THE ARCHITECTS' JOURNAL

standard contents

every issue does not necessarily contain all these contents, but they are the regular features which continually recur.

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No. 2524] [Vol. 97

THE ARCHITECTURAL PRESS, War Address: Forty-five The Avenue, Cheam, Surrey. Phone: Vigilant 0087-9

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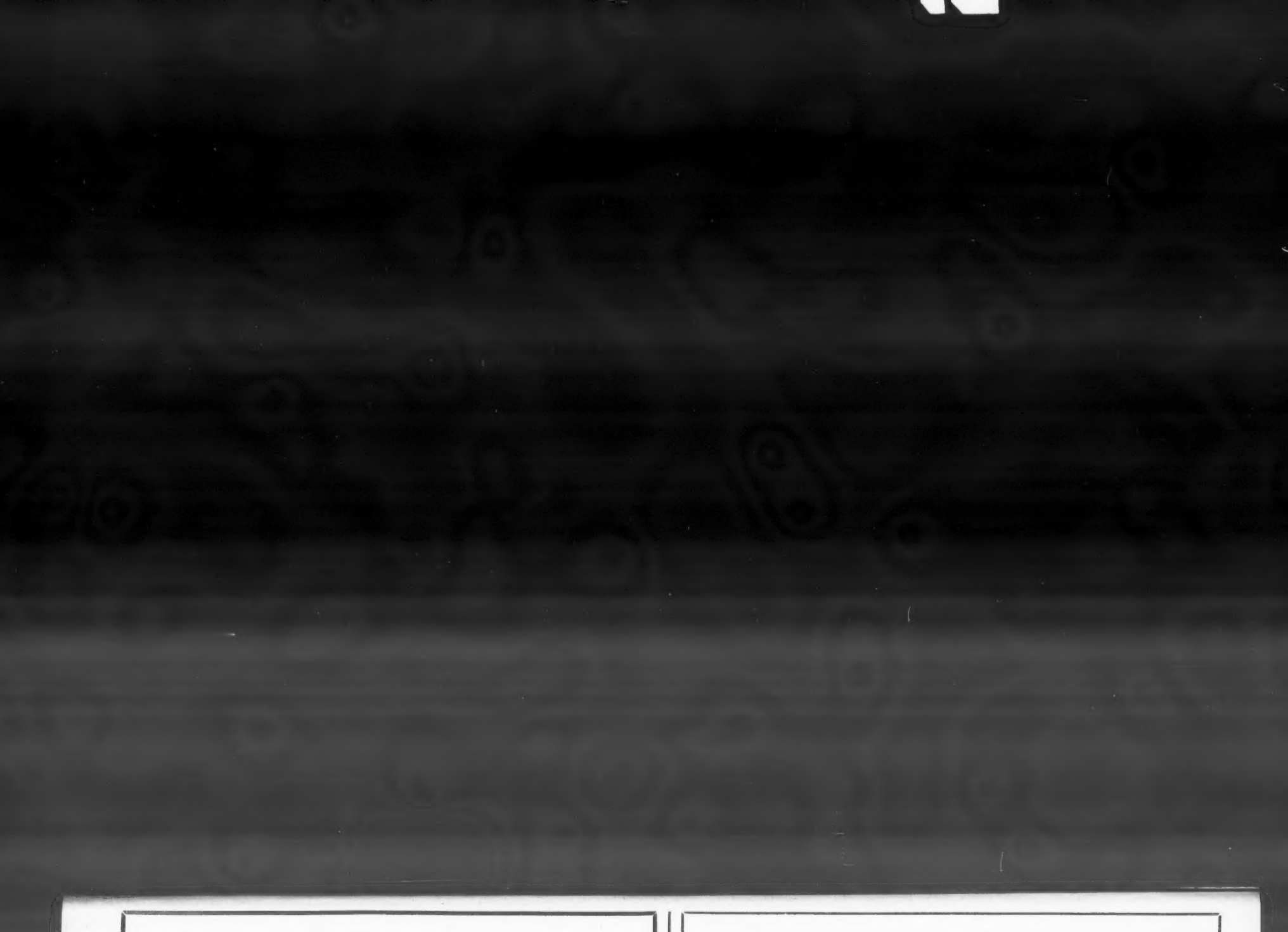
Registered as a Newspaper

★ The war has both multiplied the number of Official Departments and encouraged Societies and Committees of all kinds to become more vocal. The result is a growing output of official and group propaganda. A glossary of abbreviations is now provided below, together with the full address and telephone number of the organizations concerned. In all cases where the town is not mentioned the word LONDON is implicit in the address.

AA	Architectural Association. 34/6, Bedford Square, W.C.1. Museum 0974.
ABCA	Army Bureau of Current Affairs. Curzon House, Curzon Street, W.1. Mayfair 9400 (Extension 461).
ABT	Association of Building Technicians. 113, High Holborn, W.C.1. Holborn 1024-5.
APRR	Association for Planning and Regional Reconstruction. 32, Gordon Square, W.C.1. Euston 2158-9.
ARCUK	Architects' Registration Council. 68, Portland Place, W.1. Welbeck 9738.
ASB	Architectural Science Board of the Royal Institute of British Architects, 66, Portland Place, W.1. Welbeck 6927.
BC	Building Centre. 23, Maddox Street, W.1. Mayfair 2128.
BCGA	British Commercial Gas Assn. 1, Grosvenor Place, S.W.1. Sloane 4554.
BEDA	British Electrical Development Association. 2, Savoy Hill, W.C.2. Temple Bar 9434.
BIAE	British Institute of Adult Education. 29, Tavistock Square, W.C.1. Euston 5385.
BINC	Building Industries National Council. 110, Bickenhall Mansions, W.1. Welbeck 3335.
BOE	Board of Education. Belgrave Square, S.W.1. Sloane 4522.
BOT	Board of Trade. Millbank, S.W.1. Whitehall 5140.
BRS	Building Research Station. Bucknalls Lane, Watford. Garston 2246.
BSA	British Steelwork Association. 11, Tothill Street, S.W.1. Whitehall 5073.
BSI	British Standards Institution. 28, Victoria Street, S.W.1. Abbey 3333.
CEMA	Council for the Encouragement of Music and the Arts. 9, Belgrave Square, S.W. 1. Sloane 0421.
CPRE	Council for the Preservation of Rural England. 4, Hobart Place, S.W.1. Sloane 4280.
CSI	Chartered Surveyors' Institution. 12, Great George Street, S.W.1. Whitehall 5322.
DIA	Design and Industries Association. Central Institute of Art and Design, National Gallery, W.C.2. Whitehall 7618.
DOT	Department of Overseas Trade. Dolphin Square, S.W.1. Victoria 4477
EJMA	English Joinery Manufacturers Association (Incorporated), Goring Hotel, Grosvenor Gardens, S.W.1. Victoria 9787-88.
FMB	Federation of Master Builders. 23, Compton Terrace, Upper Street, N.1. Canonbury 2041.
GG	Georgian Group. 55, Great Ormond Street, W.C.1. Holborn 2664.
HC	Housing Centre. 13, Suffolk Street, Pall Mall, S.W.1. Whitehall 2881.
IAAS	Incorporated Association of Architects and Surveyors. 75, Eaton Place, S.W.1. Sloane 3158.
ICE	Institution of Civil Engineers. Great George Street, S.W.1. Whitehall 4577.
IEE	Institution of Electrical Engineers, Savoy Place, Victoria Embankment, W.C.2. Temple Bar 7676.
IHVE	Institution of Heating and Ventilating Engineers. 21, Tothill Street, S.W. 1. Whitehall 9609.
IRA	Institute of Registered Architects. 47, Victoria Street, S.W.1. Abbey 6172.
ISE	Institution of Structural Engineers. 11, Upper Belgrave Street, S.W.1. Sloane 7128-29.
ISPH	Committee for the Industrial and Scientific Provision of Housing. 3, Albemarle Street, W.1. Regent 4782-3.
LIDC	Lead Industries Development Council. Rex House, King William Street, E.C.4. Mansion House 2855.
LMBA	London Master Builders' Association. 47, Bedford Square, W.C.1. Museum 3767.
MARS	Modern Architectural Research. 8, Clarges Street, W.1. Grosvenor 2652.
MOH	Ministry of Health. Whitehall, S.W.1. Whitehall 4300.
MOI	Ministry of Information. Malet Street, W.C.1. Euston 4321.
MOLNS	Ministry of Labour and National Service. St. James' Square, S.W.1. Whitehall 6200.
MOS	Ministry of Supply. Shell Mex House, Victoria Embankment, W.C.2. Gerrard 6933.
MOT	Ministry of Transport. Berkeley Square House, Berkeley Square, W.1. Abbey 7711.
MOTCP	Ministry of Town and Country Planning. 32-33, St. James's Square, S.W.1.
MOW	Ministry of Works. Lambeth Bridge House, S.E.1. Reliance 7611.
NBR	National Buildings Record. 66, Portland Place, W.1. Welbeck 1881. All Souls' College, Oxford. Oxford 48809.
NFBTE	National Federation of Building Trades Employers. 82, New Cavendish Street, W.1. Langham 4041.
NFBTO	National Federation of Building Trades Operatives. 9, Rugby Chambers, Rugby Street, W.C.1. Holborn 2770.
NT	National Trust for Places of Historic Interest or Natural Beauty. 7, Buckingham Palace Gardens, S.W.1. Sloane 5808
PWB	Post War Building, Directorate of. Ministry of Works, Lambeth Bridge House S.E.1. Reliance 7611.
RC	Reconstruction Committee RIBA. 66, Portland Place, W.1. Welbeck 6927.
RCA	Reinforced Concrete Association. 91, Petty France, S.W.1. Whitehall 9936.
RS	Royal Society. Burlington House, Piccadilly, W.1. Regent 3335.
RSA	Royal Society of Arts. 6, John Adam Street, W.C.2. Temple Bar 8274.
SPAB	Society for the Protection of Ancient Buildings. 55, Great Ormond Street, W.C.1. Holborn 2646.
TCPA	Town and Country Planning Association. 13, Suffolk Street, S.W.1. Whitehall 2881.
TDA	Timber Development Association. 75, Cannon Street, E.C.4. City 6147.
TPI	Town Planning Institute. 11, Arundel Street, Strand, W.C.2. Temple Bar 4985.



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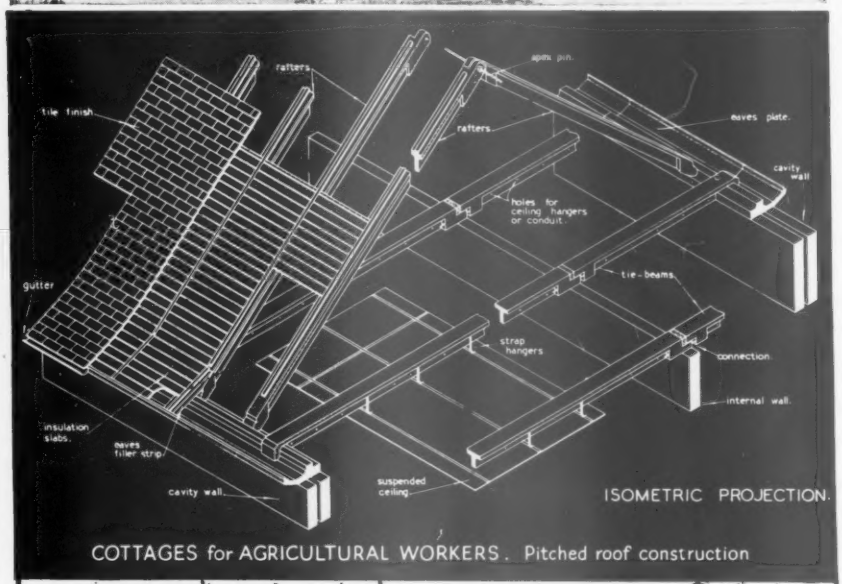
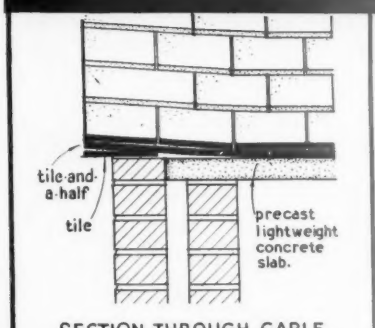


COTTAGES for AGRICULTURAL WORKERS. Pitched roof construction



SECTION THROUGH GABLE.
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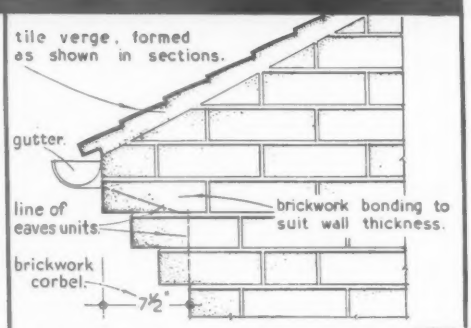
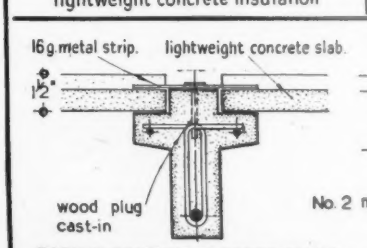
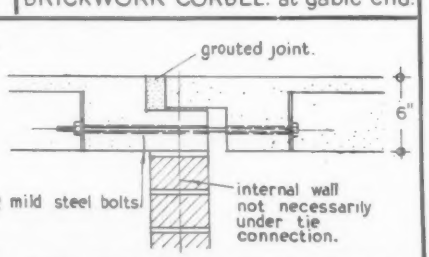


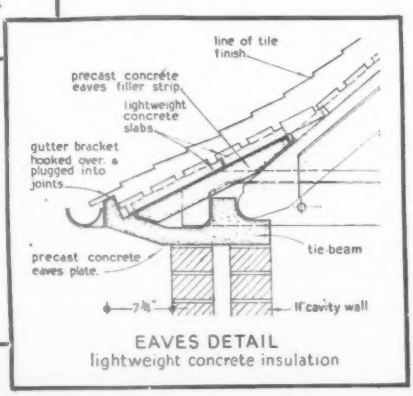
BRICKWORK CORBEL. at gable end.



RAFTER SECTION at 90° TO SLOPE
showing fixing of insulation



DETAIL OF TENSION JOINT IN TIE-BEAM



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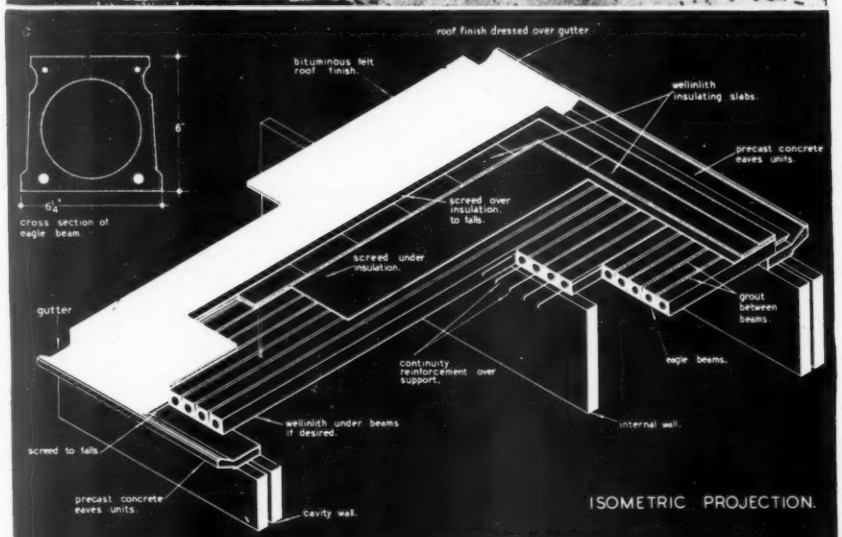
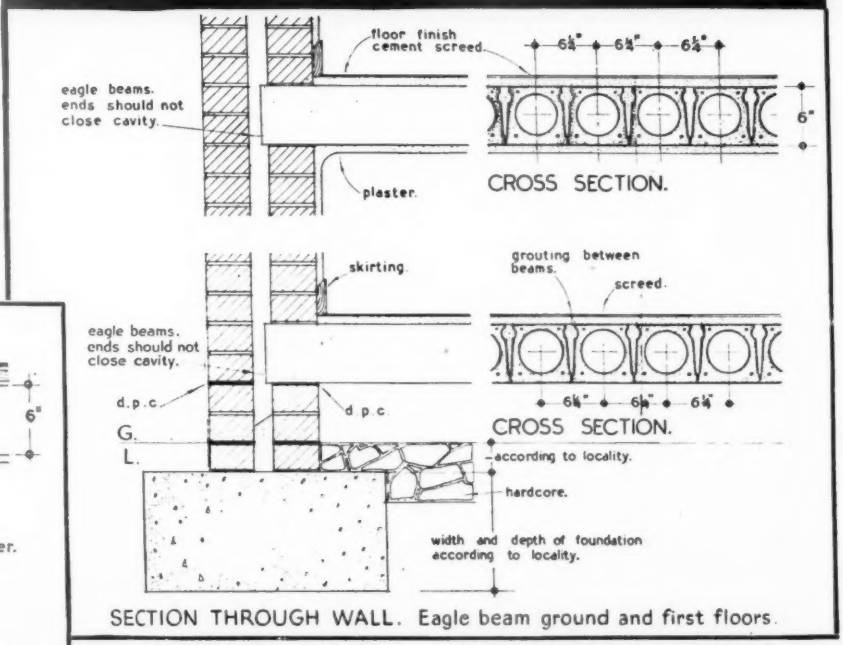
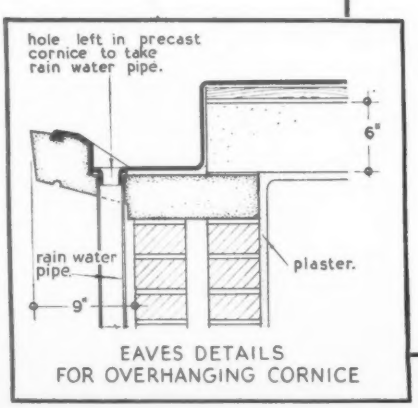


COTTAGES for AGRICULTURAL WORKERS. Flat roof construction



SECTION THROUGH WALL. Eagle beam ground and first floors.



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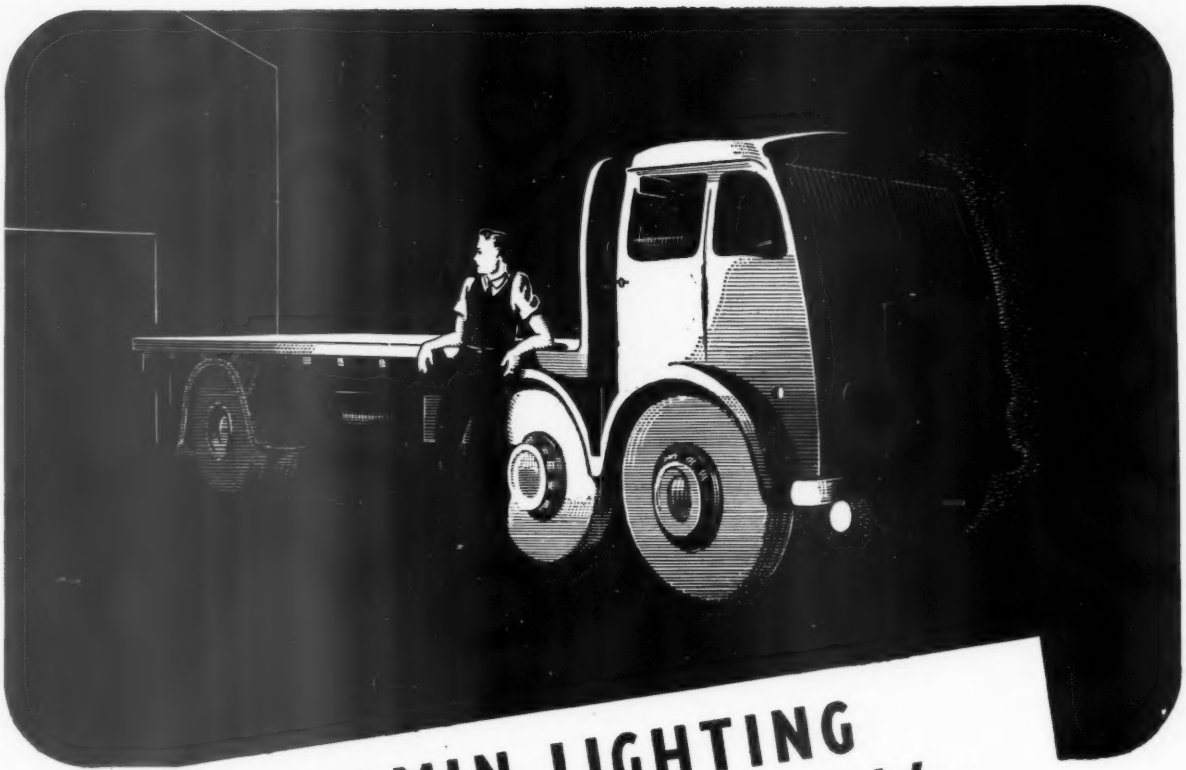

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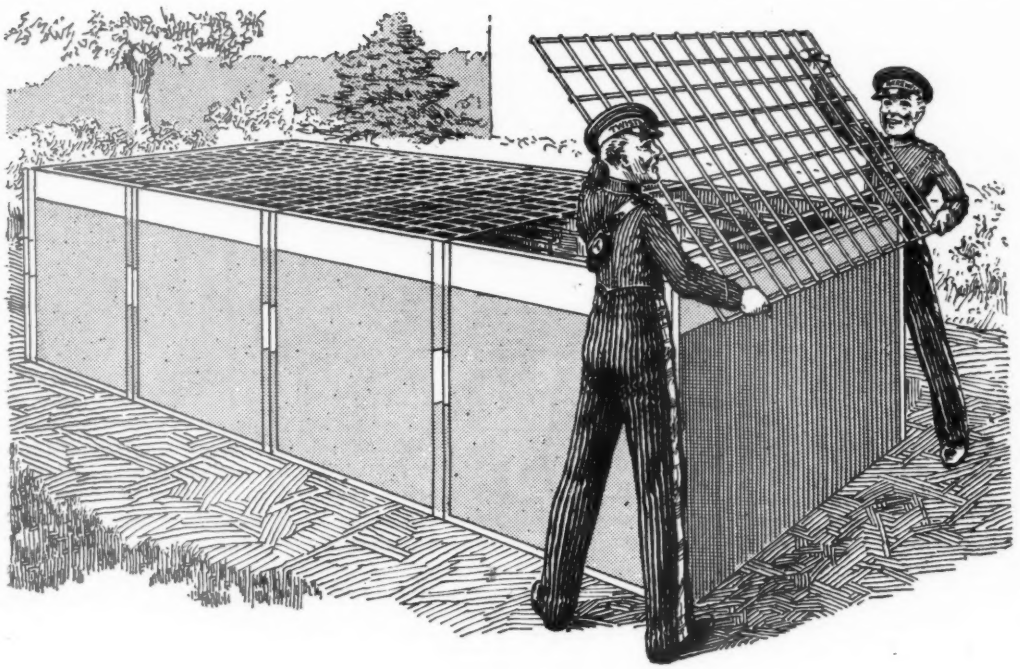

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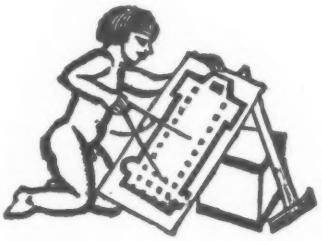
THE OLD "SWAN" THEATRE, BANKSIDE, LONDON

Towards the end of the 14th century, it is known that "performances and exhibitions" were given on crude wooden structures wheeled about the streets; but no theatres, as such, existed before 1576 when the "Theatre", Shoreditch, London, was opened. This, according to authorities, was the first theatre in Europe for the performance of secular plays.

London saw the opening of several theatres at this period, and by 1600 there were nine or ten compared with only two in Paris. These early theatres were small wooden imitations of the magnificent amphitheatres of Roman times. Stages for plays were movable wooden platforms wheeled into the arena between bear and bull-baiting and such popular amusement of the times.

A very good idea of the conditions under which Shakespeare's plays were first presented in this period can be formed from the illustration above. This is a copy of a drawing of the Swan Theatre, Bankside (1598), discovered in a London letter, *circa* 1600, from a traveller in England, Johannes de Witt.

In common with every other periodical this JOURNAL *is rationed to a small part of its peace-time needs of paper. Thus a balance has to be struck between circulation and number of pages. We regret that unless a reader is a subscriber we cannot guarantee that he will get a copy of the* JOURNAL. *Newsagents now cannot supply the* JOURNAL *except to a "firm order." Subscription rates: by post in the U.K. and Canada, £1. 3s. 10d. per annum; abroad, £1. 8s. 6d. Special combined rate for* ARCHITECTS' JOURNAL *and* ARCHITECTURAL REVIEW *in the U.K. and Canada, £2. 6s.; abroad, £2. 10s. Single copies, 6d.; post free, 8d. Special numbers are included in subscription; single copies, 1s.; post free, 1s. 3d. Back numbers more than 12 months old (when available), double price. Volumes can be bound complete with index, in cloth cases, for 12s. 6d. each; carriage 1s. extra. Goods advertised in the* JOURNAL, *and made of raw materials now in short supply, are not necessarily available for export.*



DIARY FOR JUNE-JULY

Titles of exhibitions, lectures and papers are printed in italics. In the case of papers and lectures the authors' names are put first. Sponsors are represented by their initials as given in the glossary of abbreviations on the front cover.

ABERYSTWYTH. *Town and Country Planning Association Conference.* 11 a.m. to 5 p.m. JUNE 19

BRADFORD. *Town and Country Planning Association Conference.* 11 a.m. to 5 p.m. JUNE 26

CHRISTCHURCH. *Living In Cities Exhibition.* (Sponsor, BIAE.) JUNE 28—JULY 5

GATESHEAD. *Englishman Builds Exhibition.* At Shipley Museum and Art Gallery. (Sponsor, BIAE) JUNE 21 to JULY 4

GIBRALTAR. *Living in Cities Exhibition.* JUNE

LEICESTER. *Homes to Live In Exhibition.* At the Museum and Art Gallery. (Sponsor, BIAE). Brains Trust. JUNE 19, 1 p.m. JUNE 10 to 27

LONDON. *Royal Academy's Summer Exhibition.* In Burlington House, Piccadilly. 9.30 a.m. until 7 p.m. Weekdays; 2 p.m. until 6 p.m. Sundays. Admission one shilling. JUNE 10 to AUGUST 7

Exhibition of the work of the London Regional Reconstruction Committee. At the National Gallery. The LRRC is a Committee appointed by the Council of the RIBA, with 12 members from the Institute and the AA respectively. It has been at work for nearly two years on the problems of reconstruction and post-war planning for the London Region. The latter for the purposes of the Committee's work has been defined as C.D. Region No. 5, the area of which is about 850 sq. miles, with a population of about 8,500,000. The exhibition consists of proposals for a Regional Plan illustrated by plans and a plan-model to a scale of 6 in. to 1 mile. Many other drawings and diagrams are exhibited to illustrate particular problems of the Region, such as transport, and to demonstrate the principles upon which the Committee have based their proposals. A Historical Section is included in the exhibition. (See pages 379-384). The Second Interim Report of the Committee, to be published at the time of the exhibition, will contain illustrations and form a comprehensive survey of the work of the Committee and of the exhibition. JUNE 10 to JULY 10

Rebuilding Britain Exhibition. At Royal Exchange. Open at 1.45 p.m. Monday to Friday; 10 a.m. to 12 noon Saturdays.

To-day in Ulster: This planning business: Discussion on the wireless for Northern Ireland listeners between Dennis Winston, chief Architect to the Northern Ireland Ministry of Home Affairs, and Adrian Robinson. 6.30 p.m. JUNE 10

Verner O. Rees. *Twentieth Century London.* At the Greater London—Towards a Master Plan Exhibition, National Gallery. Chairman: Henry Braddock. (Sponsor, LRRC.) 5 p.m. JUNE 21

Members of the Birmingham and District Branch of IHVE. Submission of technical data on *Vertical Temperature Gradients in Factory Buildings Heated by Unit Heaters.* At 21, Tothill Street, S.W.1. (Sponsor IHVE). 6 p.m. JUNE 22

H. V. Lanchester. *Life in Reconstructed London.* At the Greater London—Towards a Master Plan Exhibition, National Gallery. Chairman: Frederick R. Hiorns. (Sponsor, LRRC). 5 p.m. JUNE 23

Professor Ernest Barker. *Social Background of Town Planning.* At 1, Grosvenor Place, S.W.1. 1.15 p.m. (Sponsor, TCPA). JUNE 24

Frederick R. Hiorns. *Factors in Urban Planning.* At the Greater London—Towards a Master Plan Exhibition, National Gallery. Chairman: H. V. Ashley. (Sponsor, LRRC). 5 p.m. JUNE 28

Michael Waterhouse, Hon. Secretary, RIBA. *The Activities of the RIBA during the War, and the Place of the Architect in the Post-War World.* At the RIBA, 6 p.m. Sponsor, RIBA. JUNE 29

Stanley Hamp. *The South Side: London's Opportunity.* At the Greater London—Towards a Master Plan Exhibition, National Gallery. Chairman: Arthur W. Kenyon. (Sponsor, LRRC). 5 p.m. JUNE 30

Building Industries Congress on *The Building Industries in the Reconstruction Period.* BINC announces a Congress of the Building Industries on July 21 and 22 at Caxton Hall, Westminster. Chairman, F. Leslie Wallis, President of the Council. Delegates' tickets will be available shortly from the representative organizations of the building industries or direct from the Honorary Secretary to the Congress, Douglas Wood, 1, Old Burlington Street, W. 1. The Congress will be divided into sessions the subjects for which will be as follows:—

July 21. Welcome to delegates by R. Coppock, Chairman of the LCC and immediate Past-President of BINC. *The Post-War Building Programme. Post-War Housing. The British Empire and Building.*

July 22. *Town Planning. The Availability of Labour for Building. The Future Organization of the Building Industries.* JULY 21—22

MARKET DRAYTON. *Living In Cities Exhibition.* (Sponsor, BIAE.) JUNE 26 to JULY 10

NEWS

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Though no feature in The Journal *is without value for someone, there are often good reasons why certain news calls for special emphasis.* The Journal's *starring system is designed to give this emphasis, but without prejudice to the unstarred items which are often no less important.*

★ *means spare a second for this it will probably be worth it.*

★★ *means important news, for reasons which may or may not be obvious.*

Any feature marked with more than two stars is very big building news indeed.

During the quarter ended March 31 last LOANS SANCTIONED BY MOH to local authorities reached a total of £1,611,731.

The loans sanctioned were as follows:—housing, £151,463; municipal services (including clinics, sanatoria and mental hospitals), £111,997; swimming pools, playing fields, recreation grounds, open spaces, etc., £11,444; water supply, £147,225; disposal of waste products (sewerage and sewage disposal and refuse destruction), £47,694; education services (including libraries and museums), £50,308; air raid precautions, £54,885; roads and bridges (including private street works), £151,119; Other services (including loans to defray contributions, etc., under War Damage Act, 1941), £885,596. Total, £1,611,731.

The Tribunal set up by MOW in January last to hear APPEALS BY BRICK UNDERTAKINGS whose works had been scheduled for closure, has dealt with nine cases.

After considering the Brick Appeal Tribunal's recommendations, the Minister decided to confirm in six cases the decision to withdraw the licence to manufacture. In two cases the appeals were allowed and in the remaining case, subject to a restriction of output, was adjourned for re-hearing in six months time. There are no further cases awaiting hearing.

PRIDE of ACHIEVEMENT

How quickly can Dawnays get cracking on a rush job? Within a few minutes of a 'phone call an Engineer from the Design Department can be on his way to the site. On his return, and even while the Chief Designer is getting out his plans, arrangements will be made for the supply of steel so that no delay occurs when the detailed drawing begins to emerge from the Drawing Office.

How long will that take? Well, the working details of the first steel for a 300 ton job were in the shops within five days of a recent rush telephone call. Erection arrangements began immediately and the whole job, including floors, roofs, pressed steel gutters, etc. was finished complete in 26 days from receipt of that 'phone message.

DAWNAYS

STEELWORKS RD. S.W. 11

TELEPHONE :— BATTERSEA 2525

Stoneham & Kirk

from AN ARCHITECT'S *Commonplace Book*

STANDARDIZATION AND PREFABRICATION—AN ASSURANCE. [*From* Towards a New Britain (Architectural Press)]. Standardization in architecture is a very old story. The bricks of the Egpytians and of Ur are the oldest standardized building parts of which we know. But—so you hear the argument coming from those who oppose standardization in the modern house—the brick is a small unit. It influences appearance only in a very general way. It is the whole house, or terrace of houses all looking standardized that would be so fatal to the beauty of our cities. Now this argument is a fallacy. Georgian Barnfield Crescent, Exeter, is really no less standardized than Peter Jones's store to-day. Bloomsbury is just as uniform as any strictly modern estate. And looking to Bloomsbury or Bath from the chaos of Oxford Street or Piccadilly Circus, surely you will no longer mistake dignity, sobriety and good manners for regimentation and lifelessness. You need not be frightened of prefabrication either. It refers only to a technique, not in the least to the final result. You may deplore the waning of the part that individual craftsmanship used to play in the past, but you are better served for the moment by the machine than by the handicraftsman.

Mr. Barnes, speaking in the House of Commons, said that furnishing a small home COSTS £136 NOW AGAINST £52 in 1936.
He said: The cost of completely equipping a working-class home in 1936 was £52 10s. 4d. Completely to have equipped such a home in 1942 would have cost £167 11s. 10d. Purchase tax on the goods would have amounted to £31 3s. 2d., leaving a comparative cost, against the cost in 1936, of £136 8s. 2d.

Time saved by MOT plans, now far advanced, for motor roads and the segregation of fast motor traffic will be EQUAL TO TWENTY-FIVE MILLION POUNDS a year said Mr. Noel Baker, Parliamentary Secretary of MOT, at Bournemouth.
He said that motor-vehicles are so remotely like other kinds of road traffic that they should, as far as possible, be segregated on the road. That means a big programme of road engineering, new motorways through open country, and improvement of existing highways, especially at dangerous crossings. In the cities it means segregated ring roads and radial arteries on which only fast moving motor traffic will be allowed. It will be a long and costly process. Some people think it will give no adequate or economic return, but a five-mile journey from the House of Commons or the Bank towards the outskirts of London could to-day be done 40 minutes quicker for the return journey than in 1939. It is plain that a great capital expenditure can be justified on economic grounds, and he was convinced that in the next 30 years that expenditure will be made.

In the House of Lords, Lord Balfour of Burleigh called attention to the White Paper on TRAINING FOR THE BUILDING INDUSTRY, and asked whether the Government are prepared to amplify its contents.
The noble lord, who also moved for papers, said he looked forward with dread to the day when, if peace is declared, the Government are not ready to put into effect their policy about the location of industry. Lord Portal, Minister of Works, said that in the White Paper a guarantee for 12 years is proposed. It is imperative for them to see that the work is there for the men to do. Recently they have obtained from nine Government departments, their programmes, and put them on a 12-years' basis. Provision has been made for 1,250,000 men in the building trade, of whom about 500,000 will be craftsmen. The cost of housing has now gone up by 105 per cent. on pre-war figures. It is necessary to look into the question of economies which can be effected. High costs will kill building. Economies, however, must not be made at the expense of the building operative but by a more efficient use of labour and building materials. He had recently appointed a controller of experimental building development, whose business it will be to co-ordinate all ideas and new methods put forward by any firm or individual. He will have the advice of an inter-departmental committee on housing construction. A costing section has been set up to act as a yardstick. No new proposal will have the backing of his Ministry unless it shows an improvement on existing ideas. With the object of obtaining greater efficiency in post-war building an investigation is taking place into the method of placing contracts. After the war he thought they can break down costs in such a way that they will have a thriving, prosperous industry alive to the situation with which it is faced. The motion was, by leave, withdrawn.

The need for a skeleton National plan, especially in regard to land acquisition and control, is urged by the Sheffield and Peak District Branch of CPRE. Until this is fixed, says the Branch in its annual report, there can be NO PLANNING ON A BOLD SCALE by local authorities.
The report refers to the increasing damage inflicted by lime and cement works, and expresses fears that fresh claypits are about to be opened. The firm involved has made an interesting gesture in response to protests. It is employing a landscape architect to make a long-term remedial plan to restore the defaced landscape by such means as re-seeding, levelling and judicious planting of hardwoods. The chairman, Professor Porster, at the annual meeting, referred to the concerted efforts being made to secure improvements to certain "objectionable features of the Ladybower Reservoir scheme."(*A.J.*, April 29 and May 6). Mr. Fred. Mardhall, M.P., who was absent through illness, sent a message expressing thanks to the Board for their previous care for amenities and disappointment that the finish of the Ladybower scheme was unworthy of their past achievements. Though reluctant to take these matters to higher authority, he did feel this was an instance where MOTCP and Parliament should intervene, if the previous representations of a responsible body such as the CPRE has been ignored.

At a meeting of the National Book Council in London, the Archbishop of Canterbury urged the provision of BUILT-IN BOOK-SHELVES IN ALL NEW HOUSES.
The Archbishop, who was lecturing on *The Resources and Influence of English Literature*, hoped that encouragement will be given to the accumulation of private libraries, however small. One suggestion which he most heartily endorses, is that we should urge the provision in all new houses of built-in bookshelves so that those who do buy books will not be faced with what may be for them the really vexatious alternative of either buying bookshelves, which for them may be difficult to afford, or leaving the books lying about untidily.

If it were organised, said Mr. Leslie Wallis, President of NFBTE, speaking at Glasgow, there is WORK IN SIGHT FOR AT LEAST TWENTY YEARS in building and rebuilding after the war.
We builders regard the early months of peace with serious misgiving, he said, for until the Government makes up its mind on fundamental questions like planning, location of industry, and priorities, and accepts or rejects the Scott, Uthwatt, and Barlow reports, nothing can even be started. Local authorities, owners of land, industrial firms, all want to get on with the job. But until a move comes from the top nothing practical can be done.

OWING TO THE HEAVILY INCREASED COSTS CAUSED BY THE WAR THE PUBLISHERS OF THE *JOURNAL* HAVE BEEN FORCED TO RAISE ITS PRICE TO NINEPENCE AS FROM THE ISSUE OF JULY 1. AT THE SAME TIME THE ANNUAL SUBSCRIPTION RATE WILL BE INCREASED TO £1/15/-

Chairman of the LCC

Mr. Richard Coppock, the newly elected Chairman of the LCC, has been General Secretary of the NFBTO for the past twenty-two years. Born in Manchester in 1885 he left school at the age of eleven to be a baker's apprentice, but at thirteen became a bricklayer's help. In 1911 he was appointed Manchester District Secretary of the Operative Bricklayers' Society (now the Amalgamated Union of Building Trade Workers) and five years later Divisional Organiser of the North-Western Area, a position he held until 1921 when he became General Secretary of the NFBTO. Mr. Coppock has now attained one of the most responsible positions in the country. It is particularly fitting that so prominent an official of the building industry should become chairman of the LCC when London has got to be largely replanned.

TOWARDS A MASTER PLAN

★ *Among the Knights Bachelor IN THE KING'S BIRTHDAY HONOURS is Hugh Eyre Campbell Beaver, the Director-General of MOW. Sir Geoffrey G. Whiskard, Permanent Secretary to MOTCP, receives the K.C.B.*

Sir Hugh Beaver joined the Ministry—then known as the Ministry of Works and Buildings—in 1940 as Controller of Building Materials and Building Priority Officer. Later, in the same year, he was appointed Director-General, Works and Buildings and took over the chairmanship of the Central Council for Works and Buildings on its formation. At the time of his appointment he was a partner in the firm of Sir Alexander Gibb & Partners. Sir Geoffrey Whiskard, now Permanent Secretary to MOTCP, was previously Permanent Secretary to MOWP. Before his appointment to MOWP in 1941 he was for five years British High Commissioner in Australia.

In the King's Birthday Honours. Mr. (now Sir) Hugh Beaver, Director General of MOW (top), and Sir Geoffrey Whiskard, Permanent Secretary to MOTCP who received the K.C.B.

GOOD and evil in pre-industrial society were often attributed to black and white magic. Industrial man is rapidly raising planning to the same mystical heights. It is simultaneously condemned as the enemy of freedom and praised as the only way to achieve it. Those who practise it with bad results are considered sorcerers and those who preach its potentiality for good, dreamers. Planning is, after all, but organization for a defined end; its process the scientific collection of facts, the diagnosis of disorder and the co-relation of facts to achieve a correct solution. Its social value is determined by the end at which it aims, and its means are successful in so far as the end is kept consistently in view. Previously man has struggled towards achievement of his social aims, when they were consciously realised at all, without the aid of the scientific approach. The resulting lack of co-ordination has not been conspicuously successful, but neither has it been sufficiently unsuccessful, until recently, to arouse a desire in the majority of men to plan. A degree of planning is now generally recognised as necessary, even if evil. The association of evil remaining because planning is still closely connected with societies whose political doctrines we abhor or which we feel are alien to us.

Architects are less confused over planning because they are trained to plan, not only by dealing with facts on an entirely rational basis, as most scientists have to, but by having to account in their conclusions for the irrational, human element. Architects have therefore entered the field of physical planning with an advantage, although they have not yet used this advantage to the full. They still approach urban reconstruction as a job which, at its best, is a matter of circulation, related function and organized community, producing plans which work but are not living organisms. In the planning of our cities, the first job is to collect the facts upon which a diagnosis of the problem can be made. In the large cities this is an enormous undertaking, but the more critical the disorder the more thorough must be the investigation. The second job is to decide planning aims, and the statement of these has been termed the Master Plan. The Master Plan must arise from the correct valuation of constituent factors in historical and contemporary culture, external and internal trade and communications. It must be a diagrammatic illustration of aim rather than a detailed and inflexible design, because unforeseen circumstances, such as a revolution in transport, may completely upset an inflexible design. It must, above all, be inspired by a high degree of creative imagination. The third job and perhaps the most difficult, is to work out the stages towards the fulfilment of the Master Plan. Success in this will depend upon the skill with which the constituent facts have been interpreted, the degree of collaboration

achieved among the many specialists in the co-ordination of these facts and the support of the people for whom the planning is undertaken.

It is too seldom realised that the reconstruction of our cities is an entirely new problem demanding a new vision. It is not enough merely to annul the evils that industrialism has brought us; to put machinery in its right place and surround it with trees. We must make a positive, living organism out of our cities. "Men come together in cities in order to live: they remain together in order to live the good life," it must be the purpose of the planners to show men the fullest possibilities for the good life inherent in contemporary society, to awaken man to his heritage. An architect who builds a house which fully satisfies his client's needs, is a good planner: an architect who builds a house which awakens his client to a new meaning of the word house, has imagination. It is imagination we shall need in the rebuilding of our cities, not only from the planners whose job it is to pioneer but also from the people who must be the settlers, creating living cities out of what is now urban jungle.

The exhibition of the London Regional Reconstruction Committee called *Greater London—Towards a Master Plan* which opened at the National Gallery last week, sets out to indicate the main lines of planned development for a reconstituted London. The exhibition is an excellent example of clear presentation and will prove valuable in stimulating public interest in planning. The plan, however, which is reviewed in detail on page 380, is obviously hindered by lack of co-ordinated information. It is unfortunate that it was termed "Towards a Master Plan" because this implies either a stage in the diagnosis of the problem before the Master Plan is drawn up or a step towards its realization after it has been drawn up, and the LRRC plan is neither. The LRRC has merely applied eleven arbitrary principles to the problem of London, which have resulted in a regrouping of suburban centres round the villages over which London has mercilessly rolled; the whole being subordinated to the present transport system cleaned and pressed and embroidered with protecting parkways. The effect (well illustrated in the plans on page 380) is as if London were flying apart in fragments like an exploding shell. We very much fear that this is just what the plan would achieve. The regrouping of communities is a sound idea, but they must be related if we are to produce a living city. If we accept mechanical barriers of our own invention as limiting factors to social intercourse, we accept mastery by our machines. The tremendous problems of city planning cannot be solved by aiming, even with the most painstaking and enthusiastic efforts, at a target which is not clearly visualised.

The LCC plan is to be made public on July 14 and with its advantage of access to essential information, we hope that it will present proposals for the rebuilding of London founded on a genuine Master Plan.

The Architects' Journal

War Address: 45, The Avenue, Cheam, Surrey
Telephone: Vigilant 0087-9

NOTES & TOPICS

SIR HUGH BEAVER

Among the Knights Bachelor announced on June 1 was Hugh Eyre Campbell Beaver, Director General, Ministry of Works about whom there is one mystery that none of the Ministry's staff has solved. When does he do his work?

★

Sir Hugh has the habit of arriving at Lambeth Bridge House just before 9 every morning and leaving about 9.15 at night (1 o'clock on Saturdays). For a few minutes each morning he glances at the newspapers. From 9 to 6 (Civil Service hours), and sometimes later, he listens to other people giving their opinion in committee meetings, *tête-à-têtes* or on the telephone. During the few minutes between meetings he has lunch in his office and dictates letters, minutes and memoranda to his secretaries, one after the other, passing on these opinions and asking for more information. From 6 to 9.15 he checks and signs the results of his dictation. Each evening and on Saturdays he leaves with a huge bundle of papers under his arm.

★

Presumably it is only during these brief interludes between routine work that he has time to think of such far-reaching proposals as the settings up of the Central Council for Works and Buildings, the Post-War Building Directorate, the Codes of Practice Committee and other committees

At the private view of the RIBA London Regional Reconstruction Committee's Exhibition, which opened at the National Gallery last week. On the right is Mr. Arthur Kenyon, Chairman of the Committee; next to him stands Mr. Ernest Brown, Minister of Health, on whose right is Mr. J. P. Collin, Chief Housing Inspector of MOH.

and directorates—the fruits of whose work have been seen in the Education Committee's Report and the White Paper on Training for the Building Industry, the Standard Schedule of Prices, the Standard of War-time Building and the First Draft Reports of the Post-War Building Study Committees.

★

Why he hasn't cracked under the strain no one knows—for it is well known in the industry that while many of the moves he has initiated have been carried through in the teeth of Civil Service misunderstanding and prejudice, he remains unperturbed, always the idealist and the enthusiast.

LRRC EXHIBITION

The LRRC *Greater London—Towards a Master Plan* exhibition, opened at the National Gallery last week. The photograph above was taken at the private view and shows (r. to l.) Mr. Arthur Kenyon, Mr. Ernest Brown and Mr. J. P. Collin, Chief Housing Inspector, Ministry of Health, round a model of the proposed Inner Airport for London, which is linked by rail and road connections to all parts of the London region. It is situated immediately north of the Isle of Dogs, the latter being planned as a new dock basin for the port of London. The airport is provided with two double runways giving four-directional landing; the bends of the River Thames and the planned open spaces of the Lea Valley providing incoming and outgoing naturally-zoned directional-ways for aircraft.

★

The London plan is simply and persuasively illustrated by large coloured maps that show clearly the regrouping of the suburbs into more homogeneous units and a scorched earth policy along all main transport routes to provide parkways and preserve amenity. The wisdom of thus destroying most of the last 20 years' jerry building, attractive though the idea may be to most of us, is doubtful. In an acute housing shortage *Mon Repos, faute de mieux*, will have to last us quite a bit longer. Put into operation at once, such a policy would add a tidy number to that 4,000,000 at the most crucial moment.

URBAN ROADS

The improvement of road traffic flow and diminution of road accidents in urban areas is one of the biggest results which we hope Town and Country Planning will secure. And the appointment of a Committee* to enquire into the design of urban roads seems at first glance a shrewd move towards equipping Progress with another good weapon.

★

On second thoughts one cannot avoid feeling that the Committee may be tempted by its terms of reference to trample a great deal on

*Appointed recently by MOT with concurrence of MOTCP "to consider the design and layout most appropriate to various types of roads in built-up areas, with due regard to safety, the free flow of road traffic, economy and the requirements of town planning, and to make recommendations."

an obstacle which is already flat and only give a passing push to the one which really blocks the roads. The majority of pre-war car drivers could describe generally, and any traffic expert exactly, how pre-war traffic accidents and delays in urban areas could be cut down by 70 to 90 per cent. Where the public needs help is in persuading some of its members, City Councillors especially, to carry out the measures needed.

★

The main traffic routes to and from the centre of a large urban area are, for instance, a problem which no amount of tinkering can solve. Such routes cannot serve their purpose after the war unless: (1) they pass near but not through main shopping, business and recreational areas; (2) junctions occur only every 440 yards or at longer intervals; (3) the traffic lanes are fenced off entirely from the footway; (4) stopping for picking up and setting down is prohibited except in the case of public transport vehicles using special bays out of the traffic stream.

★

But it has always been held hitherto by valuers, directors of companies and councillors that the street which in any city is most crowded with traffic, whether moving or stopped, is commercially the most valuable, and therefore any attempt to divert traffic from such streets has aroused in the past the most frightful uproar. Very rightly, if the new traffic route was to be allowed to become a rival to the street it was designed to relieve. What is needed now is to persuade people that the commercial value of main streets can be retained—even if the traffic they now carry is replaced by parking and loitering spaces—to exactly the degree which the planning authorities decide that it should be retained.

★

The Committee of 12 members (Uthwatt had four) coming from cities scattered all over England and Scotland (but not including Scotland Yard and H. Alker Tripp) may be a way of doing this. On the other hand it may not.

ASTRAGAL

LETTERS

John Vulliamy (Lieut.)

John Gloag

George L. Greaves, A.R.I.B.A.

A. R. Kerrell-Vaughan
(*Clerk to the Aylesbury Rural District Council*)

The Journal in War-time

SIR,—I would like to tell you how greatly your JOURNAL is valued by students of architecture who, for the duration of war—and possibly longer—are away from their studios. It is true we sometimes turn its pages with a wave of nostalgic frustration; but as we do that it keeps us most admirably and concisely in touch with the profession.

It is encouraging to see that you maintain your policy of exacting, but reasoned, criticism, and of logical, sound, suggestion—encouraging especially during this awkward and lamentable tendency to evasive ethereal idealism.

It is so much less romantic and spectacular to keep one's feet on the ground, and I think it truly praiseworthy that you so consistently face up to the endless, often dreary, variety of detail and fact with such entertaining ability.

JOHN VULLIAMY (Lieut.)

How to Ruin the Case for Planning

SIR,—May I comment briefly on the letters from Mr. R. V. Boughton and Mr. Thomas Sharp, published in your issue for June 3.

Hair-splitting about definitions of the word *directed* discloses the fact that your correspondents do not know, or if they do know, they choose to ignore, what this word means to the British public to-day. When a young girl is mobile, she is *directed* to some work, often far from her home and uncongenial. When a young married woman is *directed* to do part-time or whole-time work connected with the war, she has to give up a good many things. All kinds of people have been *directed* to do this and to do that. People don't rebel, because we are at war; the need for such *direction* is recognized; we are fighting to preserve our freedom. But, make no mistake about it, the word *directed* stinks. If gifted and intelligent men like Thomas Sharp do not recognize this, then they will ruin the case for planning. But Mr. Sharp, fortunately, explains that what he means when he talks about elderly people being *directed* into villages, is "that they should be shown the way there, guided there." Well, so long as they have liberty to refuse such guidance with any expression of disapproval that seems appropriate to them, that's O.K. by me and by most people, I should say.

Men of genius, like Thomas Sharp, could by their work, make villages so attractive that elderly people of all classes, from peers downwards, would clamour to live in them. But is Mr. Sharp's philosophy based on what people *ought* to want rather than on what they *do* want? I repeat, I would like to see a tidy, better-ordered England; but I would rather see my country untidy than unfree. I don't believe that tidiness and freedom are incompatible. Incidentally, I don't stand for *laisser-faire* and I can't stand those self-conscious reactionaries who, mis-using the word individualism, continually whine for a return to the eyeless complacency of the nineteenth century.

I am not a technician, but in all humbleness I do suggest that men like Thomas Sharp could only give us a tidy, better-ordered England if they remember that the Englishman's house is his castle, and that Government direction and control must always be conditioned by respect for human idiosyncrasy, natural growth and local likes and dislikes. Maybe that's what Mr. Sharp means by control "based broadly on a humanistic appreciation and understanding of the public and private benefits involved"; but, if those benefits are going to be decided by what a Government department thinks people *ought* to like, then the prospect is bleak. Men of the Eighth Army and the R.A.F. are not going to be told which week-end they can go away on. When they return, it won't be the week-ends that'll be staggered. It will be the people who attempt to *direct them*.

As for Mr. Boughton: it doesn't matter how well he *directs* a broadside; it's ineffective if he uses blank cartridges. He has taken nearly two hundred words to say nothing rather dully.

East Sheen JOHN GLOAG

Local Authorities and Town Planning

SIR,—I was very interested to read in the issue of the JOURNAL for May 20, *Astragal's* note on Local Authorities and the MOTCP Bill, in which he made reference to a statement by a Member of the House of Commons that he was forced to the conclusion that Town Planning Committees of Local Authorities have as much idea of beauty and of planning and architecture as a child unborn.

As *Astragal* says, this raises very important issues and you may therefore be interested to learn of my own experiences in these matters.

There have been many references recently to the desirability of architects serving on local authorities, and I personally do believe that, particularly at the present juncture, it is a duty which the profession should undertake through its members. In that belief I sit as a member of a local authority and together with some of my colleagues have been trying to get a more positive approach to planning in my own area through the establishment of a special town and country planning committee, and ultimately we hope a joint planning board for the area.

One would have thought that such objects would have secured the whole-hearted support of aldermen and councillors alike, but such unhappily has not been my experience. So that other architects who may feel inclined to undertake such work in the future may be forewarned and thereby forearmed against the opposition they may encounter, I append the following notes:—

(1) Planning has become a political issue. That is to say that very often it is not a matter of what is best for the district but rather as to who shall get the credit for doing anything at all.

THE ARCHITECTS' JOURNAL LIBRARY OF PLANNED INFORMATION

• DOMESTIC WATER HEATING I: ECONOMIC ASPECTS

Examination of the economics of water heating involves the consideration of two primary aspects :

(a) National Economy.

(b) Individual-consumer Economy.

Obviously, only when exceptional advantages result, may national economy be sacrificed for individual convenience.

DOMESTIC FUEL CONSUMPTION.

Domestic fuel consumption represents a high proportion of the total national figure.[1] Therefore, in the national interest, questions of policy affecting domestic heat supply deserve careful attention.

FUELS.

Under present social-economic conditions, four types of fuel are practicable for domestic heat supply.[2] (*a*) Raw coal. (*b*) Coke. (*c*) Gas. (*d*) Electricity.

COMPARISON OF HEAT SUPPLY EFFICIENCIES ON A "NATIONAL" BASIS.

(a) Raw Coal.

Raw coal, burned in domestic apparatus, cannot be used so efficiently as in large industrial plants provided with special grading, automatic stoking, forced draught, and all the controls which can be established for such installations.

Atmospheric Pollution.

National losses due to atmospheric pollution causing up to 60 per cent. loss of sunlight, the aggravation of respiratory diseases, corrosion, damage to decoration, writing off of merchandise, etc., have been assessed at some 30 to 40 million pounds per annum—almost entirely due to the domestic use of raw coal.

By-Products.

The use of raw coal for the generation of electricity for general purposes and domestic use, results in the loss of the valuable by-products of carbonisation,[3] although the fuel used for electricity generation is frequently of a lower grade than that used for carbonisation.

Distribution.

Coal also involves high distribution costs.[4]

(b) Coke.

On a national basis, the use of coke overcomes many of the objections to raw coal, but :

Some atmospheric pollution occurs. This pollution is similar to that produced by the use of raw coal but involves less soot.

Coke (like all solid fuels) involves high distribution costs.[4]

1. Domestic consumption.

For all purposes.

Gas	... ...	60—70 per cent.
Coal	... ...	... 25 per cent.
Electricity	...	... 35 per cent.

2. District heating.

In the U.S.S.R., Pre-Nazi Germany and U.S.A., experiments have been carried out with district heat and power stations supplying whole districts with central heating, hot water on tap, electric light and power. The introduction of such systems would very considerably modify the conclusions arrived at in considering existing systems. District heating will form the subject of a later data sheet.

District heating necessarily involves very large capital expenditure for special heat and power stations and for hot water distribution through large underground pipes with hot water storage vessels similar in size and capacity to gas holders at suitable intervals along trunk mains. Without going into further detail it will be seen that such developments are likely to take a considerable time.

3. By-products.

Products of Carbonisation per Ton of Coal.

80 therms or 16,000 cu. ft. of gas
10 cwt. of coke
10 gallons of crude tar
25 lbs. of sulphate of ammonia
2-3 gallons of benzole

The crude tar, when processed, yields creosote, naphthalene, carbolic acid and cresylic acid in considerable quantities and some hundreds of other chemicals, such as medicines and plastics, are derivable in small amounts from the same source.

The above figures represent normal peace-time results and these under war-time conditions could be varied to provide other necessary commodities which it would not be economic to produce under normal conditions.

4. Distribution costs.

Distribution cost of solid fuel to consumers' premises is in every way more costly than to comparatively few carbonisation plants, generating stations, etc. The distribution cost for domestic use frequently exceeds an addition of 30 per cent. to the cost at depot (Samuel Commission, 1925).

Distribution cost for gas decreases with increased consumption and the leakage losses in the mains are in inverse proportion to the load.

With electricity distribution losses increase as the square of the load.

5. Efficiency.

Electricity.

Average thermal efficiency is 20 per cent. (2,800 B.Th.U. of useful energy are available for distribution for every 14,000 B.Th.U./lb. of fuel burned).

15 per cent. of this energy is lost in the distributing network as

Transformer losses	8 to 10 per cent.
Line losses	5 to 8 per cent.

It must be remembered that on electrical network the losses increase as the square of the load, whereas with gas they are in inverse proportion to the load.

[TURN OVER

(c) Gas.

The use of gas involves negligible atmospheric pollution, enables raw coal to be utilised to the maximum extent, and results in minimum distribution costs.

(d) Electricity.

The use of electricity involves negligible atmospheric pollution but :

Its generation from raw coal involves the destruction of by-products and represents a low efficiency of production.

PRODUCTION EFFICIENCY.

Calculation shows that the energy available from 1 lb. of coal of calorific value 14,000 B.Th.U./lb. if gasified is of the order of 11,319 B.Th.U., giving an overall gas works efficiency of 80.8 per cent.

The result to be obtained by using a similar 1 lb. of coal to generate electricity is of the order of 20 per cent. and all the valuable by-products are lost.

In the accompanying calculations it is assumed that there is a loss of energy amounting to 15 per cent. in the electrical distributing network, whereas the leakage losses in the gas mains amount to only 5 per cent. Coal-to-consumer efficiency for gas is therefore 27.1 per cent. without taking into account the value of the by-products which include 50 per cent. of the original weight as coke. Coal-to-consumer efficiency for electricity is 17 per cent. nett.[5]

ECONOMIC USE OF FUEL : SUMMARY.

From above notes it will be seen that raw coal is satisfactory when used industrially with proper control of grading, firing, etc.

It will be seen later that coke is satisfactory for domestic (individual) water heating in large houses (with central heating).

Gas is 29.5 per cent more efficient than electricity[5] in utilisation of coal.

For all heating purposes gas or gas combined with coke represents the most economic use of fuel from the point of view of national economy. Electricity has predominant advantages for motive power of all kinds, lighting and communication devices (telephone, radio, bells, etc.).

Where a separate boiler-house and facilities for automatic stoking or labour for manual stoking are available, either coal or coke is an excellent fuel.

Thus the overall coal-to-consumer efficiency is :

$$20 \times .85 = 17 \text{ per cent.}$$

or 1 lb. of coal at 14,000 B.Th.U./lb. yields electrical energy at the point of consumption equivalent to approximately 2,380 B.Th.U.

Gas.

From 1 lb. of coal of calorific value, 14,000 B.Th.U./lb. :

8 cu. ft. of town gas at 500 B.Th.U./cu. ft. = ...	4,000	B.Th.U.
.008 lb. benzole at 17,000 B.Th.U./lb. = ...	136	,,
.042 lb. tar at 16,250 B.Th.U./lb. = ...	683	,,
.5 lb. coke at 13,000 B.Th.U./lb. = ...	6,500	,,
	11,319	,,

Coal-to-consumer efficiency for gas alone, assuming 5 per cent. leakage losses in the mains :

$$= \frac{4{,}000 \times 0.95 \times 100}{14{,}000}$$

= 27.1 per cent. compared with 17 per cent for electricity.

Calculating heating efficiencies for the production of domestic hot water using either gas or electricity, it can be assumed that the overall efficiency of use of the electrical installation will be of the order of 80 per cent., and that for gas using single point Instantaneous Gas Water Heaters will be of the order of 65 per cent. This gives final comparative efficiencies from coal to hot water, as follows :

Electricity	13.6 per cent.
Gas	17.6 per cent.

from which it will be seen that the coal to hot water efficiency by gas is 29.5 per cent. greater than by electricity.

Efficiency of use for domestic coal-fired hot water apparatus. It is estimated that on a purely thermal basis, 15 per cent. of the heat in the coal may be transferred to the hot water, which should be constantly available for use. A. H. Barker, in Fuel Research Board Special Report No. 4, H.M.S.O., estimated that 7 per cent. of the heat is usefully employed in providing hot water actually used in the home. Margaret Fishenden, "House Heating," H. F. & G. Witherby, 1935, estimated a bench test efficiency of 40 to 50 per cent. for coal in independent boilers with considerably lower operating efficiency. It will be noted that the figure of 15 per cent. efficiency from coal to hot water used is higher than that obtained by using electricity and lower than that obtained by using gas.

Other factors such as distribution cost, storage space, labour, dirt, convenience and ready availability have to be considered when making a price comparison as well as the basis of thermal efficiency, also any ancillary services which a system may provide.

Issued by Ascot Gas Water Heaters Ltd., North Circular Road, Neasden, N.W.10. Telephone : Willesden 5121 (14 lines).

(2) Architects will inevitably be accused, as indeed I have been myself, of sitting on planning committees because thereby in some undefined way they will be benefiting their own practices. How this could be I am not quite clear, but whilst such suspicions are perhaps forgivable in the layman, it is a shock to find evidence of members of our own profession helping to spread such ideas. A case in point was in Manchester where there was bitter opposition I understand to the appointment of architects as chairman and vice-chairman of the planning committee. Happily, however, a more satisfactory state of affairs seems to exist in Liverpool where Alderman A. E. Shennan is an admirable choice for the chairmanship not only of the Liverpool Planning Committee but of the Joint Merseyside Board. I need hardly add that Alderman Shennan is a most prominent member of the profession in that district.

(3) Unhappily the officials concerned through no fault of their own have too often been trained largely in a negative approach to planning. This seems to be inevitable in view of the legislation under which planning has so far been exercised, but the result is to make it more difficult now to change to a positive outlook.

(4) A planning committee of a local authority to work satisfactorily must have very wide powers and it is clear that such powers must seriously interfere with the use of land and thereby limit its exploitation. You may imagine that this is unpopular, to put it mildly, in many quarters.

(5) An architect serving on such a committee is looked upon as an expert. This is right and proper as he should by his training have a better understanding of these matters than the layman. But there is also an inherent suspicion of all experts, and indeed I must confess I share it myself in other directions. In fact I would not support a policy of handing planning over merely to the experts, but I do feel that it is most essential that such planning committees should have a leavening of experts speaking on behalf of the citizens and not acting in an official capacity.

By all means, therefore, let us persuade, cajole or otherwise induce the members of our profession to undertake these duties for the good of the community, but in so doing let us be frank with them and warn them of the real difficulties which will face them. If they have spirit enough this will only serve to spur them to greater efforts.

Stoke-on-Trent. GEORGE L. GREAVES

Farm Workers' Houses

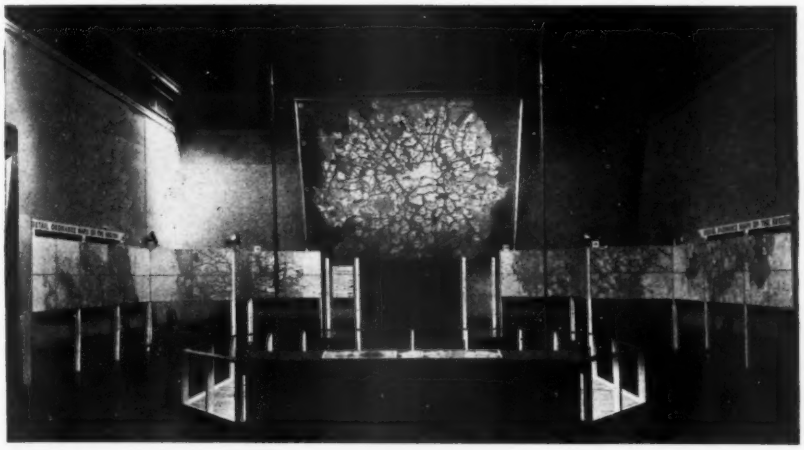
SIR,—Tenders for eight of the fourteen houses allotted to my Council were in the hands of the MOH on April 29, but at the time of writing* no intimation has been received as to acceptance of the same. It would seem that the prices are within the range of the estimates put forward by the experts. There has been much criticism of design and materials but we feel that the paramount consideration is the need for houses. As to the suggestion of the Association of Building Technicians as to the use of rural cottages by non-essential persons my Council has resolved as follows :—" That this Council, fully recognising the principle that under normal conditions an individual should be free to live where he chooses, views with much concern the partial occupation of many cottages, which would provide to some extent the solution to the problem of housing agricultural workers. The Council is therefore of opinion that H.M. Government should be urged to consider as a temporary measure the requisitioning of cottages which are used at week-ends only, or as alternative accommodation by people who still have their homes elsewhere."

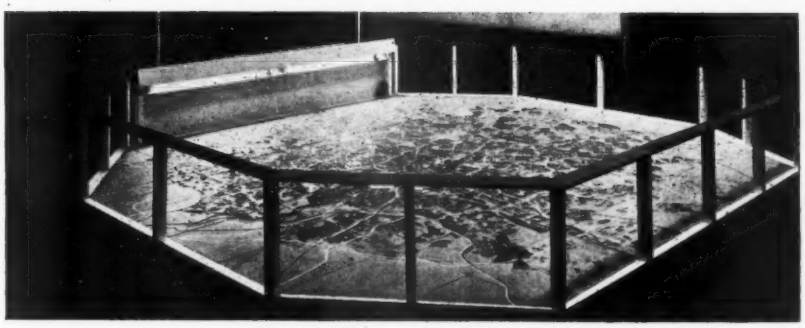
A. R. KERRELL-VAUGHAN,
Clerk to the Rural District Council.

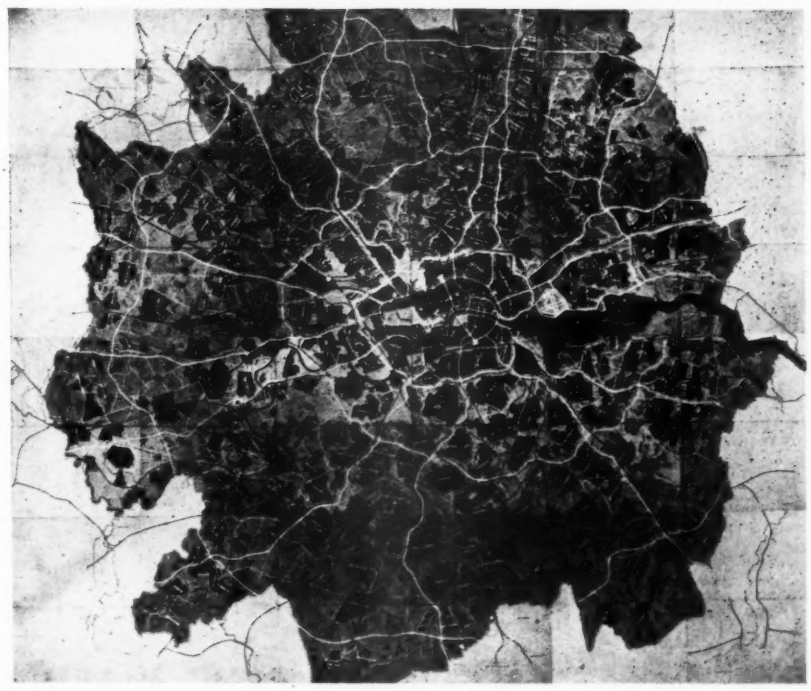
Aylesbury.

*31 May.

LRRC PLAN FOR LONDON







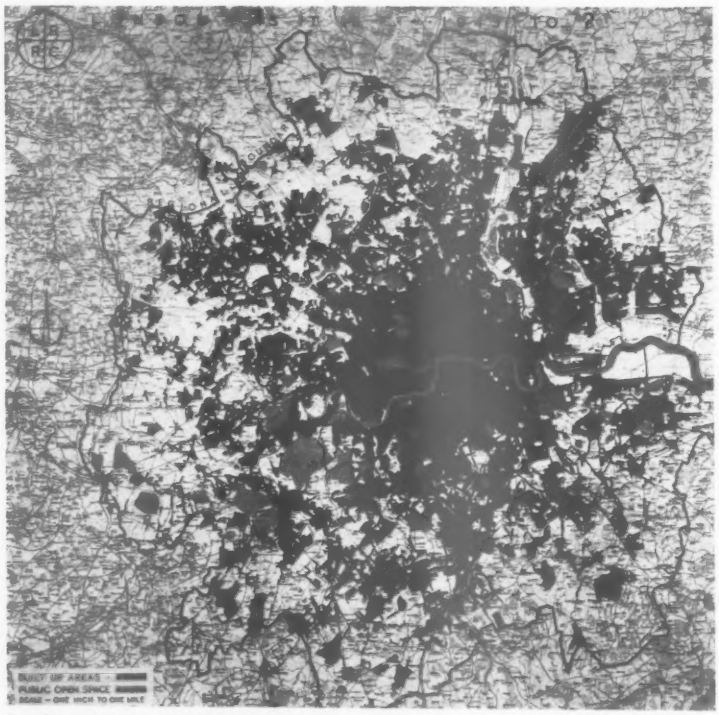
Top, general view of the exhibition showing, in the foreground, a graphically presented map of what would be the results of a regional Plan for London. The large map in the background and the boards on each side of it illustrate the LRRC proposals in greater detail. Centre and above, close-ups of the map which forms the focus of the exhibition.

REGIONAL PLAN FOR LONDON

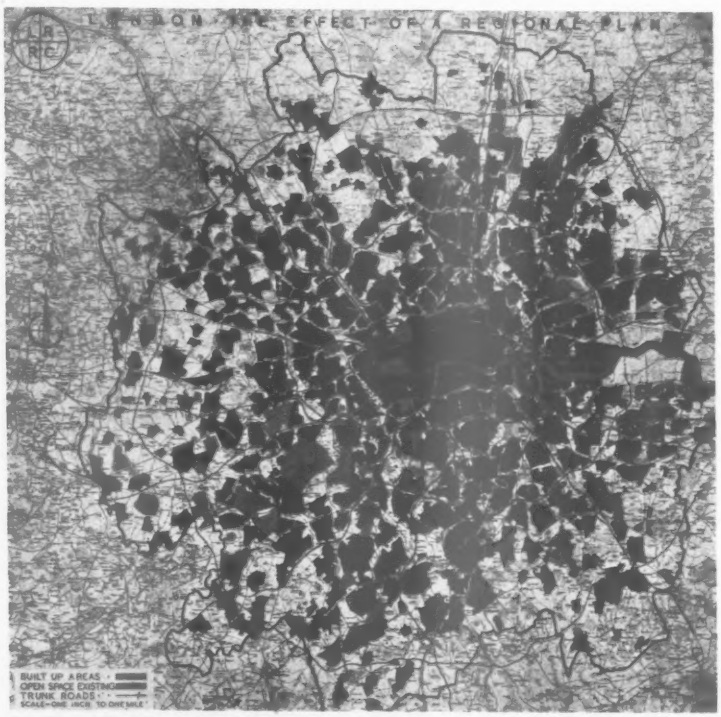
The exhibition of the London Regional Reconstruction Committee's Plan for London opened at the National Gallery on May 31. The plan is reviewed below in an article which stresses the need for a more scientific approach to the problem in order that a Master Plan may be formulated as a clearly defined aim.

The *Greater London . . . towards a Master Plan* exhibition at the National Gallery is somewhat of a planners' occasion. Here a group of people have been putting in a solid piece of work, whilst most of the others have been arguing about whether to plan, how to plan, what to plan for. The problems of planning are so involved, the interests affected so widespread, that clarification of planning aims and the establishment of a method of approach tends to gain priority over the planning of an actual region, which would naturally follow later with its own thorny problems. In that way the Royal Academy project for the centre of London, for instance, seemed premature, whilst the MARS Group's scheme for London constituted the most important contribution in recent years, in so far as it pushed on the quest for a working method and opened up the possibility of undertaking a real piece of planning, buttressed by a master plan, which was arrived at on the basis of proper scientific analysis.

In the uncoordinated, jerky and groping manner of the day, the London Regional Reconstruction Group has planned the London region, without, for instance, including the recent work of the MARS Group amongst its terms of reference. The London Regional Reconstruction Group (henceforward the LRRC) is a committee composed of twelve members appointed by the RIBA from nominations of the councils of the RIBA and the Architectural Association. All its members, and this is significant, are architects, although advised by outside experts. On the back of the report which is on sale at the exhibition, we find the insignia of the RIBA coupled with that of the



London as it is . . . 1943 to ? The dark outline denotes the boundary of Civil Defence Region No. 4 which the LRRC has taken as its planning area.



London. The effect of the LRRC Regional Plan. Suburbs regrouped round old village centres within an improved transport network. This drawing clearly shows the serious lack of integration in the LRRC plan.

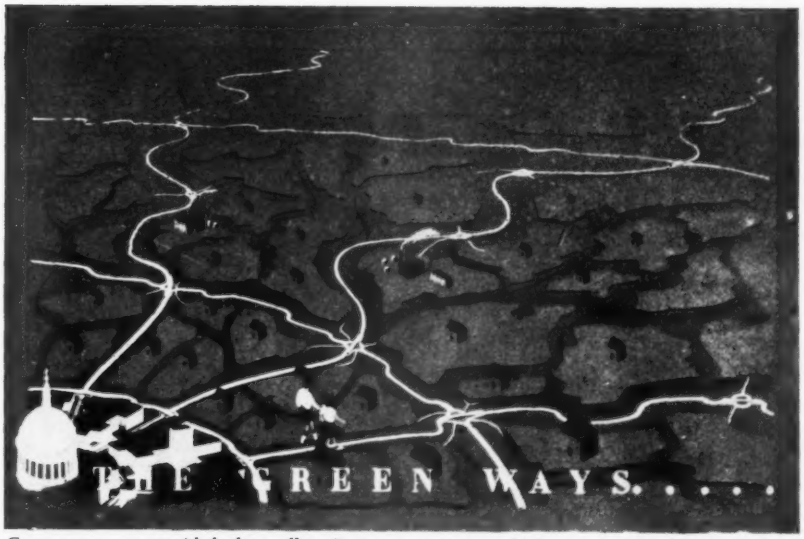
Architectural Association, but I understand that the working conditions in war time were such, that all credit must go to the members of the LRRC. It was a happy idea to show the second interim report in graphic form to the public, who cannot too often be taken into confidence, and who rightly may be sore at the amount of secret planning going on behind closed doors everywhere. The public will no doubt be thrilled with the plans exhibited so attractively at the National Gallery. They seem to offer the Londoner all he may wish for, the little house and garden, or a flat, if he chooses; plenty of amenities, a generous amount of green space, good workplaces, decent transport, and the historic places left undisturbed. In short, he is to have his London and paradise too; it seems almost too much.

At this point it may be well to remember that town-planners, and this does not apply to the LRRC alone, are working at present outside a programme of political and economic planning which, in the natural order of things, should precede any physical planning. This planning *in vacuo* prevents planners from finding any really valid solutions to planning problems, and the LRRC no doubt has suffered, like others, from this lack of foundation.

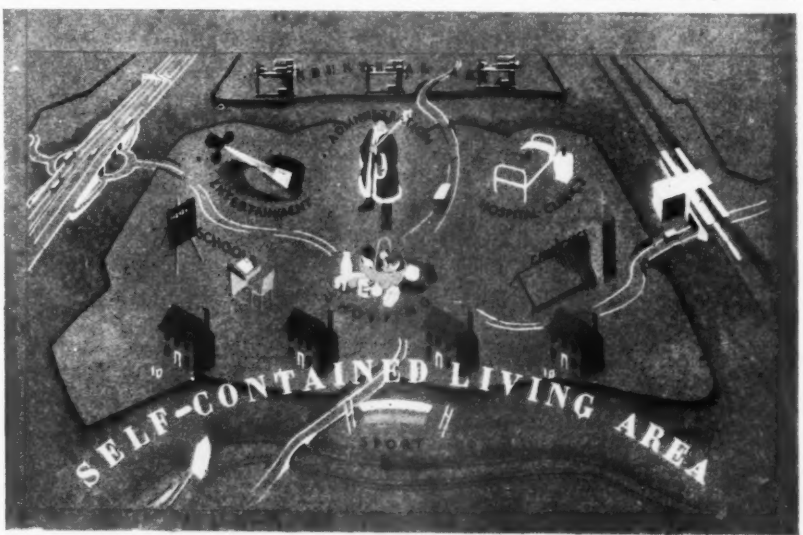
The LRRC has attempted to produce a regional plan for an area defined as the London Defence Region, which for better or worse is regarded as an area covering the urban complex of greater London. The committee has concentrated on the main lines of planned development, and has not attempted to fill in architectural detail, which was felt to need longer and more intimate localized study. Although no assertion is made that its suggestion is regarded as final, *the LRRC believes that the general principles it has formulated are sufficiently broad to apply to any regional planning problem of the great urban complexes. The regional plan is regarded as a draft towards a master plan.*

The main principles of the LRRC are shortly as follows:

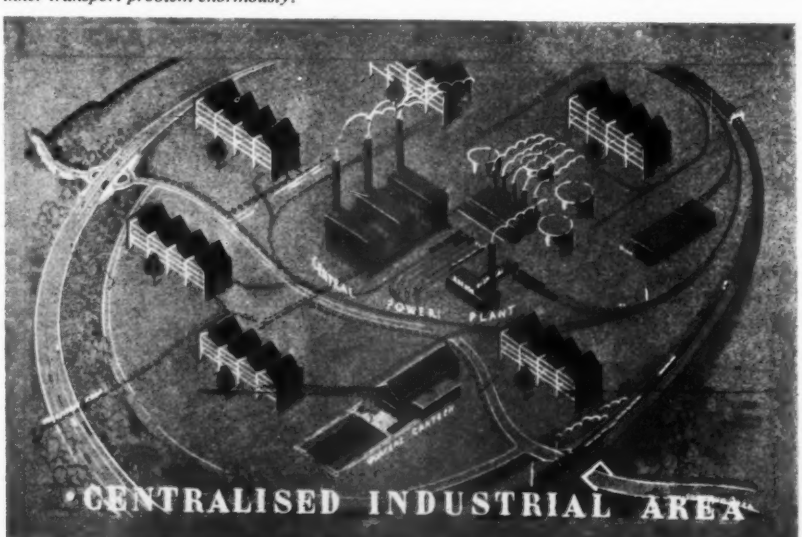
1. Railways and arterial roads must be considered part of a national transport system.
2. Railways, arterial roads, canals, rivers, large open spaces must be limiting factors for areas of local planning. Railways and main roads are destructive of common amenity, endanger life, additional reason for insisting that they are real barriers between built-up urban areas.
3. Access to arterial roads must be properly planned, together with proper segregation of the various kinds of traffic.
4. Intercommunication between rail, road, canal, docks and aerodrome must be properly planned.
5. The land between *the basic network barriers* of the trunk communications and open spaces must be replanned to provide re-centralized urban areas.
6. The urban areas must be self-contained communities, with their own civic sense and pride, with their own amenities, with provision for local light and domestic trades and industries. Area and population must be definitely limited.



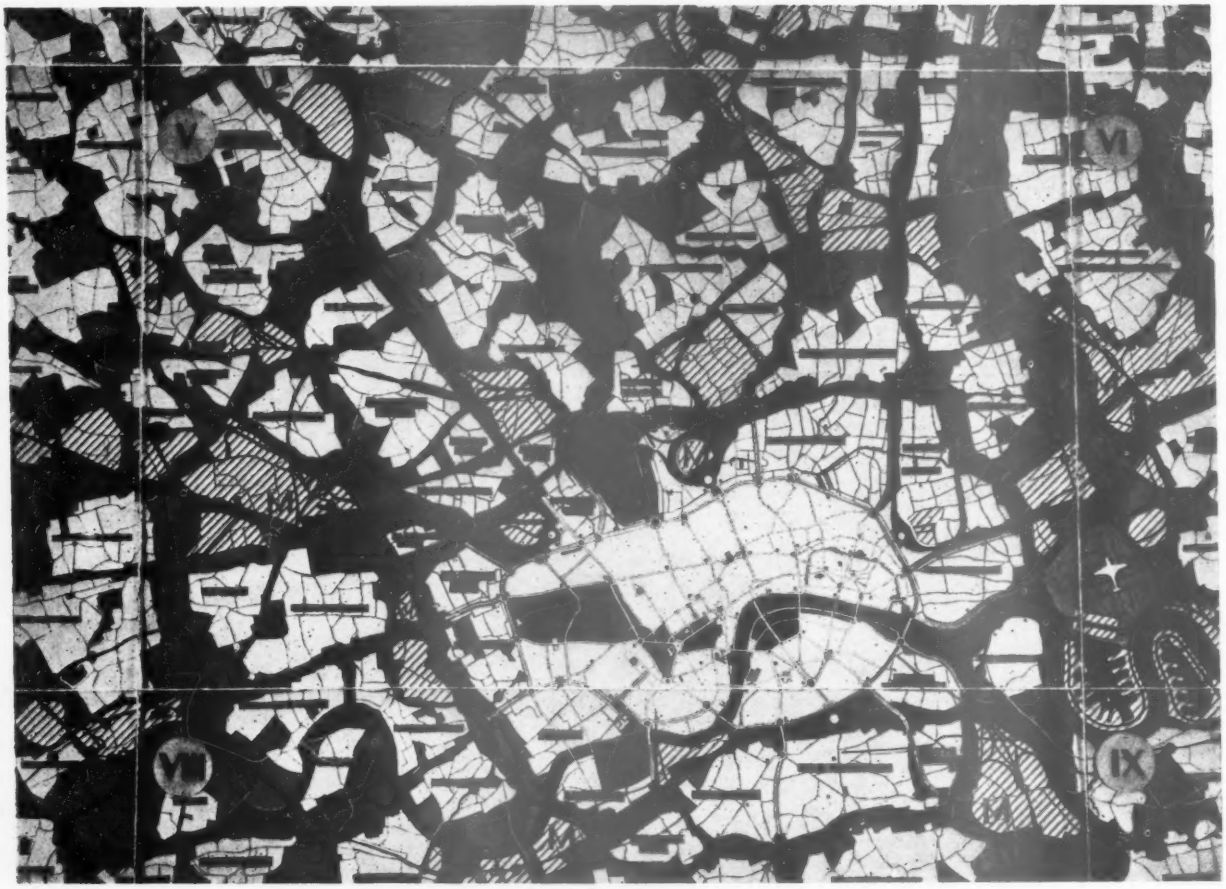
Green ways are provided along all main transport routes which are considered to be barriers between built-up areas. Communities are thus segregated in an unfortunately arbitrary manner.



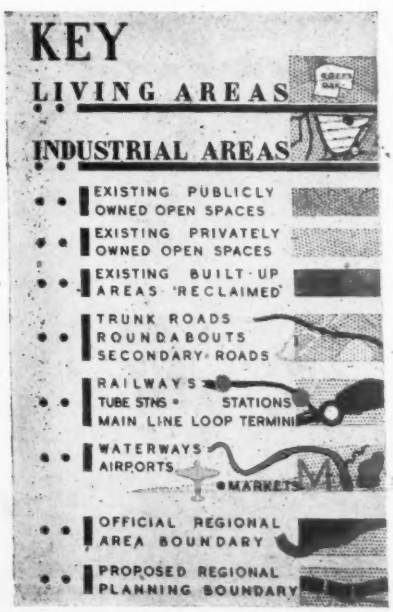
Self contained living areas are regrouped round old centres with a proportion of decentralised industry planned alongside. The multiplication of such units will tend to complicate London's inner transport problem enormously.



Industrial areas are regrouped forming separate districts throughout the region. They cannot accurately be termed centralised in relation to the London region as a whole.



Above: The central part of the large plan shown in the general view on page 379. This plan illustrates the dangers of approaching the problem without the necessary facts from which an accurate diagnosis can be made, and therefore without the necessary guidance of a long-term Master Plan.



7. Much greater public open space around built-up areas must be provided, especially in parkways to cushion off trunk roads and railways. This does not imply increase in densities beyond a reasonable figure.

8. Where land desirable for ensuring continuity of green belts and parkways is already built over, buildings must be scheduled for progressive elimination.

9. Land scheduled as unsuitable for building development must be converted into parkways or green belts, with facilities for recreation, allotments, market gardens, farms, sites for special schools, hostels, hospitals, clubs, etc.

10. Heavy industries and trade or industry destructive of common amenity must be segregated from living areas. Industrial areas must be properly laid out with welfare centres, and related to the transport system. Some industrial areas will have recentralized power service, others will be connected with re-centralized markets.

11. Preservation of national features, open spaces, rivers, streams, historic buildings and other places of intrinsic merit and continuity of local traditional character, are factors of planning and reconstruction.

All planners will enthusiastically agree with many of these points. Transport as part of a national system, co-ordination of the various forms of transport, the grouping of the vast urban complex into recognizable communities to end the isolation of the individual in the mass town, the provision of proper amenities, the generous provision for ample open spaces, parkways to connect the communities uninterruptedly with the open country, the separation of obnoxious industry and other amenity-destroying work from living areas, preservation of local character and historic places—all of these come high up in the planners' list.

The programme is, in fact, as attractive as that of a politician, who promises everything to everybody. He, too, however, must convince us that his system can provide all that is promised.

Seen broadly, the LRRC plan, if sketched out diagrammatically, shows a core (containing historic and cultural places, a national administration centre, special areas such as the Port and the City), around which lies a wide belt of diminishing density, containing a mixture of work and housing areas, and a radiating and ringroad transport net. From this viewpoint the split-up communities of the wide suburban belt, which claimed attention before, cannot be seen. Thus in general principle the scheme is practically what London is to-day, but tidied up.

To the superficial eye, London as it stands to-day, like most other European cities, shows a tendency towards a radiating-plus-orbital pattern, which is the classical pattern of the ever-spreading town, with a gradual over-saturation at the centre. Although this pattern does not work well, it is still accepted without question by a number

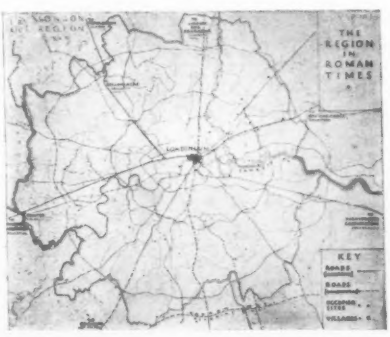
of planners. Without a proper analysis of the causes of urban overgrowth, this complacency is understandable but not pardonable.

The LRRC does not envisage a basic reorganization as a possibility and is therefore essentially a rehabilitation scheme. But is rehabilitation a possible cure at this stage of the urban disease? With all its good intentions, because it fails to see the need for large-scale reorganization, the LRRC is caught in the spider's web. The radial-plus-orbital pattern, however much improved, favoured by Bressey, discernible in the Royal Academy plan, and now filled in again by the communities of the LRRC, is the very pattern which is a cause as much as a symptom, the agent and by-product of the clogging-up phase in the urban malady. With sickening regularity this has been proven in the cases of many towns, and there is no reason to believe that the pattern will work here. Only a severe policy of restrictions, which would impose an intolerable straitjacket on the life of the city, would eventually make such a pattern work at all.

The LRRC already seems to be driven towards purely restrictive planning. Its communities are hemmed in, no matter how benevolently, by green belts, which prevent their growing (and growth is not always malignant), the size of their population being restricted. The radiating transport routes of London, corrected in their worst deficiencies, are accepted as barriers to local planning. But are they suitable boundaries for communities that are more than traffic islands?

The Romans, when they built their highways to and from the fort of Londinium, little expected that their then functional road pattern would be allowed to commit a town plan 2,000 years later. This transport system is allowed to become the master not the servant of the LRRC scheme. It has priority in the plan. The taunt of "transport town" was applied to the MARS plan, because it insisted on a clearly defined transport skeleton as a key to a satisfactory town. If the MARS was transport enthusiastic, the LRRC has a positive transport phobia; it makes a bogey of it.

In the LRRC scheme, industries, where possible, are dispersed throughout the communities, whilst only those work areas that have to be segregated, or are bound to special sites, are grouped in the centre or special areas. Probably no statistics exist which show the percentage for centralized and decentralized work, but it seems likely that in a London family there may be one member working in the community itself, so to speak, the autonomous type, another in a special or central area, yet another in a different sub-community; all of them may of course change their jobs at any time. If they should leave that district when jobs are changed, would that not counteract the feeling of rootedness which the community is to provide? Transport, under these circumstances, will be extremely complex, and will have to be provided for the scattered industrial islands, some of which need to be linked with certain others elsewhere, with their sources of raw materials, markets, etc. Will the transport system stand up to this? Can any transport system provide for such exacting demands? Where is the improvement on what we have to-day? For it is precisely the complexity of London's life and work, the lack of clearly defined functions, that wastes daily so many hours of people's lives, imposes heavy expenditure on them, piling costs on to the prices of goods, and generally resulting in a lowering of living standards.



The LRRC gives us an ordered *status quo*. Is it good enough?

Progressive town-planners maintain that it is not possible to rehabilitate our towns on that basis. They believe that good conditions of life in pleasant communities, such as those desired by the LRRC, can only be obtained as the result of a healthily functioning town organism, in which all the elements are clearly ordered so that they work co-operatively and harmoniously. The LRRC tries to obtain the symptoms of health by tackling the symptoms of the urban malady. But under the sun-tanned skin, mortal disease can still have its way, so do not be deceived by the attractive communities of the LRRC. Its approach is what Mr. Lock calls "cosmetic"; the methods are slimming, corseting, face lifting.

The cosmetic approach to the problem originating with Haussman died just after the last war, and had its hey-day in the first decade of the century. Town-planners conditioned by a long tradition of pattern making saw the new phenomenon of the expanding city of the industrial era as another pattern, which they considered to be entangled and too closely knit. As a remedy they suggested more open spaces, green belts, sometimes satellites. At the time, schemes like this were suggested for many towns all over the world. They were hardly ever carried out; they would have required too much restrictive legislation. Only as late as the 'twenties a school of thought came to the fore, though not entirely without a tradition, which attempted to diagnose the nature of the urban overgrowth scientifically. Like irreverent children they did the natural thing; they took the town to pieces, examined its various elements under the microscope and put them together again. Thus the synthetic town was born, and the famous *plan voisin*, the Russian industrial ribbon city, *la ville radieuse*, are examples of that laboratory process. They established formulæ which were not meant to be reproduced in actual towns, but which gave modern town-planning basic principles of the greatest value. As scientific town-planning progressed, it was discovered that no satisfactory answer could be found to the problem of the living organism of a town in the static conception even of a functional pattern. Therefore, not unlike calculus, which allowed a wider range of natural phenomena to be mathematically established, modern town-planners evolved a technique of dynamic planning, which could include time and movement in a planning formula.

The basic formula of the dynamic planning principle, which makes no assertion of finality, shows the very elementary picture of two ribbons, one the work zone, the other the living zone, developed alongside each other. The distance between the two, the way from living quarters to work, is constant, so that expansion can take place without lowering living standards. A transport artery runs inside the green space that divides the two zones, and there are transport sub-arteries across from work to living areas. This formula seemed to give a good working hypothesis on which to develop many towns to their different destinies. Stalingrad is planned on those lines; so is the abstract *ville radieuse*, the famous scheme for the African town of Nemours, the van Eesteren extension for Amsterdam, and the MARS scheme for London.

The scientific discipline was found to give results, and there can be no doubt that, on the basis of the analytical approach, workable programmes for the future development of healthy towns can be established.

Such a programme would mean the working out of a master plan as a long-term policy, broad and flexible in conception, and a shorter term staggered plan in stages, which starts the slow transformation from present-day conditions. This filling in process then would have a purpose and need not waste itself in haphazard efforts. It would be work of great importance, and might easily at some stage lead to a revision of the general scheme. Regarded from this point of view, much of the LRRC work is of great value, and should not be ignored by any future London planners. Conditions

like those shown in the scheme might easily exist within a master plan, at some stage of the transformation.

Apart from the lack of a functional basis and the restrictive planning methods employed, there are other aspects about the LRRC scheme that call for comment—for instance, the LRRC's general conception of London as a capital city. One feels that the LRRC regards London as a bad job altogether, that it has no sympathy with great towns. And so the LRRC planners are not really town builders; they become the destroyers of towns. City centre and suburban communities no longer hold together. (That it is possible to have small communities which are yet closely related parts of a town structure can be seen in the potential unit system proposed elsewhere). But with London split up into a great number of communities in the LRRC manner there seems no longer any point in keeping such a vast built-over area together as a coherent complex. The breaking-up process is complete, the town is planned for disintegration.

However, there are still believers in towns, even big towns, who think that the idea of a capital, which is not only the head of a country but the centre of an even wider orbit, calls for a conception which is not merely parochial in character.

They also believe that men came to live in cities for the advantages that exist in great communities only, that the disintegration of towns with its mass exodus into suburbia are not signs that the town idea is wrong, but that towns have not been properly made for the part they have to play. It is the job of the city planners to conceive workable towns in which, as of old, the spiritual and material forces can be focused to produce the rich blossom of culture which has always been associated with the towns. Dissipation of energy, from this viewpoint, as in the planned suburbia of the LRRC, would seem retrogressive.

The LRRC plan will no doubt be popular, for it maintains that the easy way is possible. To us, however, in the desert of our cities, it would be fatal to be taken in by what is only an attractive mirage.

G.M.K.

The function of this feature is to record all current developments in planning and building technique throughout the world as recorded in technical publications, and statements of every kind whether official, private or commercial. The ***Information Centre*** *attempts to supply an index and a digest of scientific data, the lack of which has for too long been a handicap both to the technician and the planner. Items are written by specialists of the highest authority who are not on the permanent staff of the Journal and views expressed are disinterested and objective. The Editors welcome information on all developments from any source, including manufacturers and contractors.*

Physical PLANNING

1158 Building in USSR

THE BUILDING INDUSTRY IN THE USSR. *David Percival and Alex Massie* (*Lawrence and Wishart*; 6*d.*; *November*, 1942.) Account of methods by which USSR built 646,000,000 square feet housing space in towns and cities by January 1, 1937 (40 per cent. total housing accommodation).

Only a society which is able harmoniously to dispose of its productive forces in accordance with a single general plan is able to organize them in such a fashion that it will be possible evenly to distribute heavy industry all over the country in full conformity with its inner development, and preserving at the same time the development of other elements of production.

Up to 1917, even in the cities, the great majority of buildings were single storey timber structures.

During the first five-year plan the numbers of building workers rose from three quarters of a million to two and a half million and the proportion of permanent workers greatly increased. It was the increase in permanent workers that made possible the training of skilled workers, improved organization of work on the site, the mastery of new technique, increased labour productivity and reduced costs.

The second five-year plan increased the mechanisation of building operations.

The mastering of the new techniques caused considerable labour difficulties. Some workers clung to the old ways and customs rather than make the effort needed to master the new techniques and get every ounce from them.

The importance of mechanisation was strongly emphasised on the grounds that, more than in any other industry, machinery could replace large numbers of workers in low productive physically strenuous labour. The seasonal worker, adept in the use of saw, axe and shovel, was no longer adequate. The industry required permanent staffs of highly qualified workers around whom the entire labour force would be organized. To achieve this three factors were essential. First, to provide them with better conditions of life and work, that is with good houses, better cultural service and a system of wages that would stimulate the rise of labour productivity. Second, an extensive work must be carried on to raise the qualifications and technical knowledge of building workers. Third, a much larger body of highly trained technicians must be created.

Stakhanovite methods soon found a place in the building industry. Applied to brick laying this meant that one bricklayer with a team of assistants placed the bricks that were brought to him on a mortar bed that was prepared for him. It was then found that one skilled Stakhanovite bricklayer could be responsible for the laying of 16,000 to 18,000 bricks a day.

In the third five-year plan there was firm insistence on the need to combat "gigantomania," the passion for building giant factories and works. Molotov called for a steady transition to medium and small units so as to speed up the rate of construction, put new enterprises into production more rapidly and facilitate the distribution of production over a wide area.

High speed express methods of building were carrying to an even higher stage the technical level and equipment of the industry, but confusion was caused by the fact that most of the People's Commissariats had their own building departments and their own system of building organizations. In addition the regional and city Soviets had their own works departments and housing organizations.

This multiplicity of organization held up the development of standard basic designs, types and codes of practice such as are essential to the full application of prefabrication and mechanisation. In February, 1938, a decree demanded that a speedy transition to the practice of using prefabricated parts manufactured by factories specializing in their production should be made the rule. Standard window frames, both metal and timber, standard doors and joinery details were required and their design must be adapted for mass production. Standard codes of practice for water supply, drainage and ventilation were insisted upon.

Some idea of the attitude that has developed among the workers is conveyed in this extract: "Each of us workers is acquainted with the construction plan. At our conferences on production we systematically work out all details of the plan and its fulfilment. Each worker may bring in his proposals with regard to rationalization and to the overcoming of whatever shortcomings hinder our work. The decisions of the conference are binding on all involved. We have made some 1,500 proposals which have enabled the management to economise scores of thousands of roubles in the construction. All the workers are divided into brigades, each brigade having from 20 to 50 members. We are paid per piece according to the progressive bonus system." This means that the worker is paid a higher rate for all units that he produces above the quota. In practice this means that if he turns out 10 per cent. more than his quota he gets 20 per cent. more than his basic wage. If he turns out half as much again as his quota he gets double wages. This system acts as a genuine incentive to workers to increase the productivity of their labour.

MATERIALS

1159 New Forms in Concrete

MATERIALS FOR TO-MORROW: CONCRETE. *C. F. Ziegler.* (*New Pencil Points, January*, 1943, *pp.* 42 *to* 45). Characteristic of concrete: structural continuity makes unusual forms stable and sound. New structural and architectural forms will emerge if continuity is applied freely.

Few of the thousands of structures built in concrete show that concrete should and will have a characteristic architecture of its own. Most of these buildings might as well have been executed in brick and stone in which many of them were undoubtedly envisaged. They bear the familiar feature of facade architecture—details developed by an age-old necessity to pile brick on brick or stone on stone in a plumb vertical plane to prevent walls from toppling over on to the citizenry. They have lintels to prevent the non-existent masonry from sagging into openings, marked-out keystones in continuous arches, etc.

We are only just beginning to recognize the importance of the unique distinction of concrete—*continuity*. This continuity derives from the ability of concrete to assume any shape or form in its plastic state, and to maintain that shape when hardened. Not only the framing members, but walls and floors and all parts of a concrete structure are integral with each other. Further, the strength of concrete makes unusual forms stable and sound. When the structural possibilities of concrete are applied freely to the problem of enclosing space, there will be curved walls, shell domes and cones as well as plane surfaces, and buildings will be round, elliptical, polygon-shaped or compositions of any or all of these shapes necessary to enclose a functional area.

The time is not far distant when concrete will begin to move freely in space, instead of straight up and straight over, stairways will be replaced by gracefully spiraling ramps; and walls and roofs will follow the sweep of the sun and stars.

Rheims Market Hall, designed by Maigrot; an example of thin-shelled concrete vaults (From Pencil Points, *January, 1943). See Information Centre, Item 1159, on this page.*

QUESTIONS and answers

THE Information Centre answers any question about architecture, building, or the professions and trades within the building industry. It does so free of charge, and its help is available to any member of the industry. Answers are sent direct to enquirers as soon as they have been prepared. The service is confidential, and in no case is the identity of an enquirer disclosed to a third party. Questions should be sent to: THE ARCHITECTS' JOURNAL, 45, *The Avenue, Cheam, Surrey*

1160 Lead Cable Corrosion

Q *Recently on a job I had occasion to pass a lead cable through an oak beam. It was found that the cable was eaten away and had to be replaced about every three months. Eventually the cable had to be cased in porcelain at the stretch where it passed through the beam, and is now satisfactory. As far as I have been able to find out this is the only wood which has this effect on lead. What are the causes for this action between oak and lead?*

A The corrosive action is due to the moisture in the timber acting in conjunction with the atmospheric carbon dioxide and the organic acids from the timber which resemble acetic acids. If the oak had been thoroughly dry there would have been no action.

Building Research Bulletin No. 6 deals with the prevention of corrosion of lead in buildings. A copy of this Bulletin can be obtained from the Building Research Station, Bucknells Lane, Garston, Watford, Herts.

1161 Books on Surveying

Q *Can you give me the names and prices of good books on Quantity Surveying written fairly recently?*

A We would advise the following books:

Elements of Quantity Surveying. A. J. Willis. (6th Edition, 1940; price 15s.)

More Advanced Quantity Surveying. A. J. Willis. (1939; price 25s.)

Working up a Bill of Quantities. A. J. Willis. (Price 4s.)

Quantities. Bannister Fletcher. (11th Edition, 1939; price 16s.)

SOCIETIES AND INSTITUTIONS

Speeches and lectures delivered before societies, as well as reports of their activities, are dealt with under this title, which includes trade associations, Government departments, Parliament and professional societies. To economise space the bodies concerned are represented by their initials, but a glossary of abbreviations will be found on the front cover. Except where inverted commas are used, the reports are summaries and not verbatim.

RIBA

ASB Lecture

May 8, at 66, Portland Place. Lecture in a series arranged by the Architectural Science Board of the RIBA on HEATING AND VENTILATION, by A. C. Pallot, M.B.E., D.SC., M.INST.C.E., of MOW. Chairman: Alister MacDonald, F.R.I.B.A.

A. C. Pallot: "The amount of heat required to warm any part of a building depends upon several factors, including its construction, orientation, degree of exposure, period and nature of occupation, ventilation rate and required temperature. The detailed calculations are a matter for the specialist, as the technique of low-temperature heating (by radiators or panels) differs from that of heating from high-temperature radiant sources (gas or electric fires), and from that of plenum heating. Radiant heat does not raise the temperature of air, but warms opaque surfaces, which in turn act as convectors.

In most cases, comfort is attained with an equivalent temperature of 62° F. to 66° F., the air temperature being not less than 55° F. and in general the best conditions are obtained when walls and other boundary surfaces are warmer than the air. It is particularly important that floors should not be cold: a difference of more than 5° F. between the temperatures at the floor and at head level results in discomfort.

Tests at the Building Research Station indicated that vertical temperature gradients with different methods of heating in an ordinary room are in the following descending order: plenum heating; radiators; ceiling panels; tubular heaters; floor panels. With high-temperature radiant sources, the vertical temperature gradient is not great, but the horizontal distribution may be uneven: 40 B.Th.U's incident per sq. ft. per hour is equivalent to 6° F. rise in air temperature, and for comfort, with the minimum air temperature of 55° F., 75 B.Th.U's are required. With an air temperature below 45° F., comfort cannot be attained.

Different methods of heating also affect the ventilation rate, the following being some test results obtained in a room with a fireplace and flue:—

Method of Heating	*Air Changes per Hour*
None	1·7
Anthracite stove	0·7
Hot water radiator	2·0
Electric convector	2·4
Electric radiator	2·7
Gas fire	3·1
Coal fire	4·5

Increased ventilation results in greater heat loss, as more cold air has to be warmed. In an ordinary office building the approximate ratio of heat loss is as follows:—

Transmission through glass windows	1·5
Transmission through walls and roof	2·5
Air interchange	4·0

It is therefore important that excessive ventilation be avoided.

Much useful information relating to the thermal transmittance of various types of construction, appropriate degrees of ventilation, etc., is contained in a booklet published in 1942 by the Institution of Heating and Ventilating Engineers, *The Computation of Heat Requirements in Buildings.*

INSULATION OF BUILDINGS

The heat requirements of a building may be substantially reduced by structural insulation. This is particularly true of buildings such as single-storey factories with a large expanse of roof. Often such a roof is of a light nature, and the loss of heat in consequence is enormous. The Ministry of Fuel and Power has recently issued a Bulletin on the subject, *Fuel Efficiency Bulletin No.* 12, *March*, 1943. This points out that the cost of insulating a roof may be more than offset by the saving in the cost of the heating installation.

As an example of the economies effected by insulation, the case of a factory roof, 10,000 sq. ft. in area, may be taken. If this is of corrugated asbestos cement (*a*) uninsulated, and (*b*) lined with fibre board ½-in. thick, comparative figures are as follows:—

	Uninsulated	*Insulated*
Amount of radiator surface to provide for heat transmission through roof (30° to 60° F.)	2,250 sq. ft.	470 sq. ft.
Approximate cost of ditto	£750	£155
Approximate fuel consumption per annum	80 tons	17 tons
Annual fuel cost (at £3 per ton)	£240	£50

The cost of lining the roof would probably be about £500, so that the economic value of insulation is obvious.

Insulation is also of importance in concrete floors laid direct on earth, and in flat concrete roofs. In the latter case, suitable insulation reduces expansion, which may be a cause of structural damage. In dwellings with pitched roofs, it is better to form the ceiling of some insulating material, rather than to adopt lath and plaster construction with a boarded roof. In general, there are advantages in providing all rooms which are intermittently heated with linings of low thermal capacity, i.e., materials which require little heat to raise their temperature, as the heating-up is greatly reduced. Wood panelling was general during the eighteenth century, and tests have shown that a room after panelling required only half an hour to reach comfortable conditions, as compared with an hour and a half previously.

It is obvious that with warmer wall surfaces, lower air temperatures are sufficient, and this is reflected in reduced heating costs, since each degree Fahrenheit of air temperature maintained throughout the winter accounts for from 3 to 5 per cent. of the total fuel consumption. The main temperature of surroundings will, of course, be influenced by the extent of glazing; for internal and external temperatures of 60° and 30° F. respectively, tests showed the following inner surface temperatures of windows:—

Single glazing:
Still air: 45° F.
Wind: 40° F.
Double glazing:
Still air: 52° F.
Wind: 51° F.

When radiators are placed against outside walls, a sheet of insulating material, such as fibre board faced with aluminium foil, should be fixed behind the radiator.

PROVISION FOR SERVICES IN STRUCTURE

Regarding the provision to be made for heating and ventilating services in structures, much useful information is contained in the British Standard Code of Practice, *B.S.* 1043, 1942. This recommends, *inter alia*, that central heating and ventilating systems should be completely designed prior to the completion of the building drawings, and that a high degree of precedence in planning and installation should be accorded to these services in order to ensure satisfactory functioning.

Central heating from a boiler house is usual in this country. The position of the boiler house is in general governed by accessibility as regards fuel delivery and ash removal and by the position of the chimney, which often must be placed inconspicuously with regard to the main frontages. Adequate space must be allowed: a cramped boiler installation is seldom efficient. Also the fresh air inlet area must be ample; each lb. of fuel required up to 300 cu. ft. of air for its complete combustion, and the area of opening should be from 2½ to 4 sq. ft. per million B.Th.U's of boiler rating.

Fuel stores should be dry and in convenient proximity to the boilers. One rule is that the floor area in sq. ft. of coal stores should be one-eighth of the annual consumption in tons. Coke (76 cu. ft. equals 1 ton) requires more storage space than coal (45 cu. ft. equals 1 ton).

Plenum heating and ventilating systems require special provision in layout: inadequate allotment of space, or deflection of ducts due to variations in the building design, may result in unsatisfactory performance.

An important point in construction is that all doors and windows in a building should fit tightly: the rate of air interchange is greatly increased by crevices round window frames, etc., particularly with high winds. Some American figures of infiltration, per foot run of crevice, with a 15 m.p.h. wind are 110 cu. ft. per hour with a wooden sash window and 52 cu. ft. per hour with a steel frame window.

The decoration scheme may affect the heating arrangements. Radiators are frequently finished with aluminium or bronze paint, but this reduces the heat transmission by 10 per cent. or more, necessitating either more heating surface or a higher temperature of the circulating water. This disadvantage is avoided with ordinary paints which are all equally effective, irrespective of the colour, and these should be used in preference to metallic paints.

LOCAL HEATING

(a) Open Grates for Coal and Coke

The advantages and disadvantages of open grates do not need recapitulation: for psychological and other reasons, this form of heating, although not very efficient, will remain popular. Perhaps the most serious disadvantage of the coal fire is its contribution to atmospheric pollution. About 1·5 per cent. of the coal is given off as smoke, and it is estimated that in a square mile of housing (12 houses per acre) 1·2 tons of smoke and 1·5 tons of sulphur dioxide are produced each day in winter. In central London the deposit of grit, etc., is about 20 tons per square mile

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BRANCHES AND DEPOTS THROUGHOUT THE COUNTRY

Overwhelming evidence of the resistance to fire and the great structural strength of reinforced concrete has been provided during five years of aerial attack on cities. Whilst it may not be necessary to design against aerial attack in the future, it is only common sense to select for war-time and post-war construction the material which has been conclusively proved to possess the greatest structural advantages.

REINFORCED CONCRETE AND ROAD TRANSPORT

Pennsylvania Turnpike built by Pennsylvania Turnpike Commission between Harrisburg and Pittsburgh, U.S.A.

THE use of reinforced concrete for modern highway systems has become standard practice throughout the world. Because greater safety, reliability, low maintenance cost, and complete freedom for the designer, will be the essentials demanded of post-war highway planning, reinforced concrete will again be selected as the material for new viaducts, bridges, fly-over crossings, and roads.

per month. This results in considerable cost to the community; the expenditure on the cleaning and decorating of buildings is from 15 to 40 per cent. more in smoky towns than in clean towns. The exterior decoration period of some multiple shops is 3 years in country districts, 2 years in average towns and 1 year in smoky towns. Also, the rate of corrosion of metalwork is 2½ to 3 times greater in polluted areas. It has been estimated that the cost of smoke in Manchester amounts to £750,000 per annum.

These objections to the open fire would be largely removed if smokeless fuel were used, although this would not entirely dispose of the sulphur problem.

With ordinary types of grate, the principal heating effect is by radiation. The following figures show some comparative radiant efficiencies, etc. :—

	Coal	*Coke*	*Semi-coke*
Radiant efficiency	24	28	33
Time to reach full output (minutes)	80-140	100	90

Both coal and coke burning brightly in an open grate radiate about 200 B.Th.U's per sq. ft. per hour, at a distance of about 3 ft. from the fire.

The mean radiant efficiencies of various types of grate as found by tests are as follows :—

	Coal per cent.	*Semi-coke per cent.*
Well grate, 18-in. wide and 11-in. deep, of firebrick ..	19·5	24·0
Register grate 14-in. wide and 7-in. deep, with firebars ..	24·2	30·8
Modern barless stool grate, with canopy	17·3	19·9

In addition to the radiant efficiency, some 5 per cent. is contributed by convection due to the heating of the fireplace, etc.

With improved designs of grates, radiant efficiencies of 32 per cent. with coal and 37 per cent. with coke are obtainable, and with patterns utilising by convection part of the heat escaping up the chimney, an additional 25 per cent. can be gained. This enables fuel consumption to be reduced by about one third, for the maintenance of the same conditions.

Fireplaces should, if possible, be sited on inner walls : if on outer walls, they should be well insulated with slag wool or similar material.

Experimental work on coal burning appliances is proceeding, and further developments will undoubtedly take place which will largely remove the present disadvantages of open grates. One simple expedient, described by Count Rumford about 1790, is to provide ducts from the outer air to the fireplace : this avoids the draughts which otherwise may occur when the fire is burning.

(*b*) *Closed Stoves*

Closed stoves have a higher efficiency than open fire grates. They are mainly convective in effect and about 70 per cent. of the heat in the fuel is transmitted into the room. The degree of ventilation effected is not so great as with open fires.

Stoves of the semi-closed type give efficiencies of about 45 per cent. with coal and 40 per cent. with coke. In common with open fires, the heat output of stoves cannot be closely related to actual requirements at any time, and some excess fuel consumption—possibly 50 per cent. —is unavoidable.

The advantages of stoves are cheapness and the ease of local control. The disadvantages are their somewhat cheerless appearance, the attention required and the dust emitted, and the necessity for flues. If they are used for the heating of buildings the corridors are usually cold and in such cases complaints are frequent.

(*c*) *Combined Units*

Units combining heating with other functions, such as cooking or hot water supply, have a lower efficiency for each purpose than separate units. Comparative heating efficiencies are as follows :—

	Per cent.
Brick-set kitchen ranges ..	30
Back-to-back grates	20
Heating and cooking units ..	17

In each case some excess fuel consumption occurs, so that the nett efficiencies in practice are lower than the figures shown, possibly by half. It may be mentioned that the cooking efficiency of the kitchen range, still popular in the North, is only 3 per cent.

(*d*) *Gas Fires*

Gas fires are a very convenient means of heating as a very wide range of control is possible, and there is probably less excess consumption than with any other means of heating. The radiant efficiency is about 50 per cent., but with convector patterns outputs of 60 to 70 per cent. are obtainable : with such high efficiencies the temperature of the gases escaping up the chimney is relatively low and there is some risk of condensation (one lb. of gas in burning produces about 1½ lb. of water). Chimneys for gas fires require special construction and normally should not be more than 30 ft. high.

The radiation emitted by a five-radiant gas fire, burning 25 cu. ft. per minute, is about 160 B.Th.U's per square foot, measured at about 3 ft. from the fire. The temperature of the radiants is about 1,500° F.

(*e*) *Electric Heaters*

Electric heating is probably the cheapest in installation cost of all local heating systems. The ordinary electric fire is practically 100 per cent. efficient, most of the heat being emitted in the form of radiant energy ; the radiation per square foot at a distance of 3 ft. from the fire is about 80 B.Th.U's per kilowatt. The temperature of the elements is about 1,000° F. One disadvantage of electric fires is that they do not lend themselves to thermostatic control, owing to the distraction which would be caused by frequent switching on and off. Also the inherent control is less close than with gas fires.

Low temperature tubular heaters are also 100 per cent. efficient, about half of the emission being by convection. The elements run at low temperatures, and are practically indestructible. The heaters are produced commercially with a loading of 60 watts per foot run, the surface temperature of the tube (2 inches diameter) being about 190° F. They can be used in almost any position, and are suitable for thermostatic control. (Thermostatic control of heating installations of any type may save 25 per cent. or more of the consumption).

A further type of electric heater is the convector, which incorporates a small fan blowing air over a heated element. This enables the air temperature within a room to be raised quickly, but a disadvantage in all such types of heating is that the air temperature tends to be considerably higher than the temperature of the walls.

CENTRAL HEATING

(*a*) *Low Pressure Water.* Central heating by means of low pressure hot water is very general in this country. There are some limitations to the system; the horizontal limit, without pumping, is about 200 feet and the vertical limit is about 100 feet, due to the head on the radiators. The temperature of the water can be regulated to suit conditions, but the exposed surfaces are never unduly hot. With ordinary radiators, and with the average water temperature of 140° F., the emission is about 160 B.Th.U's per square foot per hour : of this about 15 per cent. is due to radiation.

The ordinary central heating boiler is not very efficient ; optimum efficiencies vary from about 55 per cent. in the smallest types to about 80 per cent. in the largest, but the average efficiency in service is probably about half these values. Also a great deal of heat is lost in the distributing mains, although part of this is, of course, utilised in raising the general temperature of the building (analysis of fuel consumption in a number of buildings indicates that on the average about half the fuel is used non-effectively, i.e., used otherwise than in the spaces to be warmed). The system, however, is comparatively cheap in running costs, and will remain in constant operation with comparatively little attention to the boilers, although some overheating is inevitable in mild weather. There is a considerable time lag in reaching the required conditions from cold, and some danger of freezing, with consequent fracturing of radiators, if systems are not in use during cold weather.

Magazine types of boilers and various patterns of automatic stokers reduce attendance costs and can be equipped with automatic controls, which arrangement results in greatly improved efficiencies.

Gas boilers are about 80 per cent. efficient, and have the advantage that fuel delivery and ash removal are eliminated, and there is a complete absence of smoke.

Electric storage vessels are also used in conjunction with hot water heating systems. These are heated during off-peak periods, and have obvious advantages. The use of gas or electric boilers will usually depend upon the tariff available.

The central heating of a number of contiguous buildings can be carried out with advantage from a common boiler house, which localises fuel deliveries, etc. The larger boiler plant operates more efficiently than a number of smaller plants, and may also lend itself to the adoption of flue gas treatment, which minimises the emission of smoke, grit, and sulphurous gases.

District heating, in which wide areas are served from a central boiler house, is firmly established in the USA and on the Continent, but has not made much headway in this country. Many factors, both physical and economic, are involved.

(*b*) *Panel System.* The panel system of heating, consisting of flat grids of pipes embedded in walls or ceilings, has been extensively used. The panels are generally laid on shuttering and cast solid in concrete, special finishing plaster being afterwards applied direct to the surface. The maximum temperature of the circulating water is about 120° F. but in the majority of installations it is found that temperatures of the order of 95° F. are satisfactory during the greater part of the winter. Approximate emissions from panels, with a water temperature of 120° F. are as follows :—

Ceiling panels 100 B.Th.U's per sq. ft. per hour.
Wall panels 115 B.Th.U's per sq. ft. per hour.
Floor panels 130 B.Th.U's per sq. ft. per hour.

Floor panels have advantages but their efficiency is liable to be reduced by any form of floor covering, and their use is generally confined to entrance halls.

The advantages of the panel system are that the fabric of the building becomes warm and the chilling effect of cold walls is obviated. Rooms are entirely clear of heating apparatus and the whole space is uniformly warm. There is no stuffiness due to the accumulation of dust on hot metallic surfaces and no discoloration of decorations. Maintenance and repairs are reduced to a minimum. The system can be thermostatically controlled and panel installations are found to be economical in fuel consumption. The disadvantage of panel heating is that ceiling panels (which is the form most widely used) are unsuitable in rooms less than 12 ft. high as otherwise the cumulative radiant energy may cause some discomfort, unless a larger panel area at low temperature is used. Also the system is not very flexible, as the structure becomes thoroughly warmed and the heating cannot be readily regulated in accordance with outside conditions.

Hot water radiators are also made as flat panels and in this form are inconspicuous, although a comparatively large surface is required.

Another type of panel heating which is not widely used, "electric wall-paper," which is applied to ceilings and walls and connected up

to the electricity supply. It warms the room very nicely.

(*c*) *Low Pressure Steam.* Steam systems are not very widely used in this country to-day. They have, however, several advantages, being cheaper in first cost than a hot water installation. Also there is no time lag or risk of freezing and the system is applicable to buildings of any height. Disadvantages are that the surfaces are at high temperature so that there is intense heat in the vicinity of the radiator and the high temperature of the system increases the distribution loss. Steam boilers require continuous attention and it is not possible to regulate temperature in the radiators as can be done with hot water systems. There are many types of installation but practically all of them are noisy at times. The emission from steam radiators is about 300 B.Th.U's per sq. ft. per hour. Steam systems under vacuum are also used, the temperature in these being lower.

(*d*) *High Temperature Hot Water.* At one time the Perkins system of hot water heating, at about 700° F. was widely used, particularly when intermittent heating only was required. It has, however, become obsolete but has been to some extent replaced by high temperature hot water which is taken from a steam boiler at temperatures of between 300° F. to 400° F. Surfaces at this temperature must not be within reach and the system is therefore mainly of industrial use, in conjunction with unit heaters. Small pipes only are required and the system is extremely rapid in action.

Factory Heating. While many methods of heating are applicable in factories, the standards of temperature, etc., to be maintained are governed by the Factories Act, 1937, and various Regulations made under that Act. Most of the systems previously mentioned are used in factories, and the following notes relate to methods which are mainly of industrial application.

(*e*) *Hot Air Furnaces.* Hot air furnaces or pipeless heaters are very suitable for the warming of large spaces. Usually they consist of a cast-iron combustion chamber, surrounded by a steel jacket, air being drawn through the intervening space and discharged through a grating in the floor above. As a rule recirculation of the hot air is arranged. This system of heating is cheap, both in first cost and operation. It is also rapid in action but has the disadvantage that walls remain comparatively cold, and that dust is distributed.

(*f*) *Pipe Coils.* Pipe coils at high level are sometimes used in industrial premises. They are very unsatisfactory as a great deal of the heat emitted rises vertically and is largely lost, and floors remain comparatively cold, so that there is a very steep temperature gradient. A pipe coil, however, should always be arranged underneath a roof-light or roof lantern to temper the cascades of cold air which would otherwise occur.

(*g*) *Unit Heaters.* Unit heaters of various types are made. These consist of coils through which hot water or steam is circulated and a fan which draws air over the heating elements. Their application is mainly industrial, both floor types (with centrifugal fans) and suspended types (with propeller fans) being available. Unit heaters at high level require careful positioning in order to achieve the most satisfactory results, and both types may be very wasteful in fuel unless carefully controlled. Unit heaters are purely convective in effect: they are rapid in action, but have the same disadvantages as all air heaters.

(*h*) *Plenum Heating.* With plenum heating the requisite degree of warmth is obtained by means of hot air. This may be introduced at various temperatures and velocities, depending upon the conditions, but it is inadvisable to pass air over surfaces at too high a temperature. For the ventilation of cinemas, etc., the LCC regulations prescribe that the temperature of any surface used for warming air shall not be more than 250° F.

Plenum heating installations are bulky, as a large volume of air is necessary to transmit the required amount of heat. The system has the disadvantage that the air temperature is liable to be higher than the boundary temperatures and temperature gradients may be severe. It is also more expensive than ordinary central heating.

Practice in large office buildings seems to be stabilizing in providing heating surface to take care of the heat losses through the fabric and delivering warm air through a ventilating system to deal with the heat losses by air interchange.

Ventilation

(*a*) *Natural Ventilation.* Many patterns of natural ventilators are on the market. These consist of cones and hoods, connected to extract openings in the roof. Their action, however, depends mainly upon the difference in buoyancy between the inner and the outer air and on hot, still days, when the external temperature may be higher than that inside the building, they do not function to any great extent. They are, however, better than no provision of any kind.

(*b*) *Extract Ventilation.* Extract ventilation is the cheapest form both in installation and operation, and is of particular application to laundries, kitchens, etc., in which steam or fumes have to be removed. It has the defect that the admission of air to replace that extracted cannot be controlled. Air is therefore liable to find its way in from vitiated sources or through crevices, causing draughts and discoloration of decoration.

(*c*) *Plenum Ventilation.* The Plenum system has more to recommend it as air can be definitely delivered to any required point and by use of suitable apparatus can be introduced in any desired condition of temperature and humidity. A combined system of plenum and extract ventilation is the only method which will give completely satisfactory results, as the air movement can be definitely controlled at all points from inlet to extract. A complete balanced installation depends for its successful operation on the closing of all windows and the incalculable psychological factor then enters very largely into the problem, as closed windows are apt to cause complaints in the summer, when they would normally be open. This suggests that a mechanical ventilation system should be devised as between ordinary rooms on the one hand and spaces with no direct opening to external air on the other: supply to the former could then be reduced or cut off in summer without material disadvantages.

Air delivered by a ventilating system may enter a room (*a*) upwards with extract at high level; (*b*) downwards with extract at floor level; or (*c*) through side inlets in the walls being extracted in either or both vertical directions. The ideal arrangement is arbitrary and each case must be decided on its own merits. In America downward plenum for theatres, etc., is general, but practice in this country favours upward plenum. The House of Commons was ventilated on the upward plenum system, the U.S. Senate on the downward. In many cases, however, more compact systems are necessary and good results may be obtained with the air inlets and outlets adjoining, as by suitably arranging the velocities of the incoming and outgoing currents wide diffusion can be secured. The velocity of the incoming air should not in general exceed about 5 feet per second except at high level, and if close to the occupants should be very much lower—about 6 inches per second. If the air velocity reaches 2 feet per second (which is perceptible to most people) an increased temperature of 4° F. must be maintained for the same degree of comfort (1).

(*d*) *Air Conditioning.* Air conditioning, both from the amenity and industrial aspects, is becoming an important subject. As regards the former, however, its necessity in this country is not yet established as there are comparatively few days in the year in which full air conditioning, including refrigeration, would be decidedly beneficial. The average number of hours per annum during which the shade temperature at Kew exceeds 70° F. is 80, and it normally exceeds 80° F. for only 7 hours per annum. The cost of refrigerating equipment to deal with conditions at these times only would be disproportionately high, but in densely occupied buildings, such as restaurants, full air conditioning may be commercially justified.

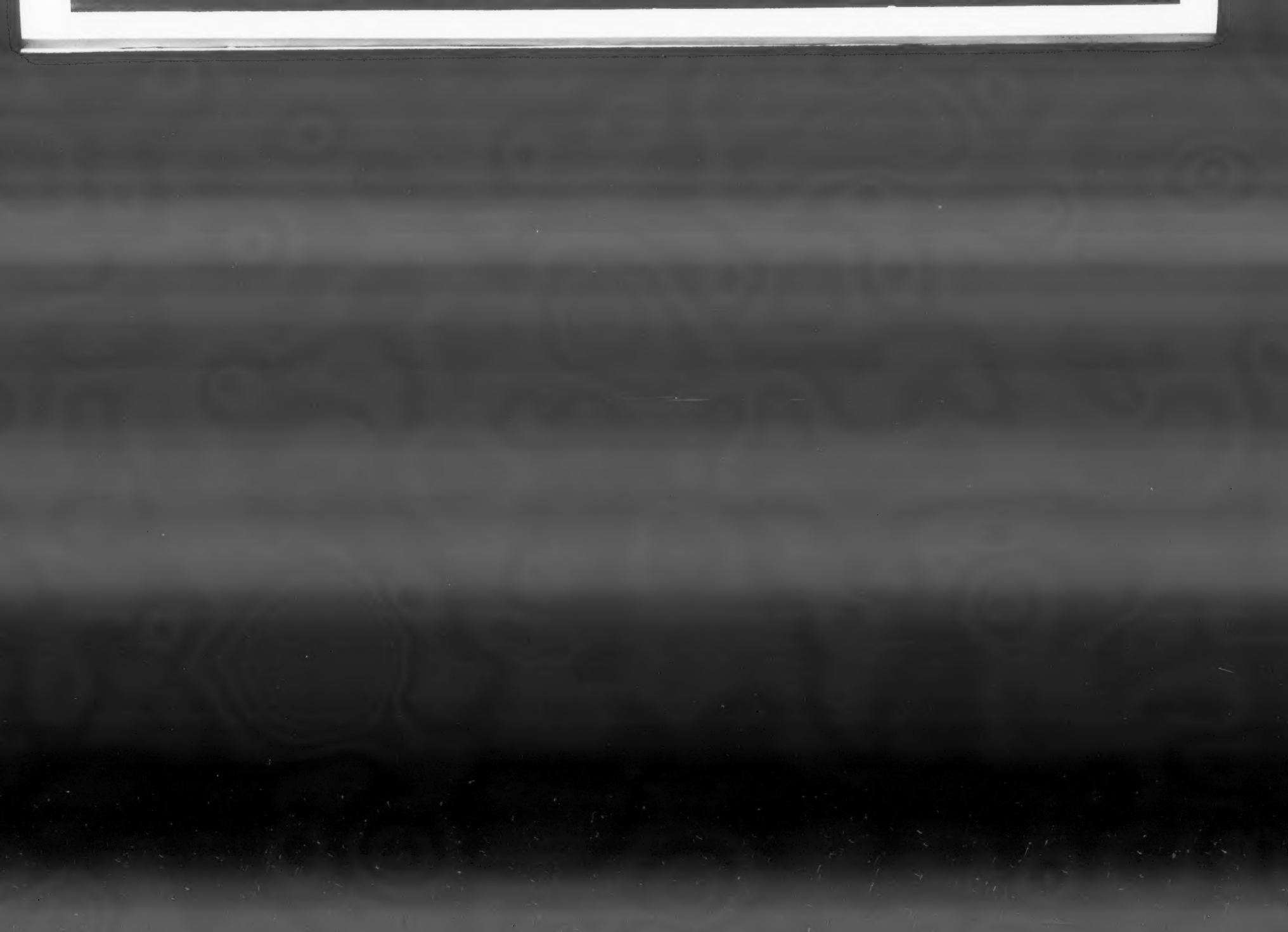
Partial air conditioning, by which is meant removal of dust by a textile or similar filter, and the passing of the air through a mist chamber, in conjunction with a heater battery, is advantageous, and an air washer can be arranged with automatic controls so that, within limits, air can be delivered in any required state of temperature and humidity. Unless refrigeration or an ample supply of cold water is available there is little benefit, as regards comfort, in passing air through a washer, as in this case, although the temperature is reduced, the humidity is increased and the total heat content of the air is not altered. A washer, however, effects a considerable degree of dust removal and should preferably be placed before the textile filter in order to reduce the cleaning periods. In towns it is found that a large proportion of the particles contained in the air are due to motor-car exhausts.

If refrigeration is used too great a degree of cooling should not be aimed at and 10° F. should be regarded as the maximum. Ventilation in crowded places quickly resolves itself into a cooling problem, but the introduction of cold air requires great care as it will cascade from an outlet in a very similar manner to a stream of water and cause great discomfort. If a large degree of cooling is required it is better to increase the volume of air rather than to effect a drastic reduction in its temperature.

(*e*) *Special Problems in Ventilation.* Recommended air changes in various types of building are quoted in the I.H.V.E. booklet already mentioned. In some cases, however, ventilation rates are prescribed by regulation. The ventilation of factories is dealt with in various Home Office instructions. Also the LCC regulations for cinemas, etc., provide that 1,000 cu. ft. of fresh air per hour per person should be delivered: the arrangements must be such that with an outside temperature of 30° F., 55° F. shall be obtainable in the unoccupied building. Kitchens require special treatment and extract should always be at a somewhat greater rate than input in order that fumes shall not find their way into other parts of the building. 25 air changes per hour or more may be necessary in the cooking spaces of large kitchens, but conditions generally would be greatly improved by the wider adoption of insulated types of appliances. In garages the concentration of carbon monoxide should not exceed 4 parts in 10,000. The emission of carbon monoxide from a car during acceleration is about 2 cu. ft. per minute and this can be taken into account when the extract arrangements (which should be at low level) are designed.

SUMMARY AND CONCLUSION

The foregoing is a very rapid survey of the main physical characteristics of heating and ventilating methods in common use. Amongst the aspects not considered are the important questions of comparative costs; the ultimate efficiencies of various methods of heating in relation to the conservation of national fuel resources and in relation to atmospheric pollution; and the desirability in some cases of providing some degree of continuous "background" warmth, "topping-up" to comfort conditions as required. Also, no reference has been made to hot water supply, which is often ancillary to heating. It may, however, be mentioned that the whole problem of the heating and ventilating of buildings is being considered in great detail by a committee under the chairmanship of Professor Sir Alfred Egerton, F.R.S. The report of this committee, when issued, will make available, for the use of all concerned with building, a large amount of information on heating and cognate problems."



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BASIC MATERIALS	Increase over pre-war prices at end of				
	January, 1943	February, 1943	March, 1943	April, 1943	May, 1943
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Portland cement	+41·46	+41·46	+41·46	+41·46	+41·46
2-in. Unscreened ballast	+71·01	+71·01	+71·01	+88·41	+88·41
Fletton bricks (at station)	+29·19	+29·19	+29·19	+29·19	+29·19
Stoneware drainpipes (British Standard) 2 tons and over	+37½	+37½	+37½	+37½	+37½
Roofing tiles	+42½	+42½	+45	+45	+45
Steel joists (basic sections) ex mills	+47·5	+47·5	+47·5	+47·5	+47·5
Lime greystone	+43·53	+43·53	+43·53	+43·53	+43·53
Sheet lead	+65·22	+65·22	+65·22	+65·22	+65·22
Iron rainwater goods and soil pipes	+26½	+26½	+26½	+26½	+26½
White lead paint	+44·70	+44·70	+46·21	+46·21	+46·21
RATES OF WAGES (Central London Area)					
Labourers	+22·22	+22·22	+26·98	+26·98	+26·98
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	A	A¹	A²	A³	B	B¹	B²	B³	C
Craftsmen	2/–	1/11½	1/11	1/10½	1/10	1/9½	1/9	1/8½	1/8
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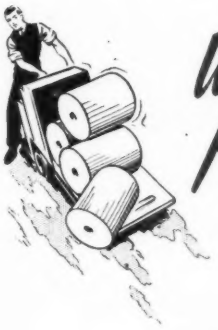

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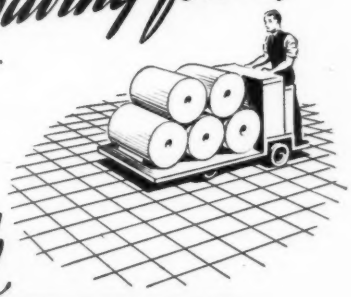

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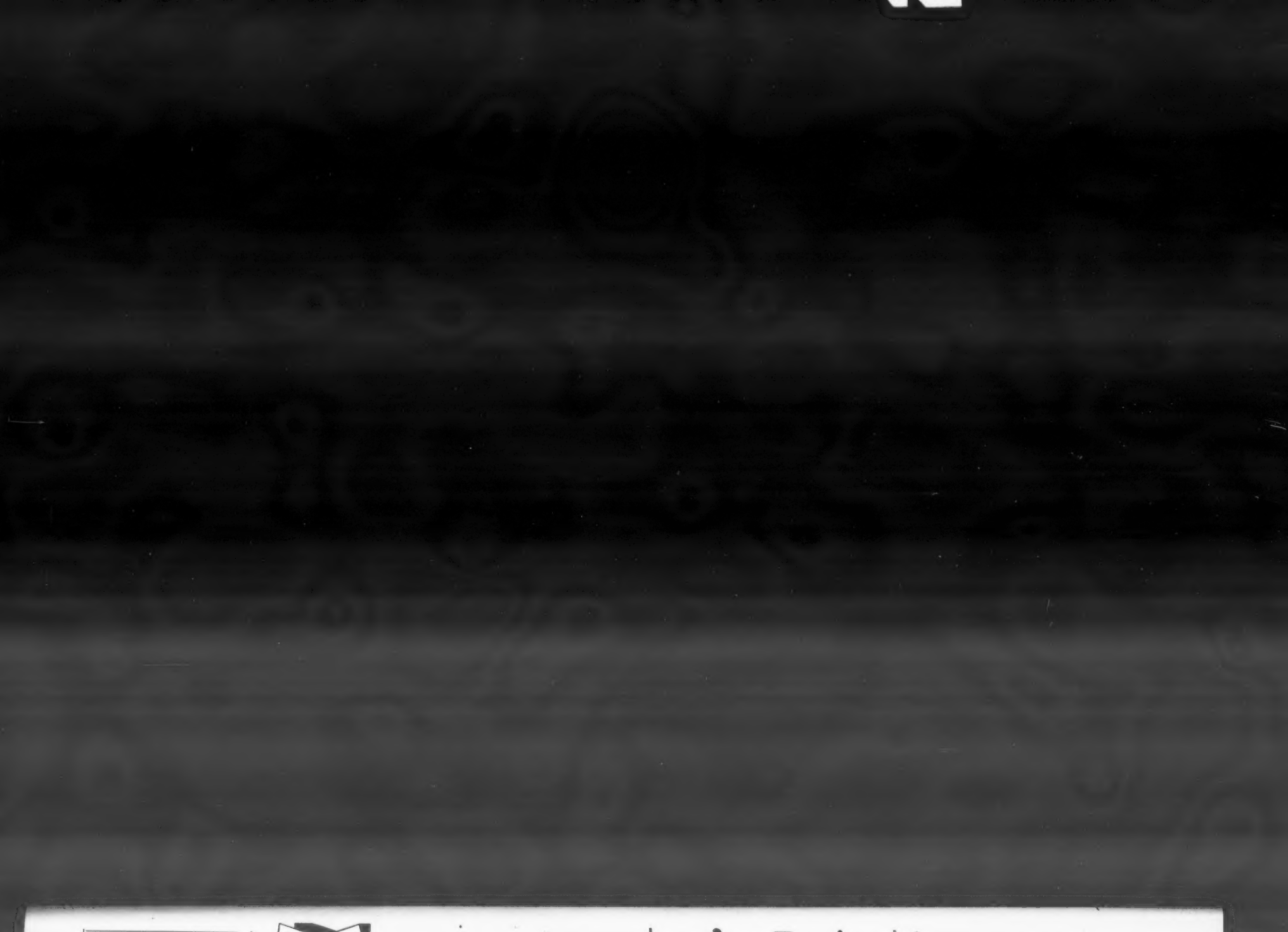

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