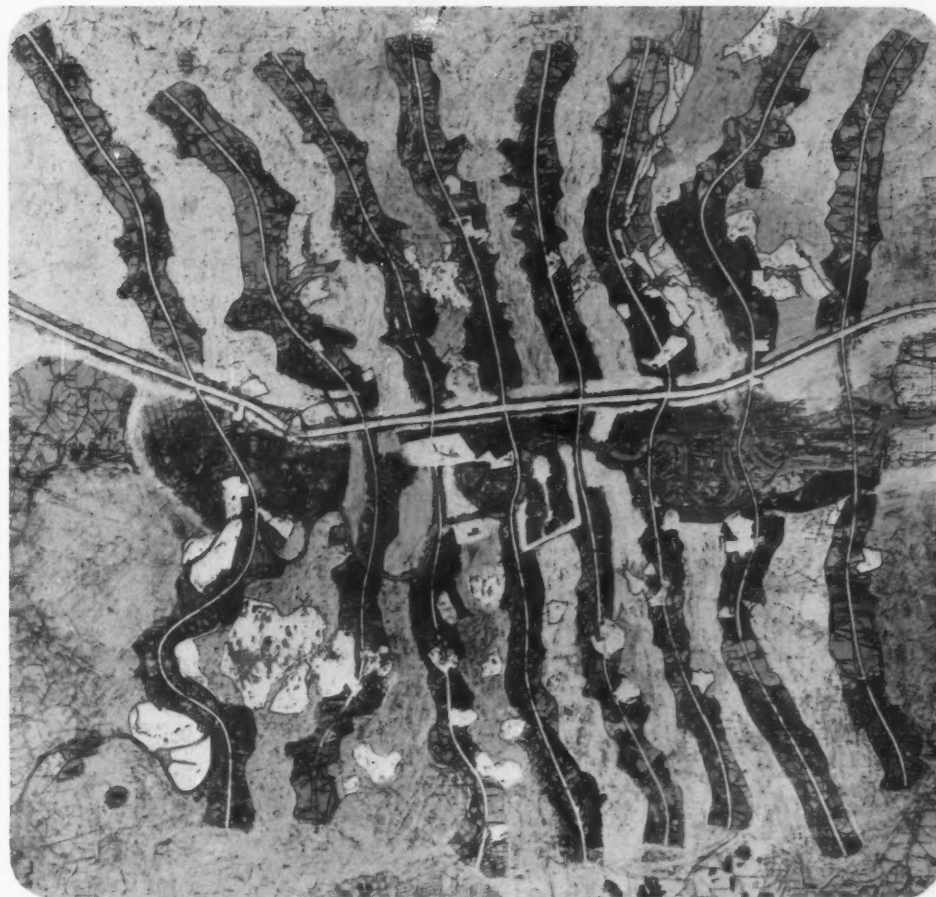
Town planning in London has been the subject of study on the part of many expert committees, and was being actively discussed even before recent events fostered the present public enthusiasm for "Reconstruction." Amongst the discussions were those of the Town Planning Committee of the M.A.R.S. (Modern Architectural Research) Group, which was set up in December, 1937, and was notable for its insistence that London must be considered in its entirety, as a working organism, and that a master plan was needed to which individual improvement schemes could all be orientated.

The Group worked out the outlines of a master plan, basing it on a methodical analysis of the relevant factors, social, economic, architectural, etc., and their findings and the arguments that led up to them are summarised on the following pages. It is not claimed that the Group's own plan is the only admissible plan for an improved London; it is put forward to illustrate the result of reconsidering the whole problem of London from the beginning. Whatever the merits or demerits of this plan, it is held that the principles on which it is based remain valid, and that so does the need for a similarly bold attempt to eliminate the losses in efficiency that years of uncontrolled expansion have entailed.

Among the architect members of the M.A.R.S. Group who served actively on the Town Planning Committee were E. Maxwell Fry, Godfrey Samuel, William Tatton Brown, Arthur Ling and Christopher Tunnard, with Arthur Korn as chairman. A sub-committee, dealing with transport and economics, was led by F. J. Samuely.

Sources—The following official publications provide valuable statistical material and have been used as sources of reference:

London Statistics. Vols. 39-41 (1936-1938).
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1. Draught plan giving a rough impression of what the map of London would look like after completion of the M.A.R.S. replanning scheme; ribbons of open country penetrate into the city between the main roads. For improved layout see figs. 4, 5 and 16.

1. FACTORS INVOLVED

The fact that during the last 20 years before the war as many as 900,000 houses were built in Greater London, rehousing over four million people, is sufficient proof of the scale on which a modern metropolis develops. To study methodically the component forces which, although unrecognisable to the perspective of the single individual, determine the very existence of such a community, to draw the conclusions they indicate and to allow himself to be guided to a logical conclusion are the main tasks of the town-planner. The fact that a workable plan has been arrived at in this way—one which is technically and economically capable of being carried out—bears witness to the efficiency of this method. **The three basic forces** can be defined as social, geographical and economic. Even the effect of the second greatly depends on the state of society and of technical progress.

The town is primarily a social phenomenon. Even if the general social structure in a country were assumed to be more or less invariable for a certain period and its influence upon the town therefore considered as "static," there would still be influences or dynamic forces of a social nature at work depending to a large extent upon the change of background and its economical influence, of the kind that govern the birth of a town, its growth and decay. **London is a unique and, at the same time, a typical metropolis.** It shares with other capitals all the typical features: the general chaotic conditions, the spoiled countryside, the slums, the dreary suburbs. These are all witnesses to a rapid and unorganised growth. Its individual problems are unparalleled, due to the insular position of England which has allowed her inhabitants to develop their own habits independent of the continent, and because of England's

role as financier of an Empire, London representing the "City" and the chief port. This particular function, together with the country's great colliery development, is the reason why, after many centuries of indifferent growth and even stagnation, the nineteenth century saw the evolution which, with ever-increasing speed, created both enormous wealth and mass poverty. The analysis of contemporary social influences uncovers many problems which can be solved only by considering the nation as a whole, and not from the point of view of a single town, even London. The question of concentration versus deconcentration, the location not only of production but also of consumption, etc., can be answered only by national planning. For the time being any plan must be sufficiently flexible to allow the results of any national investigations to be made use of whenever they become available.

The chief geographical feature of London is still the Thames Valley and the Thames estuary. The two areas of high ground to the north and south—Hampstead Heath and Sydenham Hill—the tributaries of the Thames—the Lea, the Brent and the Colne—and the large parks, are all geographical elements that cannot be ignored. But it is more than anything else, the Port of London, the largest importing centre in the world, which is responsible for the prosperity of the town, and which provides the reason why the City stands for what it does. The City, in turn, has had the effect of attracting further shipping to the Port of London. Table I, giving the import and export values for Britain's five principal ports (average of the year 1935-1936) shows that, while Liverpool was but little behind London with exports, London was 200 per cent. ahead with imports. The fact that Liverpool, in its turn, outdistances all the remaining

TABLE I. The Importance of the Port of London.
(Average 1935-36).

	<i>Import Value</i> (million £)		<i>Export Value</i> including re-export (million £)		<i>Part of British Export Deficit</i>	<i>Tonnage of Shipping</i>					
						<i>Arriving</i> (million tons per year)			<i>Departing</i>		
London	337.23	42.1%	151.00	30.7%	60.2%	30.271	17.0%	30.685	17.2%		
Liverpool	149.39	18.6%	135.09	27.6%	4.6%	16.863	9.5%	16.883	9.5%		
Hull	52.31	6.5%	25.66	5.2%	8.6%	6.075	3.4%	5.931	3.3%		
Southampton	27.94	3.5%	31.70	6.4%	1.1%	12.690	7.1%	12.659	7.1%		
Manchester	42.65	5.3%	13.37	12.5%	9.4%	3.952	2.2%	3.727	2.1%		
Gt. Britain	801.90	100%	191.75	100%	100%	177.662	100%	178.125	100%		

In value, 42·1 per cent. of all imports, and 30·7 per cent. of all exports go through the Port of London. In addition, 57·1 per cent. of goods imported for trans-shipment under bond (15.60 million £) pass through London. Expressed in weight, the imports (about 21 million tons) represent only 33 per cent. The great difference between the percentage of import and export on the one hand, and shipping tonnage on the other, is due mainly to two facts :—

(1) Not many vessels, on the voyage from the continent to overseas, put in at London.

(2) At present, passenger traffic is concentrated more at ports like Southampton and Liverpool, than at London.

TABLE II. Balance Sheet (expressed in weekly working hours).

In London the value of one person's work each year = £275 = 2/6 per hour,
43 hrs. per week.

The number of working people in 1938 was 4,349,000.

From this, the total value of one London working hour per week = 4,349,000
 $\times \frac{2.5}{20} \times 52 = \text{£}28,267,000$.

To understand the relative importance of various items, they are all expressed in terms of weekly working hours.

	Capital	Annual Value	§Weekly Working Hours	
			Hrs.	Mins.
Rateable Value of Greater London	—	104,627,000	3	48
Amount required to build London from scratch, as it is (including services, roads, railways) ...	1,750,000,000	†70,000,000	2	8
London's Productive Capacity ...	—	1,196,000,000	43	0
Amount required to carry out M.A.R.S. Plan	1,200,000,000	‡60,000,000	2	6
Amount required to carry out patchwork improvements (Bressy Plan)*	230,000,000	‡11,500,000	—	13
Administration Income of Greater London (Rates)	—	62,152,000	2	7
Capacity of London Building Trade (1937)	—	75,000,000	2	38
London Transport Board (Capital)	110,000,000	†4,400,000	—	9-3
All British Railways (Capital) ...	1,100,000,000	40,000,000	1	25
London Public Traffic Receipts (1938)	—	42,120,000	1	30
British Export Deficit	—	346,379,000	12	17
Saving of $\frac{1}{2}$ hr. per person per working day due to improved plan	—	84,802,000	3	0
Total saving expected (distribution costs, freight, etc.)	—	239,200,000	8	28

* The alterations suggested in the Bressy Report would be helpful, but by the time they are carried out many of them would already be obsolete. They are on the same lines as the Paris Rebuilding of 1870 (Haussman).

† 4 per cent. interest.

* Twenty yearly instalments.

§ Number of weekly working hours per working person in London.

|| If every working person in London works one hour each week,

Compare :—

Cost of carrying out M.A.R.S. Plan = £60,000,000 per year for 20 years.

Saving expected in time alone = £84,802,000 per year indefinitely.

Capacity of Lo

Compare also :—

Total saving expected = £239,200,000

Circumstances will undoubtedly make it necessary to decrease this deficit after the war. The rebuilding of London alone would effect a reduction of 70 per cent. without reducing the standard of consumption, and with a colossal increase in the standard of living. A similar organisation of the conurbations of Manchester—Liverpool—Birmingham—Wolverhampton and Glasgow would most likely wipe out the deficit and provide a much needed surplus.



2, London's commercial situation.

ports in Britain, and that both Liverpool and London act as sources of supply for raw material, explains why the **London-Liverpool line is an ever-growing magnet** to industry (figure 2). Along this line there is again a trend towards London, which apart from being the larger port, also represents a vast market.

Economic considerations remind us that **during a time of rapid and unmethodical development a town is apt to get out of control.** It can be compared with a factory that is technically deteriorating, and therefore has to be rebuilt. This is exactly what has happened to London, and now is the time when rebuilding should be considered. It is necessary for a moment to look at the town simply as an economic unit, because only by considering it as such will it become clear that **all labour and material spent on distribution is unproductive** and, therefore, a loss to the community and to each single member of it. This economic unit must be assumed to include the town and its inhabitants, in the sense of institutions as well as individuals. It is the growing distribution costs (mainly represented by transport) and the resultant gap between production and consumption, that is the economic equivalent of those evils which town planning should eradicate.

If a town can be redesigned so that distribution costs are reduced, production and amenities will be correspondingly increased. To compare a town with an industrial plant does not mean that the individual should be considered as a cog in the machine, nor does it signify that the character of a town, its beauty, its buildings, its gardens and its cultural life are of secondary importance. On the contrary, all attempts at improvement are directed solely towards improving the living conditions of the people, **the cultural standards**, the leisure opportunities and amenities. It should be kept in mind that distribution costs are what the engineer calls "loss in efficiency" or "internal friction" in a machine. To say that these losses are the most important factor of an engine would be incorrect. What is important is to reduce these losses to a minimum.

Nowhere in the British Isles is the comparative number of people engaged in distribution as great as in London where, according to the census of 1931, 25 per cent. were so occupied. Nor is that the full figure, as people employed by private industries, but actually working for distribution, like lorry drivers, packers and agents, are not included, nor does it include people engaged in commerce, etc. Also any person travelling must be considered as temporarily engaged in distribution, so that the actual proportion becomes much greater (more than 40 per cent.). Distribution costs are partly commercial and partly dictated by transport, but even the former can be greatly reduced if the transport is simplified.

These considerations bring transport to the fore, but it would be wrong to believe that decisive results can be obtained merely by reorganising transport. It is the town which must be organised and planned so that a suitable transport system can be developed.

The above considerations show that it is necessary to be radical, i.e. to adjust the town to its needs. Any purely local planning is doomed to failure. **It is necessary to have a master plan, a grid on which the town can be developed.** This master plan must take into account the "backbone" consisting of the Port, the City and the West End, and the industries which mainly converge upon the London-Liverpool line (figure 2). It has also to allow for the organisation of the vast population (eight and a half million people in 1937) which at present straggles untidily over the whole London area.

The idea of such a superimposed grid may appear somewhat Utopian, but this is of little consequence provided a schedule is worked out by which London can gradually be converted to its new plan. A glance at Table II will show that the number of people working in London is so colossal that the total capital investments represent **but a few hours' labour for each person**; or, in other words, looked at from the point of view of national economy, only a fraction of the time proper planning could save is necessary to rebuild the whole of London from scratch. It is worth while to appreciate this fact thoroughly, even though the realisation of the aims set out here does not require quite such radical measures.

2. DEVELOPMENT OF A PLAN

The final aim of all town planning is to provide the maximum number of amenities for the population. These amenities can be grouped under the following headings: Public Health, Culture* and Leisure. It has been found

* "Culture" means education, training, development of mental and bodily faculties, intellect and judgment.

that the provision of the maximum benefits depends on three other items: Housing,* Work and Transport. Housing and transport are an integral part of town-planning. Work, the combined labour of the community, is affected only with regard to location. The study of work is a study of statistics, directed towards achieving the best possible location.

The various investigations, therefore, have to be subdivided under the following headings:

A. Amenities. Compared with country and small towns, large towns have the advantage of more efficient health services. They are at a disadvantage, however, if the air is polluted and if the natural mode of living is hindered. These effects approximately cancel each other in the present L.C.C. area.

The outer suburbs of London show a great improvement (for infant mortality and death rate see Table III). This table also shows how much more can, and must, be done until the present health standard of, say, Amsterdam, a Continental town of comparable wealth, is reached and, it is hoped, surpassed.

The essential health requirements in a plan (and they do not allow of any compromise) are:

1. Green spaces, sufficient for long continuous walks, combined with sports grounds, should not be more than ten minutes' walk from any dwelling.[†]
2. Pollution of the air due to industry, steam, etc., is to be avoided (which means complete separation of industry and living quarters).
3. Transport between home and work should be as simple and as short as possible, and not underground.
4. Density should be so controlled that the vegetation in each area is sufficient to constantly and completely regenerate the foul air produced by human beings.
5. Low-lying districts should not be used for human habitation.
6. Overcrowding must be eliminated.
7. There must be a sufficient number of medical centres, hospitals, etc., entirely separated from the noise of traffic, and situated in green surroundings.

The present inadequate disposition of open-air recreation space is the result of unco-ordinated purchases and bequests of isolated parks, and is unrelated to the housing areas, the most densely populated areas being almost unprovided for. The majority of schools, and even new flat developments, provide only asphalt playgrounds, and the children have to travel considerable distances to reach adequate open space. The provision of allotments and gardens is negligible in the areas where the need is greatest. While in recent years efforts have been made to reduce overcrowding and to improve the hospital position, practically nothing has been done about the other requirements, and there is little chance of anything being achieved within the framework of present-day London.

While the requirements for public health are of a general nature, the cultural necessities are more specific. Education has, for many years, been on such a low level, particularly in its technical and economic aspects, that it has even hampered international competition. The situation has improved during the last two decades, but much scope for further improvement remains. To convert elementary, secondary and other schools, libraries, etc., into real centres of community interest is mainly a housing problem. The same applies to other public buildings like theatres, cinemas, concert and lecture halls, etc. Well-organised leisure serves either health or culture.[‡]

Leisure may be sub-divided first into indoor leisure, which includes that intimately related to the design of the home and dependent on privacy, quietness and a direct contact with nature, but also includes cinemas,

* "Housing" means, primarily, the grouping of people in units and is a social question. The word also refers, of course, to research into the needs and design of dwellings. These aspects have been dealt with in many publications, and there is much scope for research. They are omitted here as they are a detail and not a primary consideration.

† The much-vaunted idea of a green belt loses much of its value when applied to large towns with such a low density as is prevalent in this country. With the high density of continental towns a green belt is usually within reasonable distance of all the inhabitants, except in the case of a metropolis. In order to bring the open space within reach of everybody, it is necessary to amplify the green belt into strips reaching to the heart of the city, and the belt itself is, therefore, of little significance.

‡ There has never been a large demand for "Fun-Fairs" in the districts near St. James's Park and Hyde Park, but between Tottenham Court Road and the Bank, where there are no parks, there is a fabulous number of places providing such useless entertainment.

museums, etc.; and, secondly, open-air leisure, which can itself be divided into the following categories:

1. Horticultural pursuits.
2. Organised recreation.
3. Unorganised recreation.

Provision must be made for the first nearer to houses or flats. The second can be organised at home, at school or elsewhere. For people have different requirements according to their age or occupation. The young children require play space near their homes, the school children at school, and the adults either near their factory or office or within their housing district.

On the basis of present leisure habits, 14 acres per 1,000 persons would be required. This area does not include for playing fields for those workers who find organised recreation locally rather than at their centre of employment. Nor does it include for civic open space, such as aerodromes, stadia, race tracks, etc.

B. Housing. At present the people of London live in a vast urban agglomeration which sprawls for more than twenty miles from its centre—without organisation either of the housing or the social amenities which should accompany it. An administrative panelling into boroughs has little meaning while it is impossible to differentiate where one begins or another ends. London as a whole is the only social unit which conveys anything to its people, but it conveys a social life which is read about rather than lived. An organic social structure in which the individual can take an active part is a vital necessity, for at the moment there is more individual isolation in this mass of 8½ millions than in the smaller towns and villages of the country.

Such isolation will continue unless there is some organisation of social life and its expression in architectural and town-planning form; for the visual effect on the mind is considerable. The vast crowds must be split up into groups in which the individual does not feel so overwhelmed that he is forced to retire to his own home almost entirely for his social life.

Only by forming clearly defined units, which in turn are part of larger units, can social life be organised. These units should not be chosen at random, and much investigation is necessary before their nature will become clear. Only the general trend of such investigation can be given here.

Each unit must have a centre about which its life pivots, and which, at the same time, is expressed architecturally and in plan. In the Middle Ages, life centred only around the church and the market, and this is why the towns of that time were so satisfactory, from a town-planning point of view. Life to-day is not so simple, and focuses about many things. Theoretically, churches, shopping centres, schools, railway stations, etc., could all serve as focal centres, but in fact, life would be very limited if such purely commercial elements as shopping centres or railway stations were to become the acknowledged centre of any domestic unit. For this reason, the educational structure has been taken as the primary unit-forming constituent. Itself comprising small units which are gradually built up, it lends itself very well to the purpose from an organic point of view (figure 3). It is important that the commercial and technical elements (shopping streets, railway stations, etc.) should adapt themselves to the same units.

Two or more units, added together, do not make a new unit (two small towns are not one large one), but if something is added—a centre—that is of common interest to the small units and gives their life a new aspect, they, together with the new centre, do form a larger unit. For instance, fourteen towns each of 600,000 people do not equal London, but if the administration, universities, museums, theatres, special shopping facilities and the Port are added, then we have the Capital of the British Empire. These considerations have led to the arrangement of units as shown in figures 4 and 5.

C. Work. To achieve proper location, an analysis must be made of the place of work of the 4.3 million breadwinners in London. The latest census is that of 1931, but many changes have taken place during the last decade: more light industry has sprung up in London, and at the same time small local traders have given place to combines and chain stores. A continuous movement in this direction is to be expected after the war. Work might be sub-divided into:

1. Local and country administration.
2. Industrial and commercial administration.
3. Industry.
4. Services.
5. Distribution.
6. Miscellaneous.

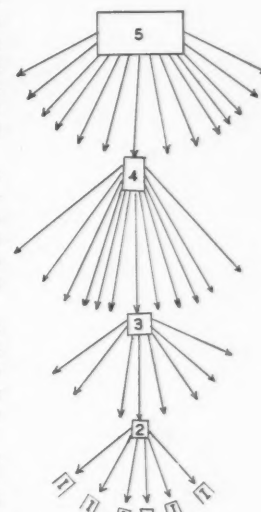
A different sub-division is, however, necessary from a town-planning point of view, as it is only to a certain

TABLE III. Mortality Rate.

	Infant Mortality per 1,000 Born	Crude Death Rate per 1,000 Living
England and Wales ...	59	12.1
L.C.C. Area ...	66	12.3
Outer London ...	49	9.7
Amsterdam ...	29	8.6

The adjusted death rate, taking into account the age distribution of the population, would reduce the difference between Outer London and the L.C.C. area by about 15 per cent. (10.5 against 12.5). If the death rate of Amsterdam is adjusted in the same way the difference would again be reduced by a similar amount. It should be noted, however, that the better age distribution in Amsterdam is partly due to the reduced infant mortality in former years.

The present infant mortality in Greater London (56) is 93 per cent. higher than that in Amsterdam.



3. System of housing units (diagrammatic)

- (1) **RESIDENTIAL UNIT.** (Approximately 1,050 people). Comprising nursery school for 70 children—small shopping street for every-day needs.
- (2) **NEIGHBOURHOOD UNIT.** (6 Residential units). Elementary school for 600 children between 5 and 11 and 150 between 11 and 15—health centre—church—branch of public library.
- (3) **BOROUGH UNIT.** (4 to 8 Neighbourhood units). Secondary and central schools—civic, cultural, and entertainment centre—hospital—main shopping street—local railway station—building yards, coal depots and other local industry with the necessary administration.
- (4) **DISTRICT.** (12 Borough units). Technical school and educational offices—exhibition hall and galleries, market hall—special hospitals—goods station and secondary industry.
- (5) **THE CITY.** (14 districts.) University museums—administration of London, United Kingdom and Empire—main shopping and amusement centre—Port of London—centralised industry—main railway station and railway system—aerodrome.

BASIC UNITS OF THE M.A.R.S. PLAN

4, District (600,000 inhabitants)

This particular drawing shows a flat development, but the principles remain the same with dwelling houses. The district shown has been assumed six miles long, allowing about 100 persons per acre, while generally a strip of eight miles length was taken as a basis. (See also fig. 13.) The sample district shown here would stretch from the area at present occupied by Shoreditch and Hackney towards Edmonton (west of the Lea Valley). Observe the main station, approximately where King's Cross now is, and the parks extending down to it, combining Finsbury Park, Alexandra Park and Hampstead Heath with other existing open spaces and replacing the present sidings and slums of Camden Town, etc. The railway on the right would be the main line to Yorkshire and eastern Scotland (see fig. 16). The intermediate road (see fig. 5) is omitted here.



5, Borough (50,000 inhabitants)

- (1) Secondary artery — station in centre.
- (2) Shopping street.
- (3) Town hall, library, etc.
- (4) Cinema.
- (5) Open-air theatre.
- (6) Boys' secondary school.
- (7) Girls' secondary school.
- (8) Hospital.
- (9) Sport fields.
- (10) Swimming bath.
- (11) Intermediate road, for private car traffic.

All the area to the left of the secondary schools is common. A similar unit is arranged on the other side of the artery.



extent that work can be grouped geographically in accordance with the above headings. The suggested sub-division is:

- (a) **Deconcentrated work** which is necessarily spread over the whole town, including most of the retail shops, the professions, most of the building trade, stores of vital materials, a certain proportion

A MASTER PLAN

of transport and administration and all domestic work.

- (b) Work which is **dependent** upon certain centres about which it is concentrated, including harbour industries, docks, wharves, depots, etc.
- (c) **Concentrated work** which is independent and can be arranged according to general town-planning needs, including central administration and the light industries such as are at present located in the north-west of London.

The relationship of all these groups is not constant and good planning will allow a reduction to be made in the number of people required for distribution and administration, but the following considerations lead to preliminary results.

The annual value of work in 1937 was 1,200 million pounds in London (out of 4,900 million in the United Kingdom). Of this, administration represented approximately 100 millions, distribution and transport 520 millions and production of goods 580 millions. Transport and distribution belong mainly to part (a) (deconcentrated work), while administration and production are to be divided between all three groups. Administration is most easily dealt with as it is quite obvious that, apart from local administration, the maximum concentration leads to the best co-operation between departments. The production of goods depends mainly on raw materials, available markets and labour, in varying proportions. Within an organised town the problem of accessible labour supply should disappear so that raw materials and markets will be the deciding factors. Raw materials are derived from outside sources in every instance, while the market is either London itself (200 million pounds expenditure—34.5 per cent.) or the United Kingdom (310 million pounds—53.5 per cent.) or overseas (70 million pounds—12 per cent.).

It is obviously most reasonable to concentrate those industries with widespread markets outside London, in order to reduce the cost of goods transport, but the industries which mainly serve London itself must be further investigated. This is done in Tables IV and V, although the figures are largely estimated. A final plan would have to be based on a much more detailed analysis than is possible at present.

D. Transport. There are two types of transport—goods and passenger. Economically, goods transport is the more important (see Table VI), and great saving could be made by proper planning. The average citizen, when speaking of transport, usually means passenger traffic, and very often it is road traffic only to which he refers.

Goods traffic must be analysed in accordance with its origin and destination (figure 6):

1. Raw materials and semi-manufactures arriving for the local industry; semi-manufactures and manufactures leaving the industry (industrial goods).
2. Transit goods.
3. Goods manufactured elsewhere, destined for local consumption (entering the town).
4. Goods for consumption (produced inside the town).
5. Erratically moving goods.

Group 1. The ideal arrangement for these goods is for them to come from an exterior point to a main goods station, thence possibly to a secondary one, and thence to the industry, and vice versa. If the passage of these goods is not to interfere with interior traffic, industry must be so located that it is separated from the residential as well as from the administration district. The more compact the grouping of the industry, the smaller the capital outlay and running costs. For reasons given later, main and secondary goods stations have to serve road as well as rail traffic, although for the former the station is merely a clearing point.

Group 2. Goods in transit should arrive at the main goods stations and depart from there. Most transit goods will either come from, or go to, the Port. A special clearing station is required for these goods. It is essential that this traffic should not pass through the residential, industrial or business districts, nor touch even the secondary goods stations.

Group 3. Incoming goods for local consumption should arrive at secondary goods stations (by road or rail), each situated in the immediate neighbourhood of the district for which they are destined. From there, the goods must be conveyed to the place of consumption (usually the main shopping street) by the shortest possible route.

At present, all suburbs in London could not be provided with a suitable goods station, but in a planned town arrangements could be made by which goods were delivered by rail or road, either at night or (better still) underground (see figure 10). A main shopping centre like the West End of London must have a properly devised goods delivery system.

Group 4. Goods produced by industry within the town and used in the town itself, would, with small communities, be delivered direct. In a city the size of London it is best to let them pass via the secondary goods station, i.e. by the same route as outgoing traffic for industry and the same as incoming traffic for consumers. The increase in distance involved is more than compensated for by the improved organisation and the complete separation of goods and passenger traffic (see figure 13).

Group 5. Erratically moving goods (mainly parcel post) is a comparatively small item (which is already better organised than the rest of the traffic). An underground post collection could easily be combined with the above-mentioned goods delivery.

Passenger traffic can be sub-divided into the following four groups:

	Per cent.
1. Pendulum traffic—comprising traffic of any working member of the community from home to work and back	60
2. Point traffic—comprising travel from home to any other points, such as theatres, shops, railway stations, etc.	12
3. Circle traffic—comprising traffic of any member of the community between several working points, such as commercial travellers	20
4. Local traffic—comprising travel between several homes, generally for pleasure or social reasons	8

The percentages may be altered to a certain extent with the reorganisation of the town. It is obvious, however, that (1) is the most important. Any replanning that is done for the sake of transport must aim at making pendulum traffic as simple and rapid as possible.

Instead of the usual distinction that is drawn between road and rail traffic, distinction should be made between completely organised transport on the one hand and flexible transport, which is partly organised or not organised at all, on the other. In the general way this coincides with road and rail traffic, but if, for instance, public transport had its own thoroughfares, was absolutely timed to schedule and had no crossings, it would come under organised traffic, although some of the vehicles would run on roads.

While it has not been possible to fix definite scales it is established that, other circumstances being equal, flexible transport is cheaper over short distances and organised transport over long distances.

These "other circumstances," however, play a very important part. They are entirely different in the U.S.A. where there is a population of 36 persons per square mile, from those in England, where there are 766 per square mile. Also, the better planned or concentrated a town, the greater the volume of traffic taken by the organised transport system. If many people are to be carried from one fixed point to another, a completely organised transport system can do so with the minimum expense and time. If, on the other hand, these people are to be collected from many different points, frequent stops and branches will reduce their efficiency considerably. Flexible traffic could still keep up with such conditions.

The change from rail to road traffic during the fifteen years before the war was mainly due to the excessive charges of the former, resulting from a lack of organisation on the part of the railways. Under average conditions in this country, the economic road limit for goods should be about 80 miles, and for passengers between 100 and 120 miles.

Time is the criterion for traffic, not distance. Ten miles means not more than twelve minutes for a vehicle travelling at 50 m.p.h., but ten miles across London takes more than an hour. Of the cost of buses running in London 15 per cent. is spent on fuel, and the other 85 per cent. on time. If the same buses were capable of travelling twice the distance in a working day, the overhead expenses per mile would be only 58.5 per cent. of what they are. This also holds good for railways (see Table VII). Even the number of vehicles required depends on time, and if each bus could do twice the present number of journeys, only half the number would be necessary for the same amount of traffic, and congestion in the streets would also be relieved.

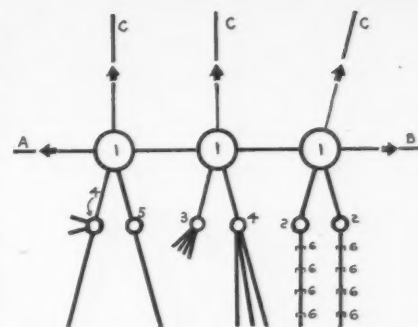
Thus, in planning a town, it is not at all necessary to reduce distances, and if a better traffic system and better living conditions can be obtained by dispersal, there should be no hesitation in doing this. On the other hand, if the traffic system is complicated by a certain type of dispersal, this should not be tolerated. Both the grouping of industry as well as living quarters in the neighbourhood of arteries simplifies the traffic. A well-organised artery,

with no level crossings, may imply increased distances, but it will provide a steady flow for the traffic and travelling time and cost will be reduced. High average speeds can be attained if the artery does not, at the same time, serve as a local road or main shopping street. This grouping along arteries does not mean ribbon development. On the contrary, it suggests the complete separation of the artery from industrial and domestic districts, possibly by wooded strips (see figure 11).

It is necessary to face the fact that the present-day street system, which is not more advanced than that of old Babylon, cannot cope with twentieth century traffic. This street system causes those obstacles which prevent steady flow, e.g. level crossings and forks, and the presence on the same road of vehicles of all speeds, the slowest of which, naturally, sets the pace.

For a time, the type of organisation exemplified by traffic lights has been considered the best remedy. These had an important influence on the prevention of accidents, but they have slowed up the traffic even further. Their installation on main roads induced motorists to take to the side streets, and this in turn made more lights necessary and slowed up traffic even more.

Nowadays, two-level crossings of the "clover leaf" or "internal cross" type are advocated (figure 9). They can solve the problem better as long as no line of traffic



6. System of goods transport (diagrammatic).

- (1) Main goods station.
 - (2) Secondary goods station to serve local consumption.
 - (3) Secondary goods station for harbour traffic.
 - (4) Secondary goods station for industrial area.
 - (5) Secondary goods station for main shopping centre.
 - (6) Local shopping street.
- A-B goods ring (connecting to other main goods stations).
C Long distance goods traffic.

TABLE IV. Location of Industry.

The following groups allow further insight into the suitable location of industry. The areas referred to are selected to fit the transport grid.

Table V gives a more detailed account of Group X.

Group I. Personal Services, Laundries, Domestic Services, etc.	Group VII. Distributors, Transport.
Group II. Entertainment, Sport, Hotels.	Group VIII. Harbour Works.
Group III. Professions.	Group IX. Services—Gas, Water, Electricity.
Group IV. Government (Local).	Group X. Industries, largely for local consumption.
Group V. Government (Central).	Group XI. Industries, mainly for export and U.K.
Group VI. Commerce, Banks.	

Group	Industrial West	Area East	Administration Area	Shopping Area	Cultural Centre	Industrial Area near Goods Stations	Deconcentrated	Total
I ...	25,000	25,000	25,000	20,000	15,000	5,000	301,000	416,000
II ...	2,000	22,000	31,000	2,000	100,000	1,000	112,000	270,000
III ...	2,000	2,000	127,000	1,000	1,000	1,000	45,000	179,000
IV ...	2,000	5,000	134,000	2,000	1,000	1,000	42,000	187,000
V ...	—	—	172,000	—	—	—	—	172,000
VI ...	4,000	6,000	121,000	4,000	2,000	2,000	24,000	163,000
VII ...	84,000	110,000	140,000	230,000	10,000	82,000	461,000	1,117,000
VIII ...	—	64,000	3,000	—	—	—	—	67,000
IX ...	50,000	68,000	6,000	—	—	1,000	1,000	126,000
X ...	69,000	105,000	40,000	23,000	—	93,000	209,000	539,000
XI ...	442,000	352,000	65,000	18,000	—	5,000	6,000	888,000
	680,000	759,000	864,000	300,000	129,000	191,000	1,201,100	4,124,000
	16.49%	18.39%	20.9%	7.26%	3.12%	4.65%	29.19%	100%

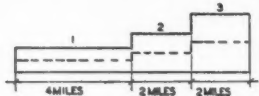
In addition to the industry in the east and west, further industry might be located near the goods ring (north and south) where satisfactory transport facilities would be available. They would be arranged in small groups (satellite towns). They could accommodate up to 300,000 working people and any additional light industry might allow a further 400,000 workers to be settled in such districts. All numbers refer to working population and are based on the 1931 census.

TABLE V. Suitable location of industries largely for local consumption.

Items in accordance with census of 1931	Total No. of Working People	Administration	Concentrated	Near Goods Stations	Deconcentrated	Shopping Area
Linoleum	2,520	200	—	2,300	—	—
Building Industry	279,910	28,000	56,000	42,000	153,910	—
Shopfitters	13,410	540	3,700	8,770	—	400
Cabinet Makers	49,200	1,000	25,000	1,200	21,400	600
Other Woodwork	8,320	150	4,200	200	3,670	100
Mineral Waters	4,790	150	—	4,640	—	—
Brewing	19,920	1,000	18,920	—	—	—
Bakers	45,690	2,000	—	20,000	19,690	4,000
Tailors	88,320	4,500	57,820	5,600	2,400	18,000
Copstructional Engineers... ..	9,250	2,000	5,750	1,000	500	—
Cycle and Motor Accessories	5,900	300	2,500	1,500	1,600	—
Glass Bottles	4,900	—	—	4,900	—	—
Gardening	6,370	—	—	770	5,600	—

It must be appreciated that the number of workers in every industry may be completely altered, either due to incidental reasons, or to any national location scheme which might be put into operation.

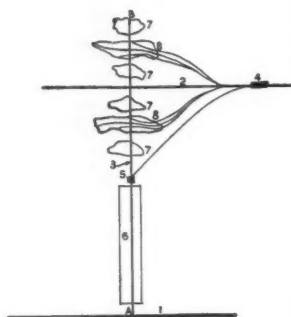
SOME DETAILS FROM THE M.A.R.S. PLAN



7. Housing density.

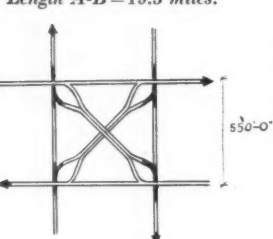
- (1) 55 people per acre (12 houses per acre—no flats).
- (2) 85 people per acre (houses and some flats).
- (3) 110 people per acre (mainly flats).

8. Main artery.



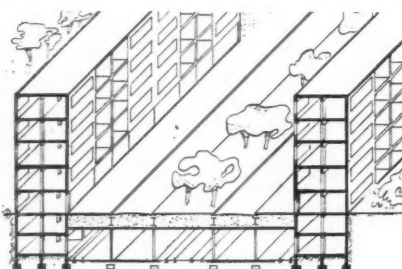
8. Satellite towns.

- (1) Main artery.
- (2) Goods ring.
- (3) Secondary artery.
- (4) Main goods station.
- (5) Secondary goods station.
- (6) District for 600,000 people.
- (7) Satellite towns.
- (8) Satellite industry.
- A. Intersection of arteries.
- B. End of secondary artery.



9. The fly-over.

This system is preferable to the "clover-leaf." The internal cross avoids the crossing of traffic lanes.

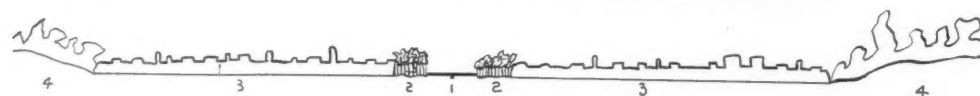


10. Shopping street of Borough.

The two internal tracks (3, 4) and two goods lanes (2, 5) connect to market hall and secondary goods station. No stationary vehicles allowed on 3, 4, 2, 5. The outer lanes along the loading dock (1, 6) serve for road and rail vehicles, loading and unloading. The rail tracks are frequently connected to the tracks 3 and 4. The upper level serves persons and local traffic. The shopping street is not a thoroughfare.

11 (Below) relation between traffic artery and housing.

- (1) Artery, 265 ft. wide.
- (2) Wooded strip, not less than 240 ft. wide.
- (3) Residential area, 1,000 yards wide.
- (4) Common land.



depends on another. Unfortunately, a large number of fly-overs cannot be arranged because they take up too much space and are structurally expensive. Fly-overs are of advantage only if there is very little diverging traffic, as stagnation can easily occur at the separation points, particularly where there are several lanes.*

There is one real solution. Let the street serve the purpose for which it was invented, namely, as access to buildings, and for slow local traffic, but provide highways for fast, through traffic. In order to keep a steady flow, the number of vehicles changing direction must be reduced to the bare minimum.

3. THE MASTER PLAN

On the basis of the considerations set out above it is possible to arrive at a grid which would suit the transport of twentieth century London, and which, at the same time, would provide the amenities required. The grid (see figure 13) is based on the following assumptions:

Population. Since the simplest system, one long strip, is obviously impossible for London, a number of parallel arteries, connected by a main artery, are suggested. The population could be settled along the secondary arteries, with industry, administration, culture, etc., near the main artery.†

Housing should extend for about half a mile on either side of the secondary arteries (ten minutes' walk at most) so that no public vehicles need be provided to bring people to the artery. Housing considerations support the adoption of eight-mile strips, each for 600,000 people. On this assumption, for a population of 8½ millions, seven secondary arteries, together with fourteen housing strips, would be required (see figure 7).

The secondary artery is intended to serve public traffic and cyclists only. Private cars are to use an intermediate road traversing the green spaces, which separate two settlements. Traffic along the artery, apart from the cycle tracks, can then be fully organised, both road and rail, and the very density of the traffic makes the arrangement of separate tracks for long distance trains and coaches economical (see figure 14).

No public traffic is to turn off the artery and the number of tracks and traffic lanes on either side need not cause any complications. Figure 14 gives a section through a secondary artery. In the centre is the goods lane (rail and road) flanked by the fastest passenger traffic, then medium traffic and so on to the slowest (cycle track) on the outside. Pedestrian crossings are to be accommodated, in conjunction with cyclist lifts, by bridges and tunnels. Private cars will have to cross the arteries only on rare occasions, and a viaduct every mile will be ample.

With an excellently organised public traffic system, the number of people going to and from town in private cars will be few, being confined mainly to certain professions. Other private cars would serve merely for pleasure. Cars will reach the intermediate roads by six double roads crossing the secondary arteries on either side of the main artery, and parallel to it. The lanes carrying traffic going in the opposite directions are about 170 yards apart. These roads would be connected to the intermediate roads (those parallel to the secondary arteries) by an arrangement similar to an "internal cross" situated entirely in the open. The separation of roads into one-way lanes simplifies the arrangement. The main artery (figure 15) is similar to the secondary arteries. It has, of course, more tracks, and in addition, has facilities for long distance traffic, and two parallel, one-way, lanes for private cars.

The crossing of main and secondary arteries would occur at two-level interchange stations, but if the majority of the people live in the housing unit opposite their work, these interchange stations would not be congested. There should be direct escalator connection between the two levels. The intermediate roads cross the main

* Two-level streets have also been often suggested. These are structurally expensive and make crossings more difficult than if traffic lanes are kept on the same level. Two-level streets are, however, worth considering where it is required to separate two types of traffic, such as goods and passenger traffic on a shopping street.

† A grid with radial arteries either coming together at a central point, or to an inner ring similar to the main artery, was considered; but it was rejected because:

- (a) It makes the solution of the organisation of the traffic more difficult;
- (b) it does not fit the geographical position of London;
- (c) it does not lend itself to future extensions.

A MASTER PLAN

artery by viaducts and would be connected to the private traffic lanes parallel to the main artery.

The administration district and the central shopping area are both served from the main artery, and as they must have a certain depth a number of one-way streets, at right angles to the main artery, must be provided to ensure internal connections. Public vehicles will serve them, running on short routes.

Long distance passenger traffic is to converge to one or several main stations* situated on the main artery so that the interchange facilities to secondary lines are simple. The main artery itself is to carry one line of long distance traffic and all trains should run right through the town to sidings beyond the outer circle. The enormous amount of space taken up by sidings in London would then be available for other uses: green spaces, housing or, in suitable areas, for industry.

Goods (figure 13). By arranging a ring system for goods traffic, connecting all main goods stations and far enough away from the centre of the town not to hinder growth, goods traffic is completely separated from passenger traffic. This ring must have one diametrical connection parallel to the main artery, but for practical reasons separated from it, forming a goods artery.

Main goods stations are to be at points where a main railway line crosses the outer circle. From the main goods stations, east and west, shopping centres, etc., are served from secondary goods stations. There would also be a secondary goods station at the end of each secondary artery, serving the needs of the 600,000 people living in that section. Each of these stations is connected with two market halls and with six local shopping centres, coal depots, etc., by road and rail along the secondary arteries (see figure 12). In this way a continuous stream of goods can be delivered, even during the day, without hindering passenger traffic. Even goods arriving by road must pass through the secondary stations in order that an organised traffic between goods stations is maintained, and from there to the shopping centres. Road-borne goods would not be unloaded at the stations, nor should rail-borne goods, the entire waggon loads being delivered, where possible, direct to their destination.

In industrial areas, goods traffic will run at right angles to the passenger and pedestrian traffic. It would be possible to look upon each block (about six square miles), bounded by main and secondary arteries, as an industrial estate similar to Trafford Park, Manchester. The traffic systems in these estates can be improved upon by arranging two different levels, one for goods (east-west) and one for passengers (north-south). A number of roads will be required leading to the main artery, similar to the administrative district, but half a mile apart.

So far a purely theoretical traffic grid has been evolved, but in fact the geographical and commercial structure of London lends itself particularly well to this arrangement (see figure 16). The suggested east-west line is already established by the Port, the Thames and the main connections to Liverpool, which form the industrial life-line of the country. Administration (the City), main shopping centre (the West End) and the cultural centre of the Empire are already near the centre of this line. Also industry is, to a certain extent, already located as required: in the east, near the port, and in the west, in the triangle between the Great West Road, the Grand Junction Canal and the River Colne. Moreover, it is an established fact that the areas north and south of the river are better adapted for residential districts, and healthier, than the immediate neighbourhood of the river. At present, fourteen districts, each of 600,000 inhabitants, have been assumed, but the number could be varied. For the purpose of arriving at a plan it has been taken that 70 per cent. of the people live in houses and 30 per cent. in flats. The outer half of each district strip would consist mainly of houses, and the density of 55 people to the acre (twelve houses) recommended by the Ministry of Health would be kept. A higher density can be allowed for the areas where flats predominate. In this way a strip 1½ miles wide and eight miles long has been arrived at. Figure 7 is a density diagram, but owing to the continuous green spaces never farther than half a mile from any house, the real density is nowhere more than half.

The same layout could be adhered to if the density were to be varied, for example, if the length of the district were reduced to six miles, or increased to twelve miles, or split into several parts. From figure 1, in which the general layout is shown, it is evident that the extreme point of every district is much nearer the centre of the

* The green spaces being carried to the heart of the city makes it possible to arrange a central aerodrome, of any size, in the immediate neighbourhood of the main station.

town, in time and distance, than the outer suburbs are to-day.

The health and leisure requirements are fulfilled by the character of the layout (continuous green spaces between the districts, supplemented by large garden areas within the strips), and the full consideration of cultural requirements is guaranteed by the organisation of the districts, based, as already described, on the educational structure.

Work is distributed in accordance with Table IV. If it should prove economically possible to deconcentrate part of the industry further, the arrangement of a certain number of "Garden Cities" or "Satellite Towns" situated on the extensions of the secondary arteries could be considered. Their industries would be connected to the goods ring, and with units of 25,000 people each an additional population of up to 1.4 millions could be settled in this way within the London traffic area, and have the benefit of excellent connections to the centre, while the main grid would not be affected (figure 8).

Although such a colossal increase in the population is neither desirable nor likely, it is worth mentioning that the number of secondary arteries could easily be increased to twelve, so that the maximum capacity of the present London traffic area would be approximately 16 millions.

4. REALISATION

The best plan is of no value unless it is possible to visualise the stages of its execution. Two aspects are important—economic and technical.

Table II shows that the total building cost of domestic and other buildings, services, transport, etc., is much less than the saving that would be effected in time alone. Additional savings would be: decreased freight charges owing to simplified distribution costs, decreased fuel, land value and running costs of transport and services, not to mention the expected increase of trade due to reduced overhead expenses. The immense saving inland value by proper arrangement is a much more important item than is generally realised. In particular, the transfer of railway sidings from expensive central sites to cheaper outside districts would make available areas which can only be estimated, but which might be appreciated when it is mentioned that sidings in the L.C.C. area represent 3,422 acres (more than the City, Holborn and St. Marylebone). The execution of the plan could be so arranged that it is possible to effect sufficient saving during the first few years to pay for the remainder of the work.

Space permits only a rough tracing of the process of realisation. Twenty years have been taken as the basis, assuming that 80 per cent. of the pre-war London building industry is employed on the task, but the amount of destruction during, and the temporary depopulation to be expected after, the war may reduce the building time considerably. Coupled with this is the fact that we have become accustomed to astronomical budgets. Consider: the total cost of rebuilding equals the amount spent by Great Britain on three months of the war. Also an enormous building programme might be the only thing which will keep our economy alive after the war. The extensive attempts at standardisation and the introduction of prefabrication are likely to increase the capacity of the building trade by 30 to 50 per cent.

The following stages have been assumed, allowing in each case for new buildings to be erected before the old ones are abandoned. As a preliminary, an exact plan would have to be drawn up, showing how to fit into the new scheme the parts of London which are to be retained. Historic monuments, other valuable buildings and places which deserve survival will be retained, most of them being already correctly situated for incorporation in the new cultural centre. A pooling system for land would also have to be arranged, and this would be facilitated by the present rating system for which all ground is valued.

STAGE 1. Years 1-4.

To be cleared—Little wholesale demolition of existing buildings during this period.

To be rebuilt—All railways to be brought under one control and into one system, with every train passing two main stations (figure 17)—City (King's Cross) and West (Paddington), and all suburban trains travelling over at least part of the inner circle. Comparatively little construction work would be necessary to bring this about as all the necessary tracks are already in existence. All sidings must disappear from inner London. Suburban traffic is simplified as on figure 18.

Building programme for houses for 1.5 million people on sites now open and in accordance with the plan; 70 per cent. of the administration district to be rebuilt.

TABLE VI. Calculation of relative income from goods and passenger transport. March, 1939.

	Receipts	% of total	% of total excluding London Suburban Traffic
Passenger Traffic:—			
(a) L.P.T.B.	578,813	4.15	—
(b) Other suburban traffic in the London area ...	1,040,262	7.5	—
(c) Passenger traffic, excluding London suburban traffic	2,770,494	19.92	22.43
	4,398,569	31.57	22.43
Goods Traffic*:			
(a) Parcels and misc. traffic	1,091,327	7.82	8.85
(b) Freight	8,445,375	61.61	68.72
	9,536,702	69.43	77.57
Grand Total	13,945,271	100.0	100.0

The actual proportion of the cost of goods transport is much higher than shown by this table because passengers assist in defraying the costs of goods transport.

*Excluding postal service.

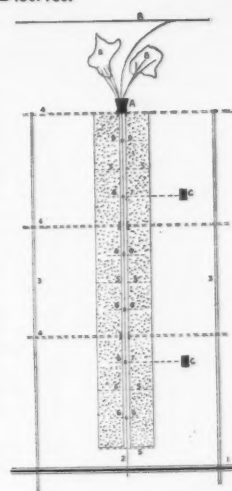
TABLE VII. Proportions of Traffic Costs governed by time and distance.

	1 Overhead Expenses depending only on time		2 Expenses Governed by Distance Travelled	Total	% of 1	% of 2
	4% Interest on Capital	Misc.				
Railways ...	4,022,920	3,849,570	679,990	8,552,480	93.25	6.75
Buses ...	539,840	12,122,780	2,230,790	14,893,410	84.98	15.02
Trams and Trolleybuses	688,440	3,505,920	447,110	4,641,470	90.38	9.62
Total ...	5,251,200	19,478,270	3,357,890	28,087,360	88.48	11.52

Figures refer to L.P.T.B. Report, 1937-38.

12. Traffic plan for District.

- (1) Main artery (See fig. 15.)
- (2) Secondary artery (public traffic and cyclists only). (See fig. 14.)
- (3) Intermediate road (private vehicles).
- (4) Private car road, crossing artery on viaduct.
- (5) Local road, crossing artery on viaduct.
- (6) Main borough shopping street, two storey traffic. (See fig. 10.)
- (7) As 6, but with market hall at the end.

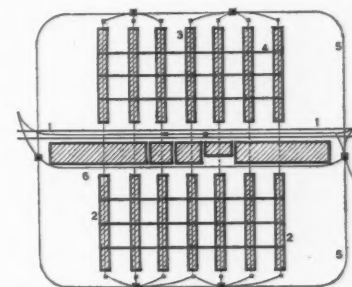


A. Secondary goods station.

B. Local industry.

C. Market hall.

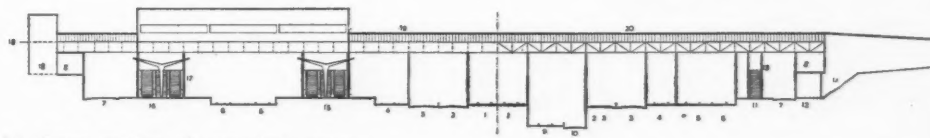
Intermediate roads are connected to 1 and 4 by internal crosses. No heavy goods traffic on 1, 3, 4, 5.



13. Transport grid.

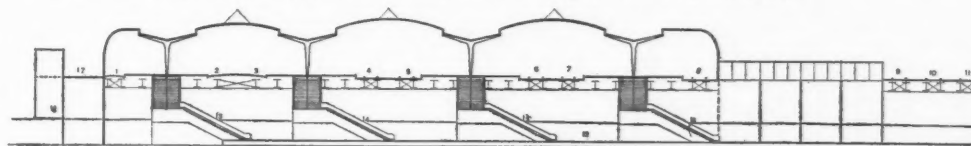
- (1) Main artery (A and B are main stations).
- (2) Secondary artery (C is a secondary goods station).
- (3) Intermediate road.
- (4) Parallel connection.
- (5) Goods ring (D and E are main goods stations, serving industry and residential districts).
- (6) Goods artery.

Secondary arteries for public vehicles only, the corresponding private traffic takes the intermediate roads and parallel connections. The main artery has lanes for private as well as public traffic. The former are connected to the intermediate roads. Long distance traffic is not shown on the plan.



14. Cross section of secondary artery.

The left-hand part shows a section through the station, the right-hand part between stations. (1) Goods track (secondary goods station to market halls and shopping streets); (2) Goods road for same purpose; (3) Road for fast coaches, stopping only at the end of secondary and at intersection with main artery; (4) Track for fast trains (same stops); (5) Track for intermediate trains, stopping every third station; (6) Track for trains stopping at every station (L miles); (7) Road for buses; (8) Cycle track, raised 8 ft.; (9) Branch of track a, leading downward to a cross tunnel into a shopping street; (10) Branch of road b, as track 9; (11) Pedestrian way, connecting platforms 16 for emergency, serves also as intermediate entry to buses; (12) Alternative entry to buses under cycle track; (13) Staircase to pedestrian bridge at intermediate bus stop; (14) Stairway to local street from bus stop; (15) Platform for tracks 4 and 5, every third stop only; (16) Platform for buses and ordinary trains, every mile; (17) Escalators; (18) Cycle lift (where required for difference of level); (19) Access road to station (no through traffic); (20) Intermediate pedestrian bridge (about 300 yards apart).



15. Cross section of main artery.

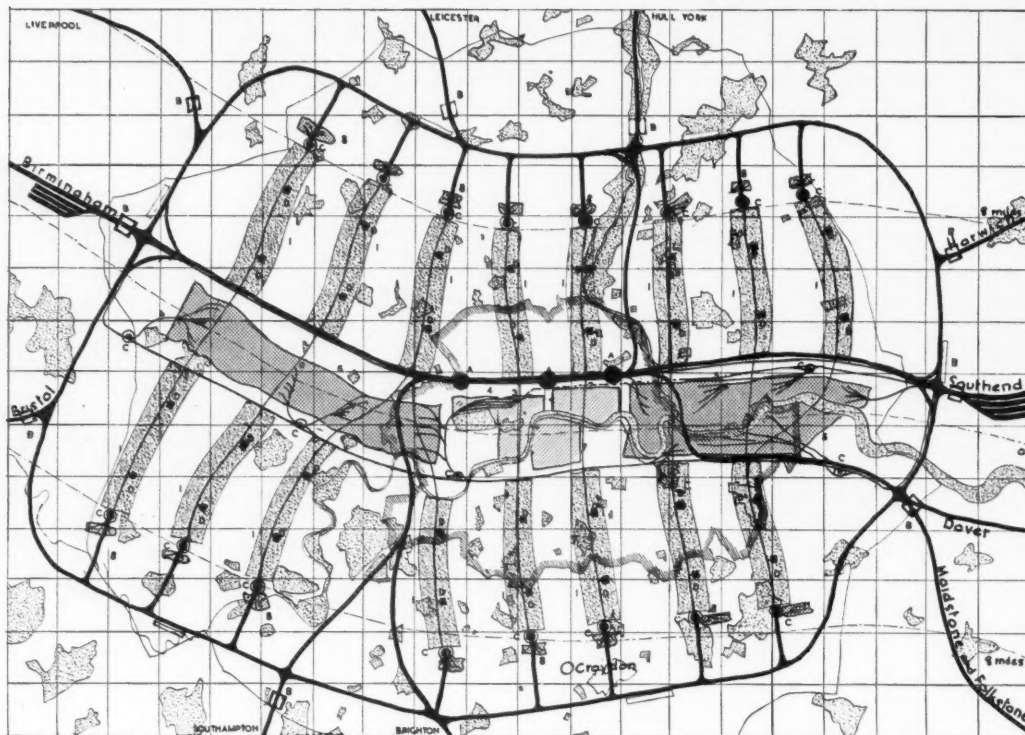
Only half the centre part (public vehicles) is shown. (1) Fast coaches, stopping at main stations only; (2) Slow coaches, stopping at every arterial crossing; (3) Buses stopping frequently; (4 and 5) Trains stopping at every station; (6 and 7) Trains stopping at crossings only (every 3 miles); (8) Trains stopping at main stations only; (9, 10, 11) Long distance trains; (12) Platform of secondary artery (crossing); (13, 14, 15, 16) Escalators; (17) Cycle track; (18) Crossing cycle track and lift.

16, The M.A.R.S. Plan.

Area of Greater London, 443,450 acres. With average density of 75 per acre, for 8,655,000 people 115,500 acres are required; for industry, 20,480 acres; for administration, shopping, etc., 3,840 acres. The remainder, 303,630 acres or 68.4 per cent. of the total, can be made to serve leisure and become an inestimable resource of public health and culture.

- (1) Residential districts.
- (2) Commercial administration (City).
- (3) Political administration.
- (4) Shopping centre. (The goods rails shown are underground.)
- (5) Cultural centre and park.
- (6) Western industries.
- (7) Eastern industries and Port of London.
- (8) Local industries, possibly combined with satellite towns.
 - A. Main passenger station.
 - B. Main goods stations.
 - C. Secondary goods stations.
 - D. Market halls.

The map shows railway connections, but all roads are omitted.



Provisional arrangement of main artery by using the Oxford Street-Cheapside and Marylebone-City Road traffic lanes as one-way streets, with crossing only at certain points. No turnings to the right.

STAGE 2. Years 5-8.

To be cleared—An east-west strip, one mile wide for main artery (north of Euston Road—mostly slums) and two half-mile wide strips in north-south direction for secondary artery.

Cleared railway sites to be used for new buildings or green spaces, according to master plan. All slum areas to be cleared. Sites to be used as above.

To be rebuilt—Administration section to be finished. Houses for 1.5 million people to be erected on cleared sites. The internal traffic is not affected during this stage.

STAGE 3. Years 9-12.

To be cleared—All redundant buildings near secondary artery mentioned in Stage 2. Two other arteries to be cut, and five further north-south strips to be cleared, each half a mile wide.

To be rebuilt—Main artery, two secondary arteries and goods ring. Houses to be erected for 1.5 million people (this includes the finishing of four town units each for 600,000 people).

There will be some of the old traffic system still in use at the end of this period, as well as the main and two secondary arteries.

STAGE 4. Years 13-16.

To be cleared—All redundant buildings near remaining secondary arteries and in the industrial areas.

To be rebuilt—Shopping centre, housing for one million people; new industries in the west of London. All secondary goods stations and goods artery.

By the end of this period all traffic will be running to the new system. No underground line need be abandoned unless the fall in passenger traffic on these lines is so great that further running is uneconomical.

STAGE 5. Years 17-20.

To be cleared—All derelict buildings.

To be rebuilt—The Port of London, warehouses, etc. Finish green spaces, reconstruct cultural centre, theatres, hotels, etc.

Additional steps might become necessary, and allowance has been made in Stages 4 and 5 for extra dwellings, should the population increase during this time.

It should finally be said that the Town Planning Committee of the M.A.R.S. Group does not maintain that every feature of this plan is original. On the contrary, much use has been made of other material available. Ideas suggested by famous town-planners, like Le Corbusier and others, the experience gained at various places where town planning has been put into practice, notions borrowed from the supporters of Garden Cities

17, Unified railway system (First stage of reconstruction). Long distance.

Main Stations.

P=Paddington.

K=City (King's Cross and St. Pancras).

To be kept in use:

B=Blackfriars.

L=Liverpool Street and Broad Street.

L.B.=London Bridge.

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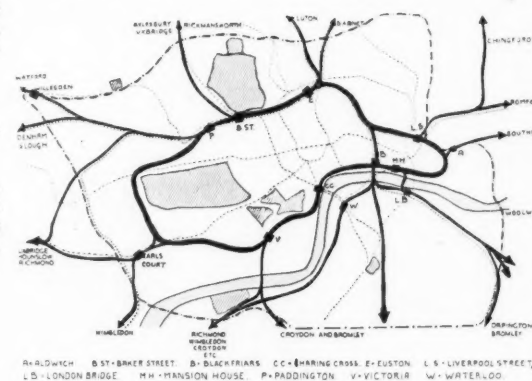
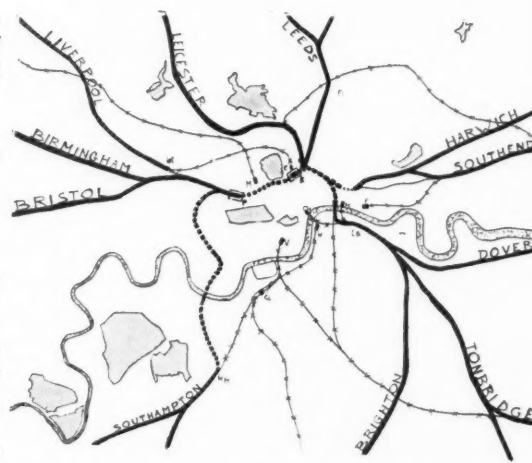
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18, Suburban traffic connected to Inner Circle (First stage of reconstruction).

By running all suburban trains over part of the Inner Circle, traffic is dispersed.

and Satellite Towns, have all been used, but because of different analytical methods, the final conclusions have been new, and different. The Group does not dispute that an entirely different grid might be developed which served the purpose better than the one proposed, but it is convinced of two things: that London can and must be rebuilt on organised lines, and that the methods employed to find the most suitable solutions must be scientific investigation into every mode of life, involving preliminary analysis, followed by imaginative and unprejudiced composition of the results.



26 Eton Avenue



13 Eton Avenue



15 Eton Avenue

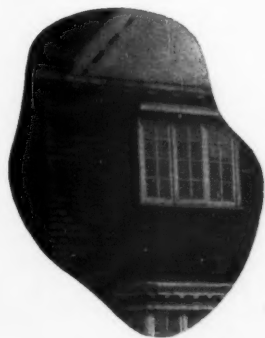
Treasure Hunt By Peter F. R. Donner

The object of these articles is to draw attention to the characteristics of the "Coburg style" in its various stages and idioms, and to tempt readers into similar hunting expeditions in their own districts. They will find that, wherever the game is played, it pays in entertainment as well as enlightenment. This month the theme is taken from the same neighbourhood as in February, and in fact completes the story then told from 1840 to 1890. What happened in Eton Avenue and in innumerable wealthy suburbs between 1890 and 1910 all over England in the same way during the same years, is indicated below.

SPECIMEN No. 1

26 Eton Avenue

What distinguishes the three houses in Eton Avenue which I am going to dissect this month from most town houses built for wealthy clients in the period between 1860 and 1890, is the predominance of horizontals over verticals. Norman Shaw, Ernest George and the others born in the thirties and forties preferred three stories to two and loved steep, phantastically outlined gables to crown their facades. A house of this kind was illustrated in February and is repeated as a tailpiece to these notes. Houses such as No. 26, Eton Avenue, with its two stories, its tiled first floor and the white gables would have been criticized by the Norman Shaw generation as cottagey and hence inappropriate for a metropolitan residence. Yet the tiling as such is by no means new. It was—this need hardly be said—the revival of an eighteenth century fashion, especially of the Southern counties. Then Norman Shaw had used it again in country houses of his. Its popularity was, however, chiefly of the last years of Queen Victoria and of the Edwardian decade. The architect who made it so widely popular was Ernest Newton, the most influential of Norman Shaw's pupils. Newton, on the one hand, Voysey on the other, created the two most inspiring styles of the early twentieth century. Voysey was born in 1857, Newton in 1856. Of Voysey more will be said another month, as for Newton, he was, as compared with the other members



Norman Shaw had been the great inspirer of English domestic architecture between 1860 and 1890. His influence was followed by that of two men: Ernest Newton and C. F. Annesley Voysey. The tiled first floor with the neat white windows and white modillioned cornices is typical of Newton and has here, by the architect of the house in Eton Avenue, been literally taken over.



The tiled first floor at Rampydney, 1699, and at Merrist Wood (by Norman Shaw), 1877.

pupils. Newton, on the one hand, Voysey on the other, created the two most inspiring styles of the early twentieth century. Voysey was born in 1857, Newton in 1856. Of Voysey more will be said another month, as for Newton, he was, as compared with the other members

of the Shaw circle, less original than Prior, less thoughtful than Lethaby, less grand than Blomfield; but he was thoroughly practical and had a sense of comfort and ease which none of the others possessed to the same extent. Houses such as the one illustrated here must have formed the immediate and closely followed example of the architect who designed 26, Eton Avenue.



Ernest Newton: House at Chislehurst, c. 1895-1900.

SPECIMEN No. 2

26 Eton Avenue

He followed Newton in more than the motif of the tiled first floor. From Newton derives the white heavily modillioned cornice of the gable. Newton, who is more than any other architect responsible for the Georgian revival of the early twentieth century, had a special predilection for these cornices, although he would not have used them for gables. For these he preferred the simpler treatment similar to that of the right-hand gable in Eton Avenue. Another eminently characteristic Ernest Newton motif is the porch flanked by a number of short stout white columns of a curiously plump grace. For this I know of no immediate Georgian precursor, though readers may, perhaps, be able to enlighten me. So little has in fact been done to elucidate



Newton's porches are especially characteristic. Among the principal types which he used, two are imitated in Eton Avenue: in No. 26 the one with the hipped roof on white dwarf columns and—



Ernest Newton: House at Chislehurst, c. 1895-1900.

the pedigrees of Coburg motifs that I find it often impossible to trace derivations without a great deal of consultation with generous voluntary helpers. To return to the Newton porches, they succeed in conveying to the visitor of a house even before he enters it that feeling of secure comfort and cultured prosperity which made Newton's style so popular with his English clients and after a while with the clients of all Newton's followers all over the civilized world.

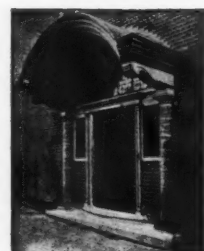
SPECIMEN No. 3

13 Eton Avenue

Sometimes Ernest Newton's porches have a hipped roof such as the one just shown. More often, however, they are covered with depressed barrel-vaults. This



—in No. 13 the one with the depressed barrel-vault. Newton treats this motif with that grace and niceness that explain his universal success, first in England, and then abroad.



Porches at Raynham Hall, 1720, Netherall Gardens (by N. Shaw), 1888, and Chislehurst (by E. Newton), 1900.

regard to this often repeated feature, Shaw, whose porch from Netherall Gardens here illustrated dates from 1888, had probably preceded Newton. Generally speaking, it can be said that nearly all Newton's individual motifs can in some way be traced back to Shaw. Yet the quiet serenity of Newton's handling gives them a personal character entirely different from Shaw's.

SPECIMEN No. 4

13 Eton Avenue

The occurrence of bay windows as such is no help to anybody who wishes to date the Eton Avenue houses correctly. They had never been absent from English architecture since Tudor days. Yet the particular form of the bay window at No. 13, spacious, not too high, broken up into many panels, and ending in a generously moulded cornice which just reaches into the gable, is again typically Newton. It makes one understand Newton's popu-



Bay windows reaching into steep gables are another leitmotif of the Newton style.

SPECIMEN No. 5

13 Eton Avenue



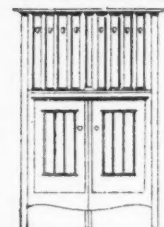
However, Newton features are here mixed up with features originated by the other most popular English architect of that generation: Voysey. In his early style such wooden posts with dainty ornamentation and crisp and bold mouldings are frequent.



From Ernest Newton's Book of Houses, 1890.

larity more than any other motif. His secret is the gentlest and yet completest blend of what seems most comfortable in English eighteenth and seventeenth century architecture. Norman Shaw had certainly been far bolder and more imaginative. But Shaw appears quite often flamboyant and ostentatious. On Newton's taste one can always rely. He will never be found ill-mannered, though at times, perhaps, a little dull. What Lethaby chiefly praised in him was his "niceness and friendliness."

Who was the architect of 13, Eton Avenue, I do not know. It could be found out, I daresay. For the purpose of this Treasure Hunt it is, however, quite sufficient to see that neither No. 13 nor No. 26 can be by Newton himself, and that both must be of c. 1895-1910. No. 13 is, I think, the more successful of the two, also the more individual. Or at least it is more than mere imitation of one architect's style. The posts on which the barrel-vault of the porch rests have nothing to do with Newton and the Georgian revival. Their source is obviously Voysey, and Voysey at his best and freest. You can find such posts, such daintily outlined recessed ornamental panels, such bold and crisp mouldings in his furniture designs and then in those of the younger architects such as Baillie Scott and the Glasgow school.



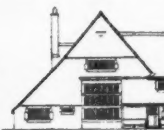
Voysey: Cupboard, c. 1895.

SPECIMEN No. 6

15 Eton Avenue



While Newton went to the Georgian style for inspiration, Voysey's idiom is a thoughtfully modernized Tudor. The gable brought right down into the ground floor is one of the many motifs Voysey adopted from English cottage architecture of the sixteenth and early seventeenth centuries.



Voysey: House at Puttenham, 1896.

For Voysey—this cannot be repeated often enough, because it is the most important thing to be remembered in looking at English domestic architecture of about 1890-1910—was, besides Newton, the leader of taste in house design, after Norman Shaw's influence had come to an end, and before that of the Continental Modern Movement had begun. Take the most prominent feature of No. 15, Eton Avenue, the two gables brought right down into the ground floor. There are few motifs of which Voysey was fonder. It had been—needless to say—a cottage and not a town motif in Tudor days. Now he introduced it into town houses, and the clients of the nineties accepted it gladly as an expression of their longing away from Victorian grandeur, fuss and formality. But while in Voysey's own works it goes to perfection with all the other features, the roughcast walls, the sloping buttresses, and the rude stone surrounds of the low windows, the less sensitive architect of No. 15, Eton Avenue has in vain tried to combine it with features of completely different origin and character.

SPECIMEN No. 7

15 Eton Avenue



The architect of No. 15, Eton Avenue, while following Voysey in its main outline, has tried—none too successfully—to incorporate in his Neo-Tudor scheme Newton motifs and Norman Shaw motifs such as the incurved canopy over the door and the “Palladian” window.

Again the interfering influence is Ernest Newton, i.e., the Neo-Georgian fashion, which by then, about 1905 or 1910, began to oust out the sturdier Voysey style. In No. 13, Eton Avenue all was Newton except the details of the porch. Here, in No. 15, a Voysey house is garnished with a number of Neo-Georgian details, and balance is not achieved. The canopy



E. Newton: “Logmore,” near Dorking, 1913.



N. Shaw: “Three Gables,” Fitzjohn's Avenue, 1881.

over the door especially, with its graceful curve, looks quite alien in a Voysey wall and under a Voysey gable. In a mature brick-built Newton house it is perfectly in place. Again the window above this canopy has, instead of the Voysey shape to be expected, that tripartite composition which comes from Raphael, went on to Palladio, and then via Inigo Jones. Kent, Robert Adam to Norman Shaw. It is in Eton Avenue, however,

used in a much thinner and feebler manner than wherever Shaw has it. The attempt in No. 15, Eton Avenue to achieve a synthesis of two opposed currents of style dates the house pretty safely. It must be of about 1905-10.

So what happened in Eton Avenue—to bring the story of the February Treasure Hunt to an end—is this. The opening up of the street had begun, when Norman Shaw's influence was at its height, say about 1890, since there is here, in Hampstead (as against outer suburbs), no reason for assuming a big time lag between the creation of the style and its adoption. Quite near by, round Fitzjohn's Avenue, Shaw himself had built six houses between 1875 and 1888. A series of houses almost identical with the one illustrated on the right was erected both at the east and the west end of the street. A stretch of about three hundred yards was left vacant. Building then ceased for some reason and was not resumed until five or ten years later. By then the change from the tall townish to the low countrified house had taken place, and the centre part of Eton Avenue has now on both sides small country houses which would look more appropriate, if they could have been placed in generously spaced gardens, distant from each other.



The Norman Shaw style house: point of departure of the houses discussed in this article.

COUNTRY CRAFTSMEN

The Woodman

By Thomas Hennell



Cutting the tree

TREE felling on a large scale is carried out by contractors, whose gangs divide up the work between them and, having felled their trees, haul the timber to the saw-mill. The sawmill buildings are not of a very permanent character, because after a few seasons' work the surrounding woods may become exhausted, and so the scene of labour must be shifted elsewhere.

When the logs have lain long enough for the outer parts to dry thoroughly and as soon as they can be dealt with, they are cut into baulks and planks. The logs are sawn into planks with a frame-saw, driven by a steam engine and consisting probably of several blades

working vertically and set at intervals equal to the depth of plank required. As these are set in motion the log is simultaneously moved forward on an iron platform or rails. The sawn planks of oak, elm or deal are built up again in the original form of the log, but each plank is separated from the next by wedges or battens. Thus they are maintained rigid, as they grew in the log, but their surfaces do not touch. The smaller pieces of wood, such as are intended for chair- and table-legs, or for tool-handles, are built in opposite pairs, placed alternately like cheese-straws, the two ends of each fresh pair just covering those of the last; the weight of those above holding

them with tension enough to prevent warping.

The frame-saw is generally used for cutting wood longitudinally, down the grain; for cutting it across the grain the circular saw is more convenient. The pit-saw, by which planks were formerly sawn by hand, has long been out of use. If it should survive anywhere, with a couple of men willing for, and capable of, the very hard task of sawyers, I cannot help thinking that in the present scarcity of sawn timber, it could be used very profitably.

There is a portable mechanical saw which imitates the action of a cross-cut saw. This works by a crank from a motor-cycle engine,



Working the cross-cut

but its manufacture has been discontinued owing to the war. The hand-saws belong to the immediate process of felling, which is carried out by two woodmen who specialise in it and always work together. A father and son, with a wife or mother to cook and look after them, make a very good team—they waste no time and work hard throughout the winter daylight. They take work by the piece or contract, and have for perquisites the chips and loppings, which they sometimes sell to gipsy fuel merchants, but as often give away to frugal cottagers who will come and collect them. They are inclined to be silent but sometimes outspoken; they see much of the country while travelling about, and their knowledge of the quality and supply of timber is unrivalled.

When a tree is about to be felled, the woodmen first consider which side has the best clearance, and then whether the inclination of the trunk and the growth of branches will allow the tree to be felled so. Neighbouring

trees may impede the fall or themselves be damaged by it. It is desirable to break as few branches as may be. The two woodmen work round the bole with their axes, cutting it very obliquely downwards through the bark, and detaching the chips with an upward fling of the axe. Thus the bark and the "sap" (the living part of the wood) is mostly cut through and the trunk is tapered down, much as a pencil is sharpened, to its heart of dry and solid wood. The taper is deeper and comes lower upon the side towards which the tree must fall. From the other side the woodmen now put in a two-handled cross-cut saw, of which the blade lies horizontally and the handles are T-shaped; the shanks of these handles being curved down and riveted to either end of the blade. The teeth form a series of double cutting jags with a deep hollow clearance between.

The sawyers kneel to their work upon their coats, and since they cut as near to the roots as possible and slope the cut downwards so as to throw the tree away from it, they have to stoop lower and at last to sit with legs extended and the soles of their feet in contact. By the time the saw is well buried in the cut the weight of timber upon it causes it to "draw" heavily. So steel wedges are driven into the cut until the saw can make easier progress, and when necessary they are driven deeper again. At last the tree begins to shiver to its top and is nearly ready to fall. As it totters the saw is edged out of the cut. Straight-grained timber such as larch and spruce is apt to be damaged by splintering or tearing up the stem as it falls; and as such timber yields easily to the axe, the stronger woodman leaps upon it striking it repeatedly while it is actually falling. With the last cut the tree seems to spring several feet into the air and falls so that the upper boughs are the first to reach the ground.

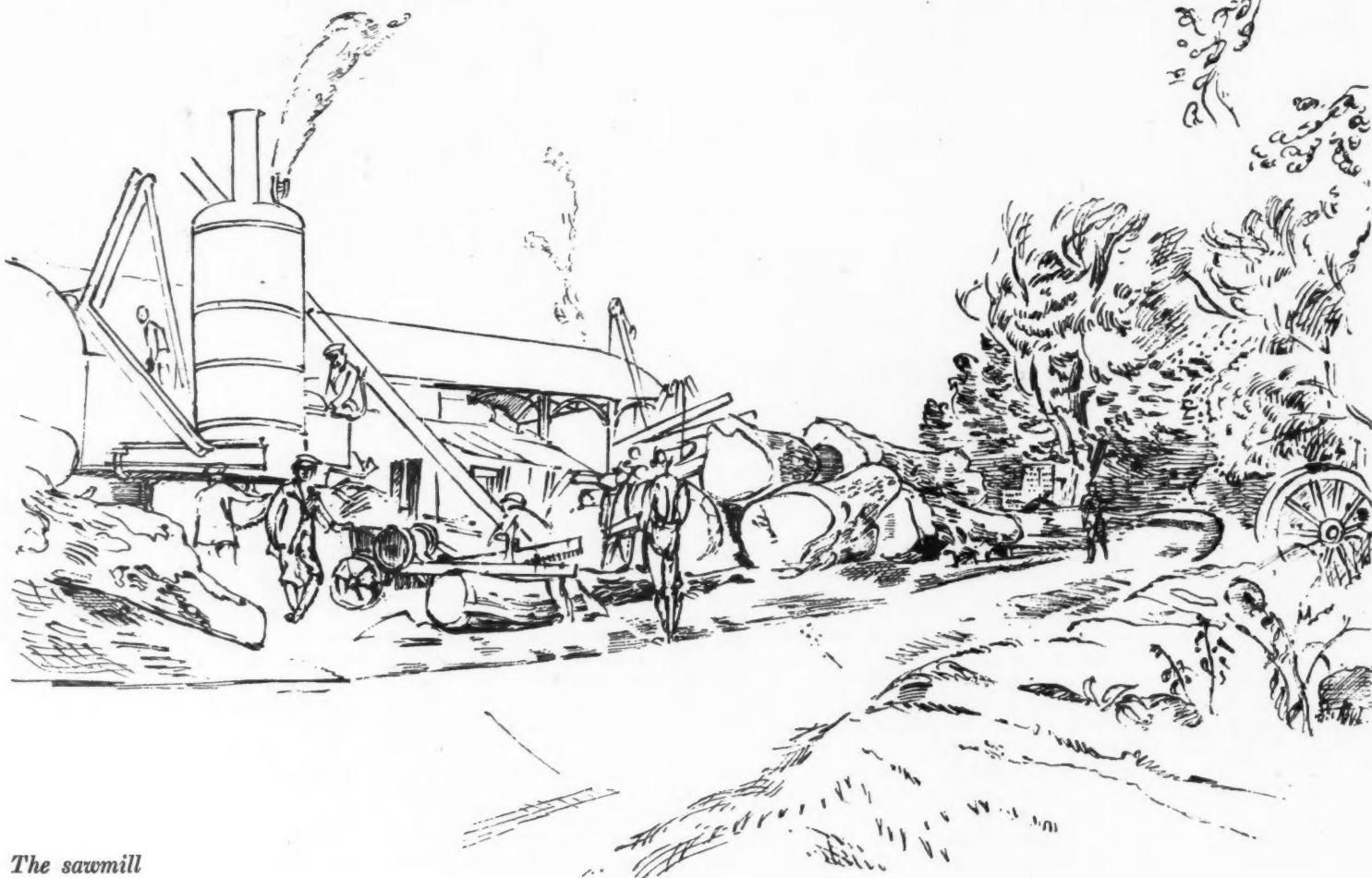
The two woodmen now begin to clear the boughs with their axes until only those are left (many broken, no doubt) upon which the trunk rests. But one long branch inclining upwards is left as a lever by which to swing the trunk over, so that the branches which were beneath can be trimmed also. The top of the tree, too slender for use as timber, is sawn off;



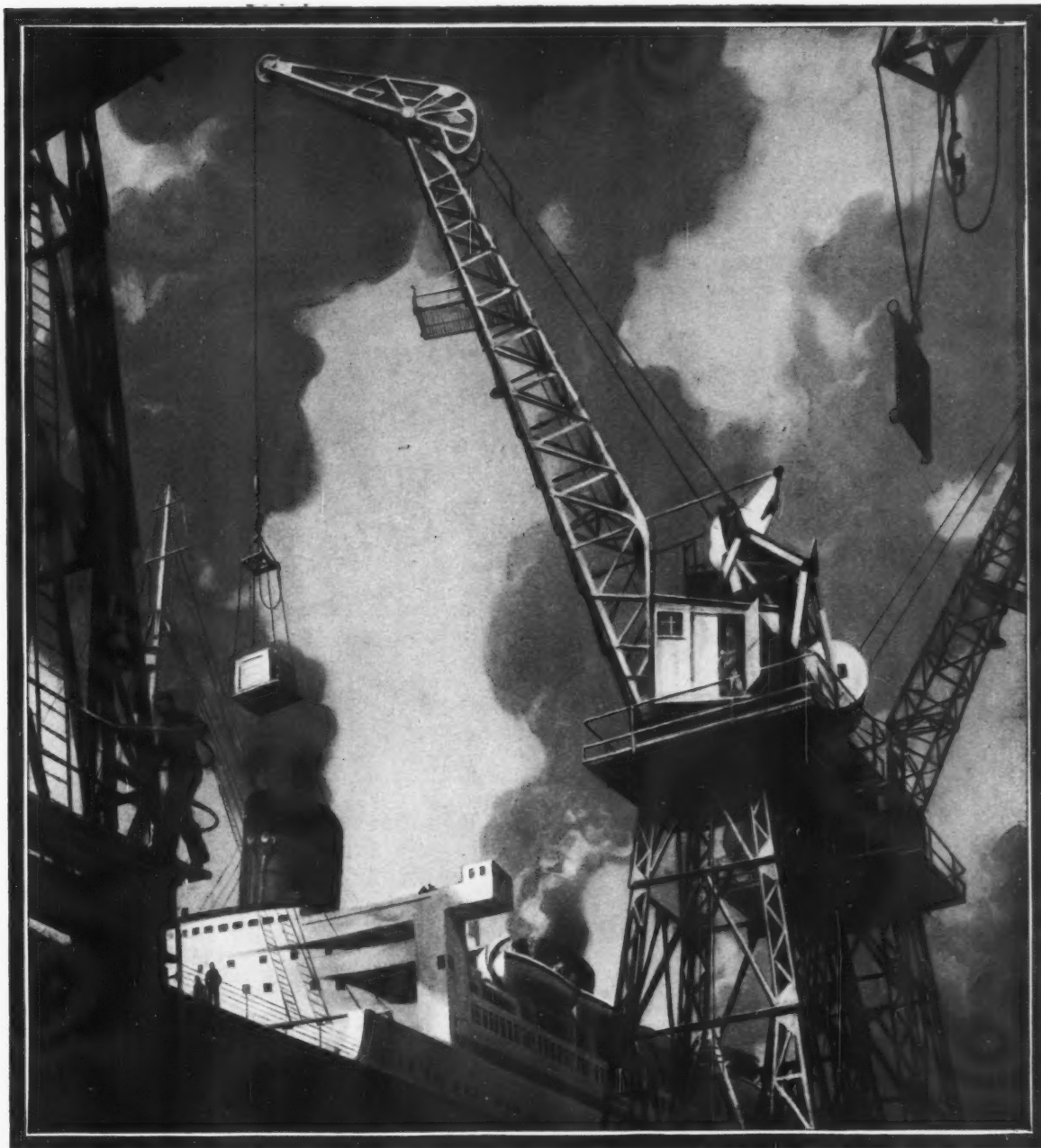
Lopping and topping

and so this final act is known as "lopping and topping."

Owing to badly organised, uncontrolled and haphazard felling of timber by builders and other speculators, and to the insecurity of estates, our long-maturing trees, of which oak is the principal, have been wasted and not replaced. The timber famine will not suddenly cease with the end of the war; so it may be hoped that the Forestry Commissioners will be able to look forward to rebuilding with other materials than pit-props and match boarding, and will plant wisely and far-sightedly.



The sawmill



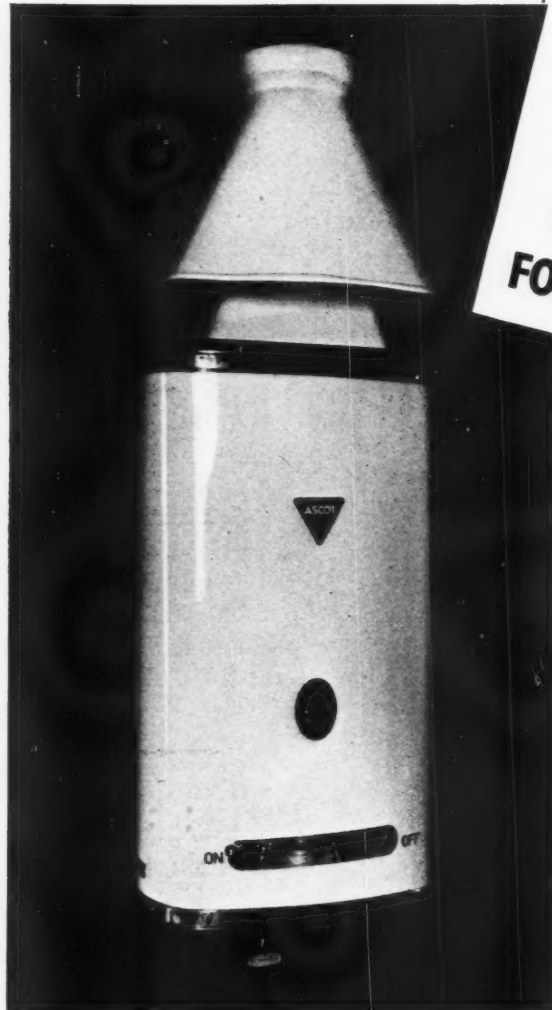
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Catalan Gothic

As we stand in the great cathedral of Gerona, or in the smaller but more completely realized fifteenth-century church of Santa Maria del Pino in Barcelona, we understand the impulse which has moved the Catalans through three centuries in this long architectural evolution. They have ever stood between the two great sources of architectural inspiration: Rome and the Gothic of Northern France. With instincts that allied them to both these centres, yet nearly overwhelmed by the Gothic current to which they were so exposed, the Catalans slowly asserted within the Gothic field their equally imperative southern instincts. They craved a firm strength and simplicity, largeness and energy, with a fine economy in the adaptation of means to practical ends. Possessing great boldness in construction, together with a sound underlying sobriety, through which they were saved from all extravagant incoherence, they succeeded in moulding out of unlike elements a finely and deliberately blended style which expresses their own instincts and temperament. The old Roman basilica had remained as a half-divined ideal for ever within them; slowly they carved their way towards it. On the border-land between Roman architecture and Gothic architecture they achieved the satisfaction of their complex frontier impulses in the creation of what we may, I think, term a Gothic basilica, a large, aisleless, internally buttressed hall which is one of the very fittest and finest types of the Christian Church.

When we turn to Barcelona Cathedral, which was begun at the end of the thirteenth, and mainly built during the early years of the following century, we reach at last the fully developed Catalan church of the so-called transitional period. I say "so-called," because we seem to realize at Barcelona, what we may already vaguely feel at Tarragona, that, so far as the Catalans were concerned, the retention of Romanesque elements in conjunction with Gothic is not the helpless result of a changing fashion, but a deliberately adopted method, carefully calculated for the attainment of definite architectural and artistic effects. And Barcelona is not, like Tarragona, a church mainly interesting for brilliant experiments and predominantly the triumphant achievement of the sculptor. It has a firmly designed beauty, as strong and attractive a personality of its own as Notre Dame of Paris. A church of such decided individuality suggests the moulding force of a great master-mind, and it seems probable that such a creative artist is to be found in Jaime Fabre, a very famous Mallorcan architect and builder of that time, to whom Barcelona Cathedral was entrusted. The genius of Fabre, we may judge, moved strictly within Catalan limits. He imported no foreign spirit or method, but he worked out the specifically Catalan conception of a church with greater insight and executive ability than had ever been displayed before, and he began to move towards those ideals which were afterwards triumphantly attained in the final form reached by the Catalan church.

HAVELOCK ELLIS
(*"The Soul of Spain,"* Constable)

MARGINALIA

The Theatre Royal, Bristol

An appeal to save the Theatre Royal at Bristol from being turned into a warehouse was launched from the stage of the theatre itself on May 1st. Speakers included Mr. Robert Donat, the Lord Mayor of Bristol, Mr. Wilfred Leighton and Mr. John Summerson. Mr. Summerson's part was to describe the architectural significance of the theatre. He said that it was almost miraculous that a theatre of 1766 should have come down to our own day almost unaltered. It was the regular thing for theatres to be burnt down every 20 or 30 years; they rarely survived longer. Few theatres, even of early Victorian date, were standing to-day—fewer still of the Regency, and practically none of the 18th century.

The theatre was not only an astonishing rarity however; in its time it had evidently been a pioneer building. The promoters took the trouble to go to London and visit the great theatres, including Drury Lane, where important reconstructions had been effected under Garrick's management. They persuaded Mr. Saunders, the Drury Lane carpenter, to let them have plans of the theatre. These they brought back home and put into the hands of Mr. Paty, the Bristol architect. Paty improved upon them and planned what was probably the first semi-circular auditorium in England.

Mr. Summerson described the theatre as it must have appeared in 1766. Most of the ornaments, he said, were of later date. Originally the wall

surfaces would be plain, but enriched with decorative paintings. There would be a great chandelier hanging from the ceiling, and diffusing light over auditorium and stage. Some of the present ornaments were added when the ceiling was tilted to accommodate a gallery; others, more fragile and frivolous, appeared to date from about 1860.

He then gave these three reasons for the theatre's preservation.

1. Because of its rarity.
2. Because of its beauty.
3. Because it stands on a site in Bristol's historic King Street, which contains so much excellent architecture that it should be preserved as a whole.

Mr. Summerson concluded by saying that the theatre was not only important

to Bristol and the west, but to the nation. Comparing it with historic theatres on the Continent, he said that these were all Court Theatres, built in the neighbourhood of palaces. It was appropriate that England's historic theatre should be a people's theatre in the centre of a busy town. A photograph of the theatre, for the purchase and restoration of which a sum of £25,000 is needed, appears on the next page.

City Treasures

A recent report (from Prebendary T. Wellard, Secretary to a committee appointed by the Bishop of London) gives some details of the measures that have now been taken to safeguard the most valuable contents of the City Churches from further damage.

Two particularly fine screens have been evacuated to the country: those from St. Peter's, Cornhill, a rare example of Wren's work, and from St. Margaret, Lothbury. The latter was formerly in All Hallows the Great, and was erected in St. Margaret's when the church was demolished. The dismantling and removal of organs was a difficult proposition, and only those of St. Catharine Cree and St. Andrew Undershaft have been taken away. These are those which had been least modernised. Two wooden sword rests—from St. Mary Aldermanbury and St. Helen, Bishopsgate—and several iron ones have also been removed.

Three sets of church bells, cast before the Fire of London, those of St. Bartholomew the Less, St. Bartholomew the Great and St. Andrew Undershaft, have gone to Somerset. The eight bells of St. Magnus have been brought down to floor level. The early eighteenth century clock in the west tower of St. Magnus has also been removed. Churchwardens' pews have gone from St. Margaret Pattens.

Statues and busts taken away include those of Milton and Elizabeth Pepys, and the Hogarth portrait from St. Bartholomew the Great has also been stored in safety.

The Royal Academy

It is not to be expected that the Architecture Room at the Academy should have much to offer in times when civil building is at a standstill, but this year's Summer Exhibition is of considerable importance in one way—photography has now been admitted as a medium for illustrating architecture. It is a reform that has long been clamoured for and is long overdue, and should make the Architecture Room much livelier after the war, especially if the reform is made much more thoroughly than has yet been the case. For if it is agreed that the building is the thing, not the craftsmanship represented in a water-colour interpretation of it, and that photography is the most honest and straightforward way of illustrating buildings, then there is no place at all for the irrelevancies of the old kind of academy perspective; the Architecture Room would look far better without it. The only limitation this would impose would be to confine the exhibition to completed works, as distinct from mere projects, but that would be no bad thing.

What one would like to see is standard-size large photographs, with

THE THEATRE ROYAL, BRISTOL



An appeal has been launched (see preceding page) to save this theatre from being turned into a warehouse. It was sold a few months ago for £10,000 to an anonymous buyer (see *THE ARCHITECTURAL REVIEW* for March), and a total of £25,000 is now required so that it can be restored and endowed as a national monument in the care of the National Trust. It is unique in retaining its interior unaltered, as the picture above shows, and is complete with side-boxes. It was built in 1766 and was the scene of performances by Mrs. Siddons, the Kembles, Macready and other famous personages.

MARGINALIA

Acknowledgements

The photograph on page 142 of the burnt-out warehouse at Hull, which had been converted into a museum under the name of Old Times Street, is reproduced by courtesy of the *Museums Journal*. The other photographs illustrating air-raid damage at Hull are by courtesy of the National Buildings Record.

The Ruberoid Company

Mr. Edgar R. James, Chairman and Managing Director of The Ruberoid Co., Ltd., is relinquishing the Chairmanship as from May 1st, but will retain his seat on the Board as a Director. He has been Managing Director since 1906, and Chairman and Joint Managing Director since 1935, when the Ruberoid Co. was incorporated as a public company.

Mr. D. L. Irwin, who has been Joint Managing Director since 1935, succeeds him as Chairman and Sole Managing Director. The appointment of two new Directors to the Board has also been announced, Mr. Stewart Proudlock, Assistant Works Manager, who has been in the service of the company for 30 years, and Mr. H. L. Plummer, General Manager of the Contracting Department who, until 1929, was representing the company in India and Burma.

a simple plan of each building. In its half-way stage this year's Architecture Room is a rather scrappy mixture of little photographs and water-colour renderings, and lacks all interest since the works exhibited date from so long ago that the general effect is that of an Academy of 1932 not 1942. Buildings shown, for example, include Vincent Harris's Leeds City Hall and W. G. Newton's Marlborough College Science Block. The best drawings are those of the President's Liverpool Cathedral, which are hung alongside a couple of huge spam-coloured views of Sir Giles Scott's Liverpool Cathedral.

In the other rooms, architectural interest is given by a number of paintings of bomb-damage, perhaps the best being a water-colour of the Palace of Westminster by Vivian Pitchforth. But in general these suffer from the too easily effective drama of the subject and the artists' failure to select with sufficiently positive sensibility from the confusion with which he is faced. There are nine pictures of St. Paul's (as against eleven last year)—the dome rising above a foreground of ruins holds its place pretty well as the sentimentalist's stock subject. Fishing boats must still take second place. There are also several of Mr. Algernon Newton's sunlit renderings of Regency London, whose atmospheric charm always disarms the critic.

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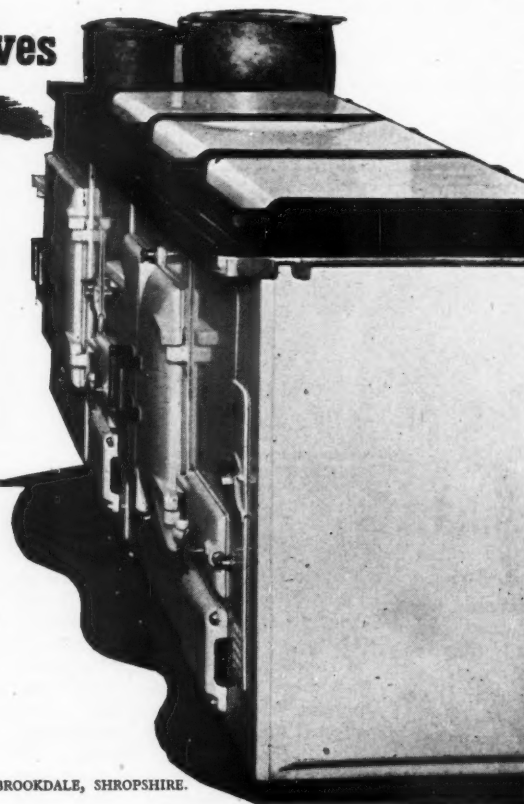
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Architect: J. Hubert

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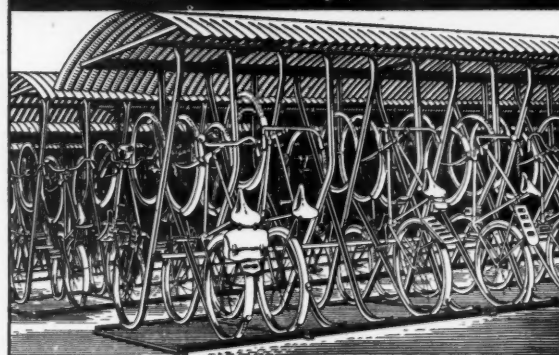
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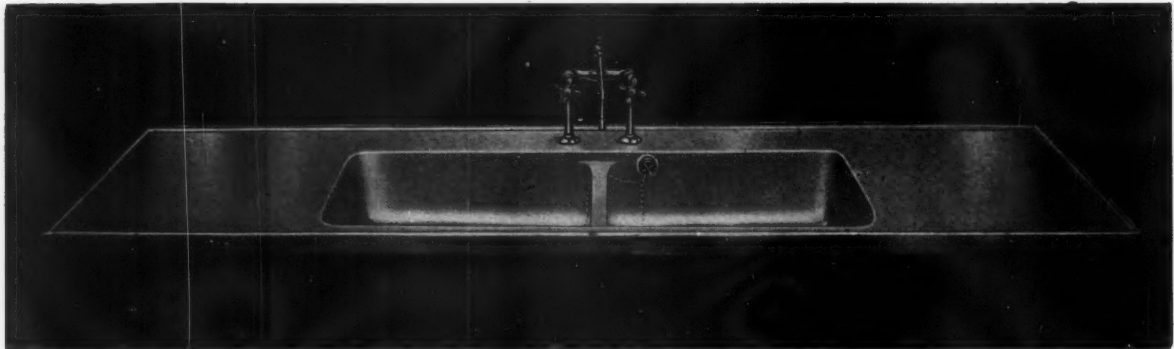
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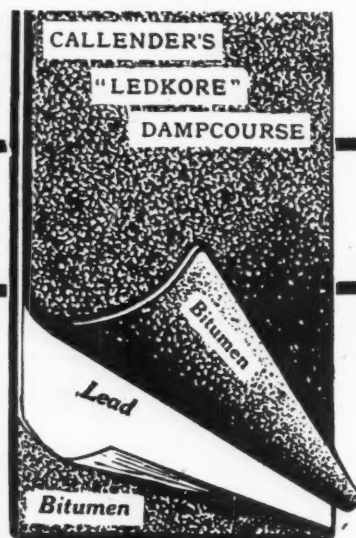
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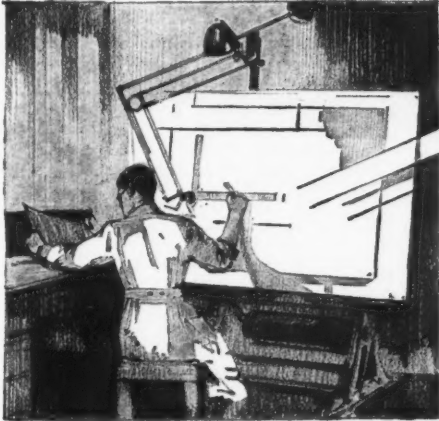
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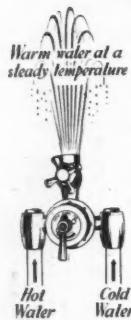
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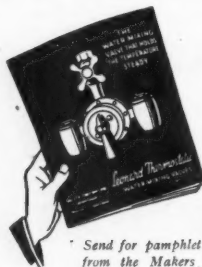


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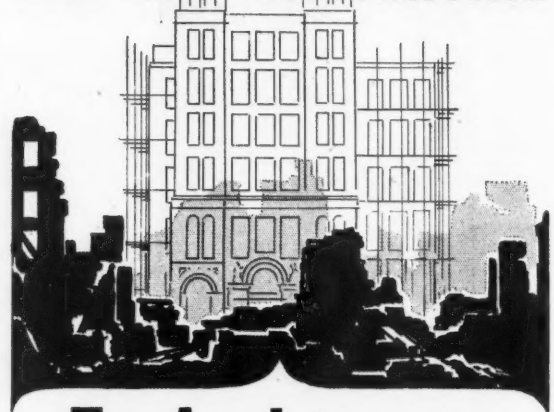
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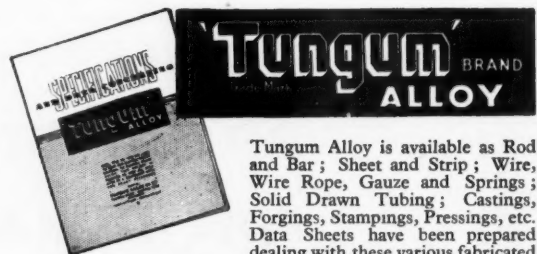


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★ FORMS on which returns must be made are obtainable from the Director of Demolition and Recovery (Scrap Metal Order) Ministry of Works and Buildings, Sanctuary Buildings, Great Smith Street, London, S.W.1.

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1942

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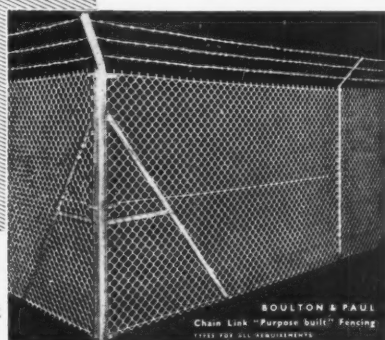
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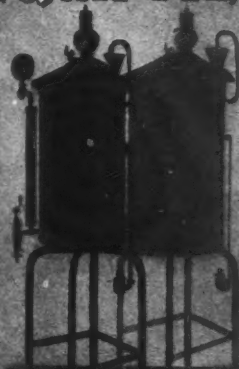
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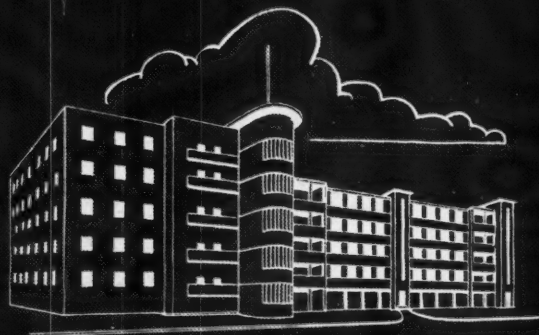
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