THE ARCHITECTS' JOURNAL

THE ARCHITECTS' JOURNAL
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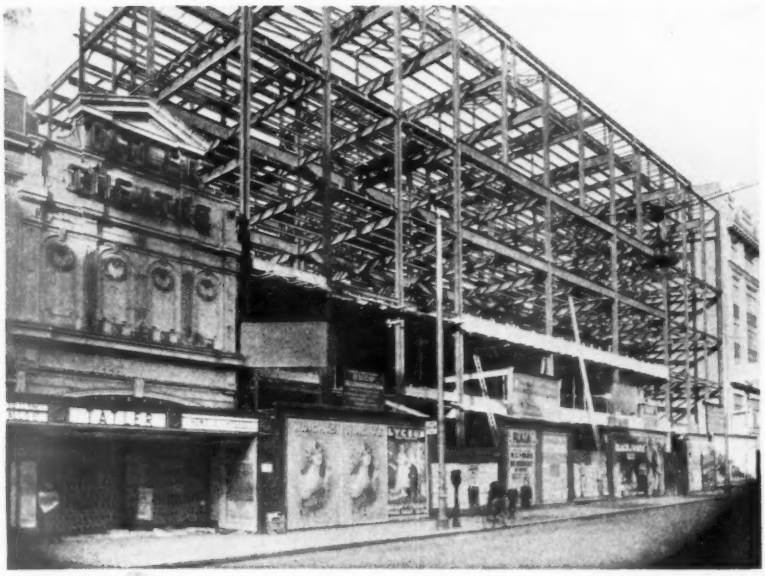
The Editor will be glad to receive MS. articles and also illustrations of current architecture in this country and abroad with a view to publication. Though every care will be taken, the Editor cannot hold himself responsible for material sent him.

THURSDAY, March 10, 1938. NUMBER 2251 : VOLUME 87

PRINCIPAL CONTENTS

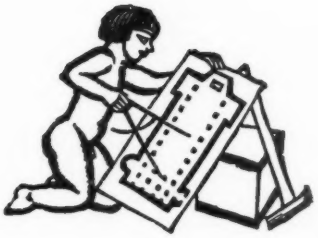
UNDER CONSTRUCTION



TOP: The L.C.C. School of Arts and Crafts, Charing Cross Road, W.C. By Mr. E. P. Wheeler, F.R.I.B.A., Architect to the L.C.C. Bottom: The extension to the London County Hall, as seen from Belvedere Road. The architect is Mr. E. P. Wheeler and the consulting architect is Sir Giles Gilbert Scott, R.A.

OPENED LAST WEEK

Opened by Queen Mary on Tuesday, March 1, the nurses' home for Westminster Hospital stands at the corner of Marsham Street and Page Street, and is the first portion of the new hospital buildings to be completed. Under the same roof the medical school, the interior of which is almost finished, is planned as a self-contained building. The steel frame of the hospital is being erected. Messrs. Adams, Holden and Pearson are the architects. *Further illustrations appear on pages 403-405.*



THE PROFESSIONAL OUTLOOK

A FEW sentences from the President's Address on November 1 caused a considerable *furore* in the profession. Quoted without the qualifications that accompanied them in the Address, they were considered by many official architects to summarize an undesirable attitude of mind too common at Portland Place.

Now, five months afterwards, the Address and subsequent comment have fallen more into perspective. And now it seems obvious that the President's remarks only broke a general tension existing throughout the practice of architecture.

Individual official architects expressed indignation, which all official architects may have felt to a small degree, when official architecture was accused of being too frequently uninteresting. The general run of architects, private or official, showed no inclination to dispute whether "average" official was worse or better than "average" private architecture. They made it clear that the question to them was part of a general professional problem which they considered very serious indeed. The letters in the professional press, recent concern over architectural education, the essays submitted in the A.A.S.T.A. competition, and one or two of the speeches at the Informal Meeting on "Architecture and the Next Slump," all prove an uneasiness concerning the state of the profession.

This uneasiness is general. Architects in private practice, architects in authority in official departments, and the assistants of both, appear to be conscious of it equally.

Its causes are of considerable complexity. In so far as they lie wholly or partly within the profession, they appear to be chiefly two. Events and tendencies outside the profession are compelling changes within it, and its members in general, while doubtful of what changes to make, are aware of the insecurity and possible unsuitability of the present organization of architectural practice. And the younger members of the profession are finding themselves increasingly compelled to choose between very considerable financial insecurity and entering official departments which often, as at present organized, do not offer a reasonably attractive proposition to energetic younger men.

The principals of established private firms are faced with the probability that larger private commissions are likely to become more difficult to obtain, while larger offices cannot be run on smaller jobs without some modification of the principals-and-assistants system. They see that town planning is gradually becoming more important, and they, usually, know nothing about town planning. And they are aware that good assistants increasingly dislike working permanently for a firm without recognition of their share in the work designed and more security of tenure than most private firms are able to give.

The younger men who make up the mass of assistants are in an even more difficult position; particularly if they have the energy and initiative which architecture particularly needs. Up to the age of 26 or 28, they are prepared to work for other architects as a part of their training. Beyond that age they look for and should be able to attain a job to which reasonable responsibility, credit for work done, and a reasonable and secure income will be attached. And such jobs, the younger men feel, are not available in anything like the necessary numbers.

These younger men are democratic and are conscious of architecture as a social service. They consider that the unit of architectural practice is now the group—a small group under a leader with, if necessary, disciplinary powers in private practice, or an aggregation of groups under several leaders in official departments. If a member of the group is inefficient, he must be got rid of. Otherwise he should be able to find a secure and interesting job.

The difficulty of doing this at present for the abler men of about thirty years of age is, the JOURNAL feels, the chief cause of professional uneasiness. For those without exceptional good fortune, influence or private means, setting up in private practice is becoming almost impossible. Existing private firms, in spite of many exceptions, are generally less able to offer partnerships to younger men, while tending more and more towards keeping minimum permanent staffs and engaging extra men for strictly temporary periods.

Finally, the official departments, which appear to be likely to execute an increasing amount of the country's architectural work, have in some cases considerable drawbacks for the young architect entering them permanently. Lack of responsibility, lack of credit for work done, too much specialization and subdivision of activities and generally over complication and overstaffing—these defects in some official departments are undoubtedly making young architects reluctant to enter them. And it is probable that their remedy would remove one of the larger causes of uneasiness among architects.

In an attempt to show the part now played in the practice of architecture by official departments, as well as their defects and advantages, the JOURNAL intends to publish during the next few months five articles, each of which will deal with the organization, methods, and conditions of a large official architects' department.

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NOTES & TOPICS

EXHIBITION

THE R.I.B.A. Exhibition on "Health, Sport and Fitness" is an excellent, thoroughly enjoyable mixed bag. Architecture is not specially stressed, but is there—in varying sizes from the small house to a big and beautiful model of a recreation centre. The sociologically minded, fitness fans, and those who are interested in fine photography, can be equally recommended not to miss it.

*

Lord Aberdare said the right things at the opening, and to those who, arriving late, were out of sight of him at the back, he was clearly audible through the amplifiers. Mr. Easton, who moved the vote of thanks, was, as usual, short; and, as usual, apparently witty. Apparently is necessary, for Mr. Easton was not provided with a microphone and suffered, as far as the back rows were concerned, from being both inaudible and invisible. Another microphone or two seemed needed for crowded audiences.

D.I.A.'S NEW SECRETARY

Mr. M. L. Anderson's appointment as Organizing Secretary of the D.I.A. has now, I see, been officially announced; he ought to do it very well, for he has had the right sort of experience for it. A.A. school—some journalism—and two spells as architectural adviser to quite important firms in the building industry.

*

He has also had a turn at being D.I.A. Chairman: but chairmen come and go. Mr. Anderson was very largely responsible for the D.I.A. exhibitions which are now touring provincial shops with some success, and now has the Master of Sempill as a chairman who apparently means to get something done.

HEALTH, WEALTH AND ARCHITECTURE

This is the title of the R.I.B.A. Informal Meeting on Wednesday, March 16, at 6.45 p.m. The actual speaking begins at 6.45; tea and chatting to anyone one knows and feels like speaking to are possible an hour earlier.

*

Informal Meetings are arranged by and for younger members. Anyone who wants to practise addressing a committee with brevity and point or who wants to abolish or reform the R.I.B.A., can suggest a subject, speak or suggest speakers.

*

Yet, despite reform in the air and the large number of active and intelligent young men within striking distance of Portland Place, I am told the meetings are usually compelled to rely for suggestions on the enthusiasm of about 20 organizers.

*

This is not good enough. Young members who think the R.I.B.A. can be improved in this way and that, do not deserve much attention if, when a free forum for argument and suggestion is provided, they pay no attention to it. There are limits to the amount of spoon-feeding which any society can supply.

*

On Wednesday next, Mr. Pointon-Taylor (Ministry of Health) in the chair, almost all subjects will be relevant and the most important of problems for architects in the future will be especially relevant. I hope to hear what architects feel about them.

"NO OTHER SITE AVAILABLE"

Lulworth Cove, Lindisfarne, Abbotsbury, Burford, Blakeney Point, White Waltham—the list of pleasant spaces which the Air Ministry or War Office wished to acquire for military purposes is long.

*

To the layman with an interest in unfrequented spots the cumulative unhappiness of the suggestions became, in a sense, humorous.

*

At last the Air Ministry has decided to try to do better. Professor Abercrombie has been appointed their town-planning adviser. For the future one supposes that major and minor gaffs will be pointed out before the correspondence columns of *The Times* are filled with protests.

SPOTLIGHT ON A.A.

The influence of *Time* (or William Hickey) is spreading to rival newspapers. An A.A. girl student was described in the *News-Chronicle* last week as "six-foot, interesting, ear-ringed Elizabeth Chesterton." She was being interviewed in the series, "Girls With A Future," upon the prospects of women architects. However, she sensibly confined her remarks to a description of life at the A.A. rather than a forecast of a woman architect's career.

*

In view of the full description given, it was perhaps a pity they omitted to say she was left-handed—otherwise many people who see the accompanying photograph may think that all women architects draw with their T-squares upside down.

WAUGH IN WOTTON-UNDER-EDGE

My note last week, *Waugh against Mars*, has brought the following letter from Mr. Evelyn Waugh.

16 Cornwall Terrace, N.W.1.
As from
Piers Court, Stinchcombe, Glos.
March 6.

SIR,—Please believe me, I meant no disrespect to any particular group of modern architects. In fact, I was unfortunate enough to miss the M.A.R.S. Exhibition. We hear of things late round Wotton-under-Edge and I arrived hot-foot at the gallery to find it had been closed for several days. All I saw was Mr. Bernard Shaw's introductory whoop of triumph at the destruction of Adelphi Terrace.

"Professor Reilly Speaking"—a 6 ft. by 4 ft. poster which was part of the decorations at Bluecoat Chambers, Liverpool, for the Northern Architectural Students' Association's Congress Ball. The Liverpool school carried out the decorations.

The point of the article to which you refer was to recall to the classical Orders, not the Corbusier School whom I regarded, perhaps mistakenly, as a spent force in this country, but the whimsical school who are all too flourishing.

My objection to the Corbusier School goes deeper than a mere preference for coal fires and cornices. I think they presuppose and encourage changes in social habits which have not, in fact, taken place to any large extent in this country, and which, so far as they have taken place, should be checked.

I hope you will not let Mr. Shaw and his friends loose round your editorial offices.

Your obedient servant,

EVELYN WAUGH

*

Mr. Waugh appears to me to differ from some of his literary confrères in that his views on architecture are not merely decided but serious. We pay him the compliment, not always handed out by architect-wallahs to amateurs, of answering him at length, and in deadly earnest. Thus.

*

Dear Mr. Waugh,

I submit, with the greatest respect, that you are guilty of an abuse of veracity in stating that we hear things late round Wotton-under-Edge. It happens to be a part I don't know, but I would bet you six copies of this JOURNAL to your latest book that not merely telegraph poles, but power cables, and a plethora of other objectionable objects such as petrol-filling stations, link you up with civilization and make it possible for you to hear the news no later than you would, begging your pardon, in Cornwall Terrace, London.

*

Were I to call you a liar in view of your statement you would be justified in sueing me for whatever it is one sues people for who call one a liar, since the statement was clearly not meant to be taken seriously. It was, if I must come to the point, a whimsical statement, and one that anybody in his senses would accept as such.

*

Yet, Sir, the horrible little modern architects, to use a phrase of yours with which I can sympathize, know jolly well—I repeat they know *jolly* well—that *your* whimsey about Wotton-under-Edge being a place where one hears things late, i.e. a place where modern utilities have not yet penetrated, is a distortion of the truth. Furthermore, it is a dangerous distortion on account of what it covers up. It covers up the unsavoury fact which is known to *you*, but which *your whimsey* aims to slur over, that Wotton-under-Edge, Piers Court, Berks, Glos, Wilts, etc., are in fact today little more than a desirable series of fields intersected by first-class roads and bounded here by a stone wall, there by a thorn fence, making highly eligible building sites close to a 'bus service and fifteen minutes from a fast train.

*

Now the danger, as I see it, of remarks such as yours in *Country Life*, is that egged on by such people as your good self and Mr. Robert Byron, not to mention Sir Edwin Lutyens and Mr. Berthold Lubetkin, the horrible little architects may really begin to think that the architectural issue is between functionalism and whimsey, or neo-whimsey and disciplined whimsey (the Orders, etc.). The new President of the R.I.B.A. is spending some of his term of office trying to put this about. Whereas, as I hope you will agree, the real architectural issue is how, in England, to achieve a decorous transition between a rural 19th century Eden-under-Edge dotted with huge but clearly limited manufacturing areas, into delimited, universal, shore-to-shore garden suburb of the 20th century. It is the architect's job to think out how to effect the transition with the least mess. It is pre-eminently a problem of planning or (as we say) of land utilization. The style of buildings that goes up is relatively unimportant.

*

Words cannot express, my dear Sir, my own disgust at this prospect. Nevertheless it stares me and my horrible little confrères in the face. Horizontal windows, left-wing slogans, simply have no place in this problem, which no new social or economic order could seriously modify, unless it was prepared to smash motor-cars, electric power plants, telephones and modern systems of water-supply. But while *we* are busy trying to find the answer to this, the men who have been brought up on the Orders and Entablatures have been busy laying out (in every sense of the word), New Regent Street and Carlton House Terrace.

*

As to the Adelphi, *that* work again you must put down to your classical friends ably supported, unless my memory deceives me, by Mr. Osbert Sitwell, who was, I think, the first person amongst the intelligentsia to state in the press that the Adelphi was his idea of mud.

I am, dear Sir,

Your obedient servant,

ASTRAGAL

NEWS

POINTS FROM THIS ISSUE

THE IDEAL HOME EXHIBITION

Mrs. Neville Chamberlain will open the Twenty-Second *Daily Mail* Ideal Home Exhibition at Olympia, Kensington, W., on Tuesday, April 5, at 11 a.m.

EXHIBITION

An exhibition entitled " New Schools for Old " was opened at the Housing Centre on Monday last by Viscountess Astor, M.P. The exhibition has been arranged by the Nursery Schools Association, the Ten-Year Plan for Children and Mr. Ernö Goldfinger. It will run until March 19.

SITES FOR AERODROMES

Professor L. P. Abercrombie has been appointed to advise the Secretary for Air on the choice of sites for aerodromes.

GLASS TRAIN TO REVISIT LONDON

The Glass-Age Train will pay a return visit to London on March 28. It will be on view at Platform 6, Victoria Station, from March 28 to April 2. The train will also be on view at Addison Road Station, when the Ideal Home Exhibition is being held, from April 5 to 30.

FEDERATION OF TENANTS' AND RESIDENTS' DEFENCE ASSOCIATIONS

A federation of tenants' and residents' associations was formed at a meeting held recently at Friends' Meeting House, when some 40 delegates from associations in different parts of London decided to join together in their common interest, specially in view of the Government's proposals to remove rent control, reduce housing subsidies to local authorities, and to encourage private speculative building.

The federation will deal with all questions affecting tenants and residents, such as overpayment of rent, repairs, rates, jerry-building, breaches of building by-laws, schools, transport, road safety, etc. It will supply legal, architectural, and other assistance to associations which affiliate to it.

Full details of the federation are obtainable from Mr. K. Farley, Acting Secretary, 46 Townshend Cottages, Townshend Road, St. John's Wood, N.W.8.

THE ARCHITECTS' DIARY

Thursday, March 10

R.I.B.A., 66 *Portland Place, W.1. Exhibition : "Health, Sport and Fitness." Until March 31. 10 a.m. to 8 p.m. (Saturdays, 5 p.m.).*

ARCHITECTURAL ASSOCIATION, 36 *Bedford Square, W.C.1. Exhibition of Work by Students of the Royal College of Art—arranged by the A.A. Students' Art Club. Until March 18.*

LONDON SOCIETY. *At Goldsmiths' Hall, E.C.2. Annual Meeting. 4.15 p.m.*

INSTITUTION OF CIVIL ENGINEERS, *Portsmouth, Southampton and District Association. At the Municipal College, Portsmouth. " Air Raid Precautions as they Affect the Work of the Civil Engineer." By Colonel William Garforth. 4.45 p.m. Birmingham and District Association. At the James Watt Memorial Institute, Birmingham. " Engineering Experiences on the Gold Coast." By Alfred Drury. 6 p.m. Bristol and District Association. At the Royal Hotel, Bristol. " Some Notes on the Application of Vibration to Concrete and Reinforced-Concrete Construction." By Jack Mercer. 5 p.m.*

Friday, March 11

TOWN PLANNING INSTITUTE. *At Caxton Hall, Caxton Street, S.W.1. " Planning a City." By R. M. Finch. 6 p.m.*

REIMANN SCHOOL, 4–10 *Regency Street, S.W.1. " The Artist, the Photographer and Self-Expression." By Ifor Thomas. 8 p.m.*

Saturday, March 12

ST. PAUL'S ECCLESIOLOGICAL SOCIETY. *Visit to Westminster Hall, St. Stephen's Chapel and Cloisters. 2.30 p.m.*

Tuesday, March 15

HOUSING CENTRE, 13 *Suffolk Street, S.W.1. Tuesday Luncheon : " Decentralization as a National Policy." By W. Harding Thompson. 1 p.m.*

R.I.B.A., 66 *Portland Place, W.1. " The Rights of Leisure." By A. J. A. Symons. 6.30 p.m.*

Wednesday, March 16

ARCHITECTURAL ASSOCIATION, 36 *Bedford Square, W.C. Musical Evening arranged by the A.A. Musical Society. 8.30 p.m.*

TIMBER TRADES FEDERATION. *Annual Dinner at Grosvenor House, W.1.*

INCORPORATED ASSOCIATION OF ARCHITECTS AND SURVEYORS, 43 *Grosvenor Place, S.W.1. " Aviation." By Flight Commander Nigel Norman. 7 p.m.*

ST. PAUL'S ECCLESIOLOGICAL SOCIETY. *At 6 Queen Square, W.C.1. " History and the Parish Church." By T. A. Coysh. 8 p.m.*

R.I.B.A., 66 *Portland Place, W.1. Informal General Meeting ; " Health, Wealth and Architecture." 6.30 p.m.*

SIR JOHN SOANE MUSEUM

We are informed by Mr. Arthur T. Bolton, F.R.I.B.A., that the Sir John Soane Museum in Lincoln's Inn Fields, W.C., will be open free on Tuesdays, Wednesdays, Thursdays and Fridays during this month and in April, May, June, July and August, between the hours of 10.30 a.m. and 5 p.m.

PUBLIC BATHS FOR SOUTHWARK

The Southwark Borough Council has applied to the Minister of Health for sanction to borrow £25,000 for a site, already acquired, in Borough High Street, S.E., for the erection of public baths. The estimated cost of the scheme is £160,000.

INCORPORATED CLERK OF WORKS ASSOCIATION

Professor Richardson, F.R.I.B.A., presided at the fifty-fifth annual dinner of the above Association, held in London on Saturday last. In the course of his speech he pointed out that the object of the Association's benevolent fund was to assist distressed members and pensioners of the Association. He never ceased to realize that a clerk of works was an important person in the building industry, and he pointed out that in medieval times the clerk of works held high office among the King's Ministers. He went on to say that he never ceased to realize also that there was only one way to learn practical architecture, and that was to make friends with a good old-fashioned builder and a clerk of works of integrity.

Mr. W. C. Hacking, President of the I.C.W.A., responded.

Other speakers included : Messrs. W. E. Brewster, V.P.I.C.W.A., T. P. Bennett, F.R.I.B.A., F. Saunders, F.S.I., G. W. Harris, P.P.I.C.W.A., Louis Jacob, F.R.I.B.A., A. B. Ashby, P.P.I.C.W.A., W. Dove, L.M.B.A., C. D. Angier, M.I.C.W.A., and Colonel Marriott.

FLEETWOOD APPOINTMENT

Mr. Cedric Arthur Spivey, of the City Architect's Department, Manchester, has been appointed to the post of Architectural Assistant of the Borough Surveyor's Department, Fleetwood. The salary is £335, rising to a maximum of £405. The position of architectural assistant was created recently to cope with the increasing work of the Borough Surveyor's Department.

HOUSING IN SCOTLAND

During January 841 houses were completed by local authorities in Scotland, compared with 1,223 in December and 1,086 in January, 1937. At the end of last month 27,499 houses were under construction—175 more than at the end of the previous month—and 9,455 houses contracted for had not been begun. Since 1919 Scottish local authorities have erected 190,018 working-class houses.

POSTER COMPETITION

The Management Committee of the Paris International Trades Fair (to be held from May 21 to June 6) invites designs for a poster suitable for advertising the Fair. The prizes offered are as follows : First prize, 5,000 francs and a plaquette, second prize, 2,000 francs and a gold-plated medal, third prize, 2,000 francs and a silver medal, fourth prize, 1,000 francs and a silver medal, fifth prize, 1,000 francs and a silver medal. In addition, there will be a further ten prizes (at least) of 500 francs, and ten prizes of 250 francs.

Full details of the competition are obtainable from the London Office of the Fair, 17 Tothill Street, S.W.1. The latest date for submission of posters is May 1.

CHANGE OF ADDRESS

Mr. Wells Coates has removed his office to No. 18 Yeoman's Row, Brompton Road, S.W.3. Telephone No. : Kensington 9252–9253.

R.I.B.A.

NEWS BULLETIN

Visit of H.R.H. the Duke of Gloucester. H.R.H. the Duke of Gloucester is visiting the Health, Sport and Fitness Exhibition today, March 10. His Royal Highness, who recently became an Honorary Fellow of the R.I.B.A., has shown great interest in this work of the Institute in connection with the National Fitness Campaign.

Health, Sport and Fitness. " The Rights of Leisure " is the subject of a lecture by Mr. A. J. A. Symons on Tuesday, March 15, at 6.30 p.m. Mr. Symons is a distinguished author and book collector and secretary of the Wine and Food Society, and of the First Edition Club. He will champion the cause of the man who prefers the gentler and more intellectual recreations. The chair will be taken by Mr. J. Murray Easton, F.R.I.B.A.

General Meeting. On Monday, March 21, at 8 p.m., Mr. Stanley C. Ramsey, F.R.I.B.A., will read a paper on " Speculative House Building."

Touring Exhibitions. " Modern Schools " opens at the Public Museum and Art Gallery, Hereford, on Monday, March 21.

" Airports and Airways " will open at the

Museum and Art Gallery, Derby, on Friday, March 25.

"Civic Centres" opens on April 2 at the Public Libraries, Museums and Fine Art Galleries, Brighton.

Informal General Meeting. The Junior Members' Committee has selected the appropriate title of "Health, Wealth and Architecture" for the informal general meeting on Wednesday, March 16. One of the speakers will be Dr. Edith Summerskill, of the L.C.C. The chairman will be Mr. S. Pointon Taylor, F.R.I.B.A., architect to the Ministry of Health. Tea will be served at 5.45 p.m. and the meeting will begin at 6.30 p.m.

THE LATE W. D. CARÖE

We regret to record the death of Mr. William Douglas Caröe, F.S.A., F.R.I.B.A., which took place in Cyprus on February 25 at the age of 80.

Son of the Danish Consul in Liverpool. Mr. Caröe was educated at Trinity College, Cambridge, where he took his degree in 1879, and was a pupil of the late Mr. J. L. Pearson, R.A. He was architect to the Deans and Chapters of Canterbury and Durham, to Southwell, Brecon, and St. David's Cathedrals, and to the Charity Commission, and consulting architect to the Diocesan Boards of Finance of Canterbury, Lichfield, Newcastle-on-Tyne, and Bath and Wells, and the Canterbury Diocesan Board of Education. He was a past president of the Architectural Association, and had received the Norwegian Order of St. Olaf.

Mr. Caröe's works included the offices of the Ecclesiastical Commission in Westminster, new buildings at Pembroke College, Cambridge, and at the National Physical Laboratories, and University College, Cardiff, and the designing or restoration of a number of episcopal palaces, the Archbishop's Palace at Canterbury, Tom Tower and Cathedral, Oxford, and schools and churches all over the country.

His published works are: *Sefton: Topographical History; King's Hostel, Trinity College, Cambridge; Wren and Tom Towers, Christ Church, Oxford.*

The Bishop of Durham, in an appreciation in *The Times*, wrote: "He was much more than an architect, for his interest in the churches which, as architect to the Ecclesiastical Commission he was required to visit, was not limited to the specific matters with which he was required to deal. He was a skilled archæologist, a keen antiquary, a widely read historian, as well as a successful architect. To visit an old church or a monastic ruin, or indeed any ancient monument in his company was a delightful experience. He carried a boy's enthusiasm into his difficult and often arduous duty. His knowledge of our medieval churches, garnered through many years of active work, was extraordinarily ample, detailed and accurate. His genius was as versatile as it was brilliant. Nothing was too small to interest, nothing so difficult as to discourage him. He had what I suppose are the constituents of the highest merit in his noble profession — courage, imagination, readiness to adapt himself, patience, industry."

EXHIBITIONS

[By D. COSENS]

THE French painters of the nineteenth century are now almost universally accepted as old masters. The derivations and influence of their work, and every known incident of their lives, have been so much Rosenberg and Helft have arranged an excellent exhibition in which both an early unfinished Manet portrait of exceptional interest, and another version of one of Cézanne's favourite themes, are shown for the first time in this country. Pissarro's "Pont Neuf" is perhaps his finest painting, and the whole exhibition is of the usual high standard maintained by this gallery.

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It is open to argument whether, with a few obvious exceptions, it is a good plan to reduce all nursery fittings to a diminutive scale. The opposition was strongly led by Robert Byron in his review in the *New Statesman* of the Mars exhibition. In the exhibition of nursery furniture at Heal's, admirable as it is, the grown-up's insistence on the differentiation of childhood is sometimes overstressed, more one suspects to their pleasure than to that of the child. The climbing frames, the sandpits, slides and toys couldn't be better—any sane child would delight in them, and most of the furniture is thoughtfully designed and well made. The sturdy many-purpose table or chair used at Dartington Hall is the most practical and economical in design and, from the child's point of view, the most successful, for this is furniture that with a moment's imagination can also be used as a foundation for games. The textiles are good and the exhibition seems to contain everything that the modern child, or at any rate the modern parent, can think it wants.

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But the question of decoration for these otherwise carefully considered children's needs serious revision. Is the rash of little lambs and rabbits that springs up over almost every possession destined for the nursery really gratifying to the infant mind? And in an atmosphere calculated for healthy growth in every other direction are not those endless oh-so-artless pictures of cute little animals and nice little girls and boys, all in flat wash and simple outline, rather astonishing? This reaction from the macabre and disturbing illustrations of Grimm and Hans Andersen is understandable, but it is even more unhealthy in its superficiality. In nursery decoration it is this over-anxious baby-talk that is such a weariness, and it should be remembered that a child is a remarkably observant human being, not a sort of charmingly dependent sub-species with a view-point entirely unrelated to reality. An excellent series of lithographs by contemporary artists has been published for schools, and there are also inexpensive reproductions of such cheerful and easily apprehended painters as Van Gogh. Any of these, or nothing at all, would be infinitely preferable on the walls of Heal's excellent model nurseries. That is the only serious criticism of an otherwise admirable exhibition, and at the same time of a prevalent misconception.

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At 26 Berners Street the Old Bleach Linen Company are showing their latest furnishing fabrics and also a few excellently designed printed linens by Mansouroff, Ashley, and Marian Dorn. These are a new and rather tentative experiment which, should be continued.

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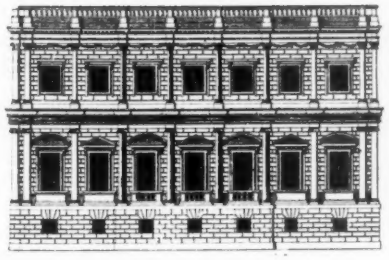
Ten French Painters of the Nineteenth Century. Rosenberg and Helft, 31 Bruton Street. Until March 12.

Nursery Furniture, Heal's, Tottenham Court Road. Until the middle of March.

New Furnishing Fabrics, Old Bleach Linen Company, 26 Berners Street.



ANARCHY

[By J. R. HILTON]

ANARCHY is the most attractive of political theories. Nothing could be more desirable than the abolition of politicians, partisan presses, bureaucrats and that crush. In the community of angels a state of anarchy must certainly prevail. Where every mind is a perpetual living mirror of all other minds in all their relations to one another, the best policy, in whatever individuals particular aspects of it may evolve, will be recognized immediately by all and immediately put into practice. Hope of an advance in this direction led liberals to welcome recent improvements in communication. Your true liberal ideal is to move as far as possible towards anarchy, in this sense of a universal and immediate recognition of the best public policy; when government and submission to government shall be dissolved, by the agencies of perfect education and perfect communication, into the acquiescence of reason in truth.

As we are some way short of this goal we have to put up with makeshifts, varying from near-democrat with apparent rule by balance of opinion, to the apparent rule of one man. From one extreme to the other the urge to anarchy appears. We see it in the fictions of self-rule and liberty. We see it no less in the belief that the leader reflects the State in himself, fighting out in his soul all sectional conflicts in the State and realizing a policy which includes somehow or other the element of non-compulsion, of that acquiescence which one facet of a single mind shows in its relation to the whole.

Anarchy of the type just outlined, which may be discerned, rather dimly, in the ideals behind all forms of political stop-gap, may be termed positive anarchy. The negative anarchy to be contrasted with it corresponds more closely to the common conception of anarchy, whose devotees are expected to desire the abolition of the stop-gaps without offering an alternative; tearing off the bandages before the wound is healed. Negative anarchy is simply disorderliness and actually exists in large quantities.

Political creeds may be conveniently classified according to their relations to positive and negative anarchism. Liberals, we have seen, are anxious to

increase positive anarchy with the minimum of stop-gaps. They tend to ignore existing negative anarchy. Conservatives apply themselves to the defence of such positive anarchy as exists and the application of stop-gaps to such negative anarchy as disturbs them enough. Socialists are concerned to apply stop-gaps to all negative anarchy, hoping that a certain amount of positive anarchy may eventually result. Communists would apply a big stop-gap to negative anarchy, leaving positive anarchy to look after itself. Fascists, as already noted, in applying a big stop-gap to a limited field of negative anarchy, would hope that a somewhat mystical kernel of positive anarchy might be preserved by the leader principle. All reasonable men desire a minimum of negative anarchy and stop-gaps and a maximum of positive anarchy. Anarchists appear to be Liberals short-circuited.

Come back to architecture. Anyone who has walked down Oxford Street at 5 o'clock on a fine summer morning (preferably Sunday) will have seen the Great Negative Anarch flaunting himself in naked vigour. Divested of the illusory civilization lent by the smooth traffic stream and comparative uniformity of bus and saloon, the god of disorder stands clear in triumph, ageing but scarcely flagging.

I remember correspondence in the *Daily Telegraph* between Sir Charles Allom and Professor Richardson. They were both horrified by the anarchy of the Strand. Sir Charles said better architectural education was needed. The professor pointed out that this would not tame the savage self-expression of multifarious small-property owners or soften the elbows of vested interest.

Public order is one of the topics of the day ; there is a danger of street fighting. Yet street-frontage fighting has reached a pitch of ferocity that can hardly be surpassed ; public order is in shreds ; and the police just stand by. (If public order in dress were flouted in this way, what a gala there would be. But for some reason it would not be good business.)

The philosophy of rugged, or is it ragged, individualism is full of inconsistencies. Your rugged individual is more likely than not to be full of praise for some or other unpleasant process for "knocking the corners off"; while any suggestion that an angularity of his own be softened for the sake of neighbourliness is considered rather bad form.

The liberal long-run truth and the terrible liberal short-run fallacy are illuminated in architectural history. While a certain architectural culture was established, education and communication were increasingly effective in producing a general harmony, a positive anarchy. But early in the nineteenth century there was a terrific increase in the number of landlords whom this sort of education did not reach. And then, far worse, there was a terrific increase in the power of communication, which, far from helping the old traditions to filter through to a greater number of people, let in a swamping flood of all manner of bits of other people's and other ages' traditions ; and negative anarchy covered all. There was no stop-gap.

Educate the architects by all means. But education alone in the present circumstances is a brave continual keeping of the ground open until some seed may chance to fall from the air. And even when a sufficiently prolific seed has rooted and made headway against the tares in the architectural garden, it is only a nursery garden. The seedlings must be transplanted into the open fields. The beastly great Public has to be ploughed and harrowed. And that is a longish job.

What can be done in the meantime? We all, as reasonable men, want to see the establishment of a positive anarchy, a natural flowering of consistent design grounded in common feeling and co-ordinated by free association. We all see an inevitable continuance for some time of untidy confusion irritating and exhausting to those who live in it. There is a gap. Is there no stop-gap?

The creation of an *ad hoc* dictator is impracticable. And the political dictators, though they have issued some pronouncements on architectural style, have done so with less than their usual assurance and effect. The British Government, as a president of the R.I.B.A. once pointed out, have produced chiefly negative measures of more service to interests other than architectural ; a sort of surgery without subsequent dressings. After an all-night debate on the depressed areas a brave gentleman "tried to interest a jaded House in town planning" ; the House, perhaps naturally enough, became empty.

Local authorities, or their experts, are in some cases very much in advance of Parliament and the Ministries, not only in awareness of the problems, but in enlightenment of attitude and determination to get something done. The advisory panel system can do much to foster these shoots of right feeling. From the better local authorities impulses travel both upwards to Whitehall and Westminster and downwards to prospective building owners and builders, speculative included, who, if only to save their own time and money, are beginning to ask beforehand for advice on the broad principles of designs likely to be approved. And many builders of small houses would be only too glad to get good standard designs at a reasonable price.

The advisory panels have not exactly fitted their function everywhere and all the time. In this they are like all stop-gaps. And regarded as such, as a step towards the positive anarchy we all desire, the system is possibly developing into the best available. We must only take care that, while stopping the gap, it does not exclude the new growth which will close the wound.

LETTERS *FROM* READERS

G. V. DOWNER, Managing Director, G.V.D. Illuminators Ltd.
M. C. TONER, Publicity Manager, Holophane Ltd.
GILBERT ALLOM, Chairman, Allom Bros.
E. H. B. BOULTON
L. H. B. ROBERTS

Lighting

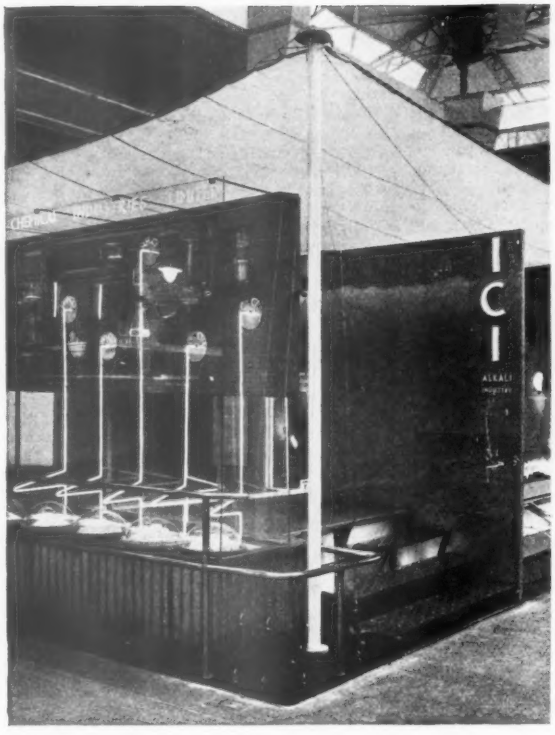
SIR,—Thank you for your letter of February 16 conveying the authors' comments on my letter of February 14, in which I criticized their recommendation of 15 to 20 ft. candles for artificial lighting in schools. I still maintain, however, that such intensities are liable to be dangerous to eyesight in view of our inability at present to reproduce more closely either the colour or distribution of daylight.

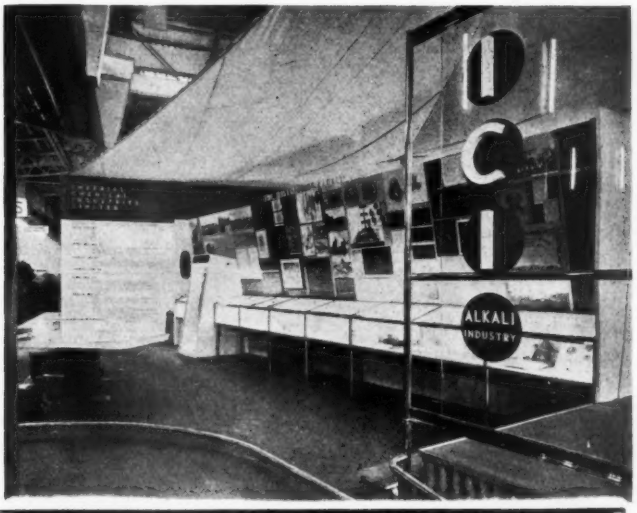
Our eyes are naturally suited to daylight, and can adapt themselves to an enormous range of intensities. I feel that there is not much point, for instance, in taking 500 ft. candles, as the authors suggest, for the light just inside a window on a fine day, since rooms and windows, different kinds of day and the light at different times of the same day, all vary so greatly. Probably there are windows at which on certain days the light just inside would be, say, 3,000 ft. candles. In my own office it is often about 300 ft. candles. On the other hand, the light diminishes so greatly towards evening, and almost without our noticing it, that it frequently falls well below the average intensity of the usual artificial light, as shown by the common experience that, when at last we do switch on the artificial light, we are often quite dazzled at first, showing that we had not realized how "dark" it had become.

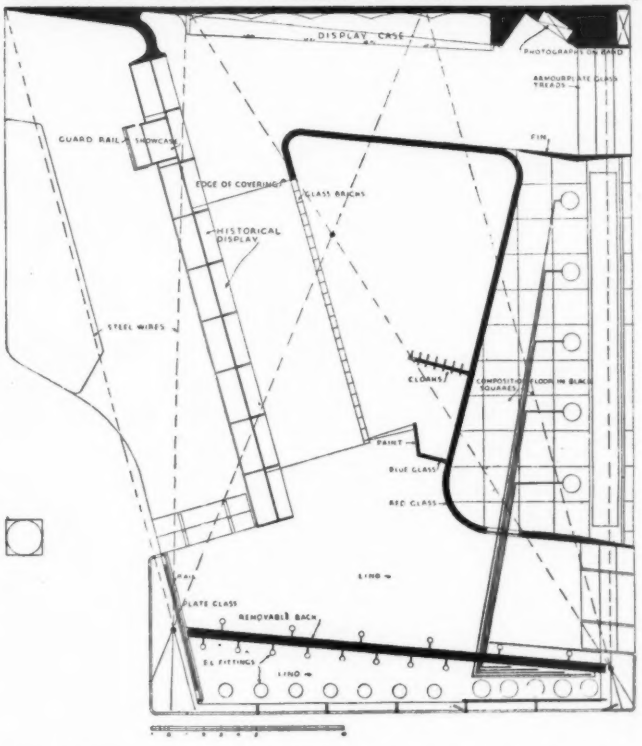
As I have found in practice that 4 or 5 ft. candles is usually ample for literary or clerical work, I consider it inadvisable to go much above this in artificial lighting, and, in any case, even if higher intensities were not injurious, my experience proves that they are unnecessary and therefore extravagant.

G. V. DOWNER

SIR,—With reference to the letter on "Lighting" published in your issue of March 3, I am at variance with the







The Imperial Chemical Industries' stand at the British Industries Fair, designed by Ernö Goldfinger and Gerald Flower. The I.C.I. have decided to show each year the produce of one of their component companies and this year the Alkali products are shown. History, production, research work and uses are illustrated in four sections.

The stand is covered by a canvas canopy supported by three painted steel masts and is partly finished in materials using alkalis in manufacture such as galvanized iron, glass bricks, flexible glass sheets, etc.

Main colouring is slate blue, glossy white, and cobalt blue; vermilion and grey linoleums were used throughout. Close collaboration was maintained between the architects and the I.C.I. publicity department.

Right, general plan of stand and fittings. Above, two detail photographs.

views expressed by your correspondent and entirely in agreement with the author of the Schools article, mentioned in a previous issue.

School lighting has been the subject of intensive research by the Illuminating Engineering Society, who are the body best qualified to give an impartial statement on the subject.

The recommended values of illumination are now published in a special hand-book by the above Society, and the figure quoted for class rooms, libraries and offices of schools is 5 to 10 ft. candles.

The standard of modern illumination has been raised with the development of gas-filled lamps, and intensities which were adequate 10 or 12 years ago are not sufficient for modern requirements.

The findings of a body of experts who are members of various lighting firms with 20 to 30 years' experience in school lighting should be the standard for architects to base the lighting intensities for educational buildings.

M. C. TONER

SIR,—With reference to the correspondence in last week's issue on lighting in schools.

There is no occasion for your correspondent to be disturbed at the suggestion that 15 to 20 ft. candles are required on table tops. The human eye is well able to stand very much higher intensities, and in fact is exposed to at least 1,000 ft. candles nearly every day in ordinary daylight, and in our experience there is no reason to believe that artificial light cannot be raised to the intensity of daylight, without discomfort, provided it is produced correctly.

Comparatively recent developments in scientific lighting make it possible to produce 15 to 20 ft. candles with a very moderate consumption of current and entirely without glare.

In our opinion, a minimum of 10 ft. candles should be provided for classrooms, and, therefore, in view of depreciation due to ageing lamps and other causes, an initial aim of 15 to 20 ft. candles is not excessive.

GILBERT ALLOM

Book on Timber

SIR,—I am collecting material for a book on small rural structures in timber. May I ask if any of your readers have photographs of work which they have personally designed and executed, in any of the following categories :—

Summer-houses, pavilions, gazebos, garages, small bungalows, small buildings connected with allotments and

gardens, tea-houses in public gardens, holiday camp buildings, youth hostels, village halls and squash courts.

I want photographs (not drawings), plans in ink, a brief description of the timber and other materials used, and the form of acknowledgment that should be made if the examples are included. The greatest care would be taken of any material lent for this purpose, and it would be returned after the book has been printed.

Material should be sent to me at 47-51 King William Street, E.C.4.

E. H. B. BOULTON

Timber Development Association.

Extensions to Bottling Plant

SIR,—Regarding Astragal's report last week, in your issue for February 24, I feel that the profession will watch with interest the rebuilding of any public-house situated on the county boundary, partly in Cheshire and partly "elsewhere."

The transition from Tudor to Georgian as the building passes over the border will surely constitute a *tour-de-force* in architectural design.

L. H. B. ROBERTS

R.I.B.A. LECTURE

PROBLEMS OF A RURAL PRACTICE

Following are some extracts from the paper entitled "Problems of A Rural Practice" read by Mr. Edwin Gunn, A.R.I.B.A., at a general meeting of the R.I.B.A., on Monday last.

THE chief and outstanding problem of a country practice is to secure worth-while work. This perhaps is equally true of any practice—town or country—but there are features of the specifically rural architectural field which intensify the problem.

In the first place, the general ignorance of the everyday person—the potential client—as to the status and qualifications of the architectural profession is even more profound in the country than in town. The second reason is more complicated and difficult to state fairly without offence. Under the conditions above recited architects of ability generally have required a wider field than their opportunities in country practice offer, and in consequence country practitioners tend to be a residue, whose abilities are low and whose advice few people will consider worth paying for on the R.I.B.A. scale. To say that country practitioners are, as a whole, outsiders, prepared to undercut fees, and customarily to furnish crude and incomplete designs, would be a gross overstatement, but there are in most districts practising architects (so-called, frequently they are local officials), who do all these things, which (besides rendering it still more difficult for an able architect to live) lower the general status of the architectural profession with an undiscriminating public. The field for the *bona fide* practitioner is still further reduced by the tendency which is apparent whenever substantial building work is in prospect to bring in from the nearest big town or from the capital an architect of established reputation.

This leaves the unfortunate local man with a practice which consists in the main of difficult cases—varieties of architectural juggling tricks. He is likely to be invited to undertake jobs which the local builder does not care to tackle unaided, and which are deemed unworthy of acceptance by a real architect from town. Work of this sort will be found to constitute a big proportion of his orthodox practice, and in addition he will find himself invited by the builders, who have received commissions to build houses for customers, to prepare designs for these, which usually it is desired should be done *sub rosa*, without relations with the actual employer.

This perhaps will be thought to paint a rather gloomy picture of country practice. It certainly does intentionally stress the worst features—the problems. From this aspect, two improvements in attendant circumstances may in course of time be hoped for. Persistent corporate exposition of the functions and attainments of qualified architects, coupled with hoped-for compulsory registration, should eventually eliminate pretenders, thus ensuring that most of the work which should reward the architect for his years of training does in fact reach him. Secondly, this Institute might sponsor a movement which would recognize the value of local knowledge and close supervision as a supplement to specialized proficiency in particular classes of building, such as local committees expect from city architects. Association of outside specialists with local practitioners is not unknown, but, so far as I can find, has never received official encouragement.

I think it is fairly safe to say that the ordinary country practice is essentially a one-man show. It is this for several reasons, and attempts to make it otherwise are largely responsible for that departure from strict professional standards, such as the introduction of "side-lines" not strictly conformable to the code of practice. Architecture as a one-man show has outgoings which are almost negligible, so that the net income enjoyed need differ very little from the actual receipts. As soon as an assistant is employed, whether draughtsman or secretary, the outgoings are at least trebled, so that to produce an equivalent income an expansion of business quite considerable in extent must take place. But a steady flow of work can never be expected.

It must be recognized, however, that architectural practice as a one-man show requires special treatment. Clients as a rule are so close at hand and so interested in their undertakings that they are only too prone to visit their architect in season and out of season, discussing *ad nauseam* every possible aspect of every feature of their work. They are singularly slow to realize that while they are talking no work can be done—either their own or another's—and as they are usually of what is known as "the leisured classes," time seems of little consequence to them. The architect will be well advised to take a leaf from the doctor's book, and ordain definite office hours—say 10-11 and 4-5—leaving himself free to do some work in the intervals, and "sporting his oak" if need be to attain that end.

At the start of this paper I mentioned the force of tradition (or custom), at one time nearly of universal sufficiency to produce good results. There is, however, both good and bad tradition, and since the decay of the old craftsmanship many country districts appear to have developed some unpleasant building customs which are hard to displace. It would serve no good purpose to enumerate a list which is probably peculiar to one district, but as instances of my meaning I can cite the habitual use of black mortar for pointing, the exaggerated "collaring up" of joints in rubble masonry (aptly named "snail-crawling"), and the persistent belief that whatever effort may be made to secure an orderly effect elsewhere, in kitchen quarters it is permissible for pipes to straggle and all attempt at tidy arrangement to be abandoned. The country (love it as one may) demonstrably lags behind the town in matters of design—not only in this habit of regarding kitchen quarters as something not meant to be seen, but by following fashions at one or two removes distance. Country shopkeepers are apt to be found installing new shop-fronts which involve the destruction of genuine old fronts of character such as town shopkeepers following the cycle of fashion are putting in!

So far I have concentrated, perhaps unduly, upon professional difficulties; I must now mention a few of the practical problems peculiar to design on rural sites.

The town architect, familiar with sites where, subject to compliance with by-laws and regulations, he is sure of obtaining outlet for drainage to a public sewer, and a supply of water, gas, and electricity by simple connection to a service main, may find himself stumped when introduced to a site lying miles from any such services. This is particularly so since the decay of the big country house, which used to form the dream job of every aspiring architect, but is now all too rare, so that experience of the self-sufficient establishment is more limited. I may be accused of trying to teach my grandmother to suck eggs if I say that the first step in such a case is to find water, test its quality and sufficiency, and get such evidence as is possible as to the constancy of its flow. But I have had repeated proof that this essential preliminary is often neglected. Also it seems not generally realised that most valuable guidance in this matter can usually be obtained by reference to the records of the Geological Museum, and those held by experienced firms of well-sinkers.

Sometimes a public supply may be found in existence in a nearby village, but in such cases the local authority (parish council or the like) is very loth to extend on any terms which are acceptable.

Reverting to sewage disposal, when limited sites are in question, it must never be forgotten that some land by its natural features results in a stalemate. A cesspool or septic tank (as provided by by-laws) or a properly designed bacterial purification plant, which is the preferable unrecognized alternative, must be distant at least 50 ft. from any building and in such a situation that intentional effluent or accidental overflow cannot run on to a public road or to an adjoining owner's land. In some cases the dimensions of the site in conjunction with the slope of the ground render these conditions impossible of attainment.

Then there is the heavy clay site, in which the absorbent quality of the subsoil is almost nil. In such cases any surface filtration area should be confined to the open topsoil and some artificial aid may be desirable. It might be more generally known that black-currant bushes are a valuable absorbent of partly purified effluent; they are gross feeders and will suck up and thrive upon liquid which may otherwise merely stimulate the growth of rank weeds.

As to electricity, it is often necessary to convince clients that electricity mains adjoining their site are not directly available for connection. They may be high-tension mains, in which case a step-down transformer would have to be provided, which for a single consumer may prove an unwarrantable expense. If a private generating plant is provided, however "noiseless" this may be, it is wise to relegate it to an outbuilding, since noises quite inaudible by day often become worrying in the quietude of evening or night.

Gas is not often available away from fair-sized towns, except in the recently introduced form of bottled or "Calor" gas, which seems to be a boon. People who have once been used to gas appliances for cooking are always loth to change to other methods.

Air gas or petrol gas can sometimes be usefully employed, and acetylene gas also on occasion.

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R.I.B.A. "MEMBERSHIP PAMPHLET"

The 1938 edition of the R.I.B.A. Pamphlet, *Membership of the R.I.B.A.*, has now been published. Copies may be obtained from the Secretary, R.I.B.A., price 1s. each, exclusive of postage.

The pamphlet, in addition to containing information regarding the Examinations and Membership of the R.I.B.A. contains full information regarding architectural training.

NURSES' HOME, WESTMINSTER HOSPITAL

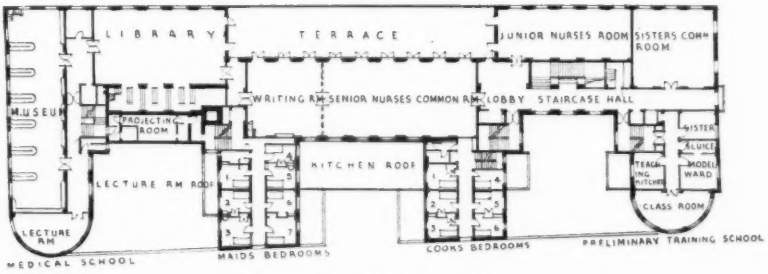
DESIGNED BY ADAMS, HOLDEN AND PEARSON

GENERAL PROBLEM—*Nurses' home for Westminster Hospital. Under the same roof the medical school, the interior of which is nearly finished, is planned as a self-contained building.*

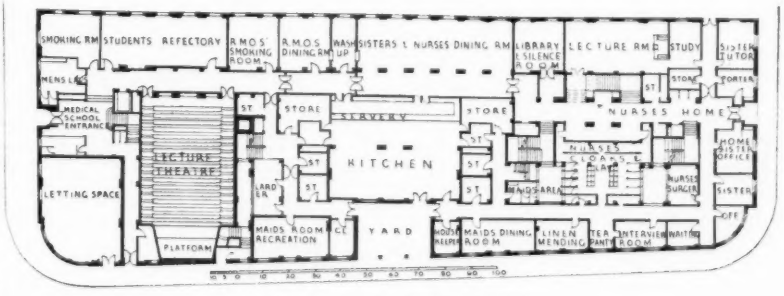
SITE—*An island, bounded by Horseferry Road on the north, Page Street on the south, St. John's Gardens on the east, and Marsham Street on the west. The nurses' home occupies about two-thirds of the building at the south end of the site, with the entrance in Page Street; the medical school the north end, with the entrance from Horseferry Road. The hospital, the steel frame of which is being erected, occupies a separate site on the east of St. John's Gardens. A subway will connect the nurses' home with the hospital.*

CONSTRUCTION—*Steel frame, faced externally with multi-coloured Sussex stocks and having a red brick base and Portland stone strings and copings. The windows are metal casements, opening outwards, with fanlights.*

The photograph is of the east side facing St. John's Gardens.

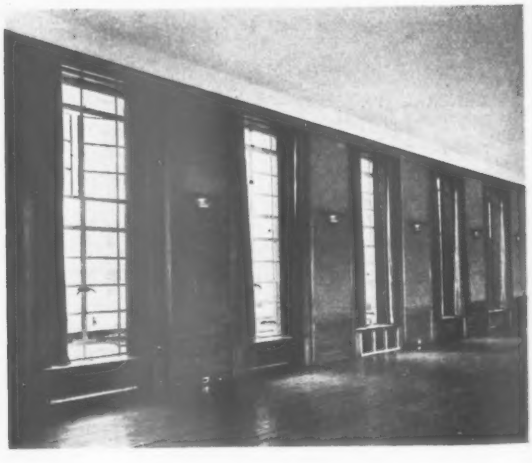


FIRST FLOOR PLAN

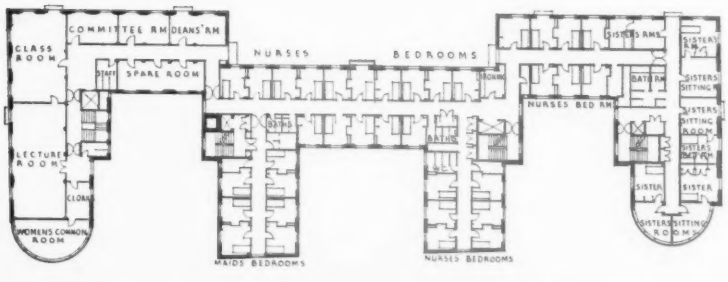


GROUND FLOOR PLAN

NURSES' HOME, WESTMINSTER HOSPITAL:



The photographs show : above, the main staircase, looking down to the ground floor and up to the first floor ; right, a nurse's bedroom, and windows in the senior nurses' common room.



TYPICAL FLOOR PLAN

BY ADAMS, HOLDEN AND PEARSON

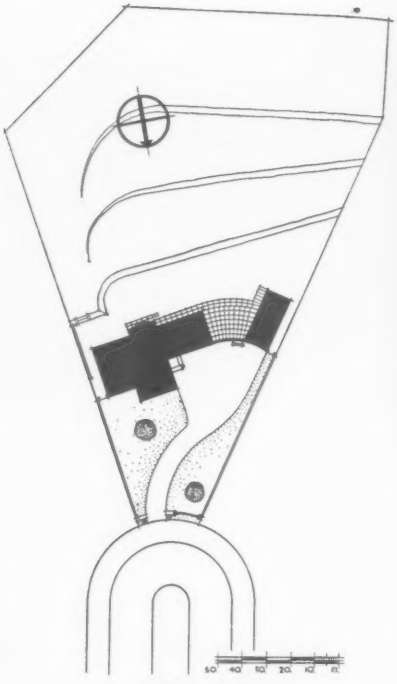
INTERNAL FINISHES—*The common rooms on the first floor, overlooking St. John's Gardens, have Australian walnut dados, door linings and architraves, with fabric covered panels above; and oak strip boarded floors with Australian walnut margins. The main staircase is of reinforced concrete with oak treads and Australian walnut balustrade and risers. A dado of similar material is fixed to the first floor staircase hall. Cork composition paving has been adopted generally for the entrance halls and corridors, with marble or black tile cove skirtings, and there are fibrous plaster ceilings to the most important rooms and to certain parts of the entrance halls. The sisters' and nurses' bedrooms have painted plaster walls; floors screeded to receive linoleum, and each room is fitted with a built-in wardrobe and recessed lavatory basin and a gas fire. In addition the sisters are provided with a built-in writing-desk. The bathrooms and lavatories, etc., have cork composition tiled floors, the dining-rooms and certain other rooms teak blocks. The walls of the main kitchen are tiled for the full height, and a false ceiling is formed with white glazed asbestos in sheets 4 ft. square.*

SERVICES—*The sisters and the nurses and maids have their own staircase, and there are lifts for the nurses and maids. Provision is made for a lift for the sisters at a later date. On every floor are ironing-rooms, tea pantry and shampoo rooms. The boilers and steam-raising plant serve the nurses' home and the medical school, and later will serve the hospital. The plant includes calorifiers and hot-water supply arrangements. A mechanical ventilating equipment is provided for the main lecture theatre, the basement and certain rooms on the ground floor, the kitchen and the internal lavatories and bathrooms; and fume extraction plant for the laboratory and fume cupboards. All pipes are hidden and are accessible from access panels treated in keeping with the adjacent wall surfaces. Coal fires are provided in the main common rooms. House telephones are installed and public call boxes on the ground floor.*

The photographs show: above, the kitchen; and the service in the sisters' and nurses' dining-room; left, a typical bathroom unit on a bedroom floor.

For list of general and sub-contractors, see page 432.

HOUSE AT SANDERSTEAD, SURREY:



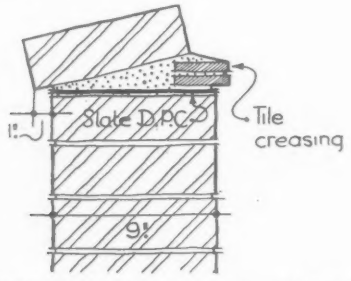
SITE PLAN

PLAN — *The general shape and arrangement of the plan was primarily determined by the fact that the site is on a hillside overlooking a valley to the north, and by the restrictions on the property which required the front of the building to be within 50 ft. of the road, and prohibited windows overlooking adjoining property to the east or west.*

These restrictions meant that the building had to be on the lower part of the site and, within limits, had to be parallel to its road frontage. This, in turn, meant that one long side of the house necessarily faced north and all important rooms therefore had to face south.

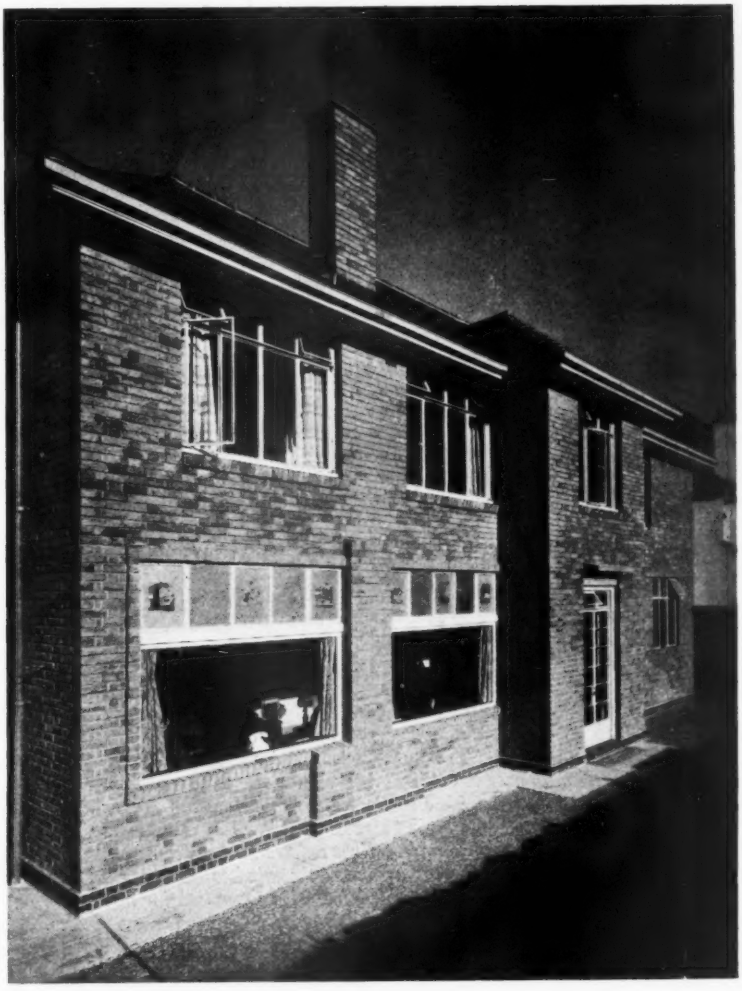
The house is planned to take a further extension of the first floor wing which will accommodate a large nursery carried over the loggia and a portion of the garage, following the curve of the present screen wall and having a series of long windows run on the curve overlooking the gardens to the south.

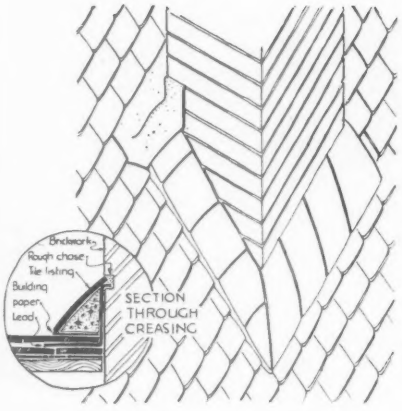
The photographs show : top, the north front ; centre, the front entrance ; left, a view from the south-west.



SKETCH SECTION OF GARAGE AND GARDEN WALL COPINGS

DESIGNED BY OSCAR A. BAYNE

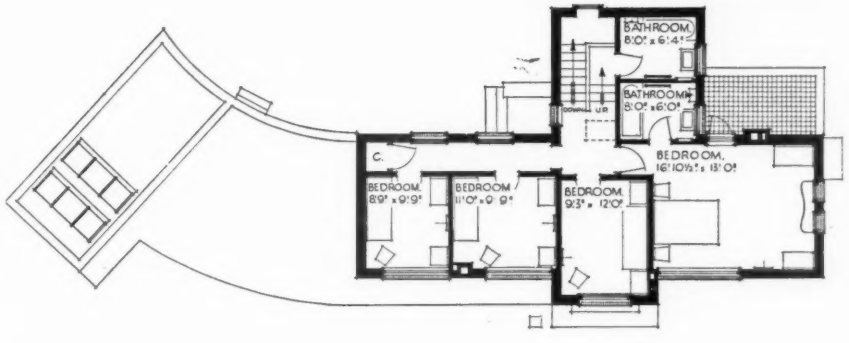


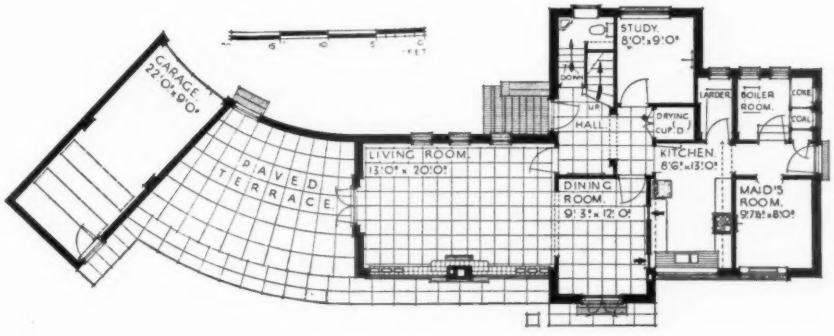


CHIMNEY STACKS: AXONOMETRIC SKETCH OF TILE LISTING

CONSTRUCTION—*Normal brick cavity wall construction was used throughout, with brick or hollow tile internal partitions. Lintols are of reinforced brickwork with the floor loads carried on steel channels over the larger windows.*

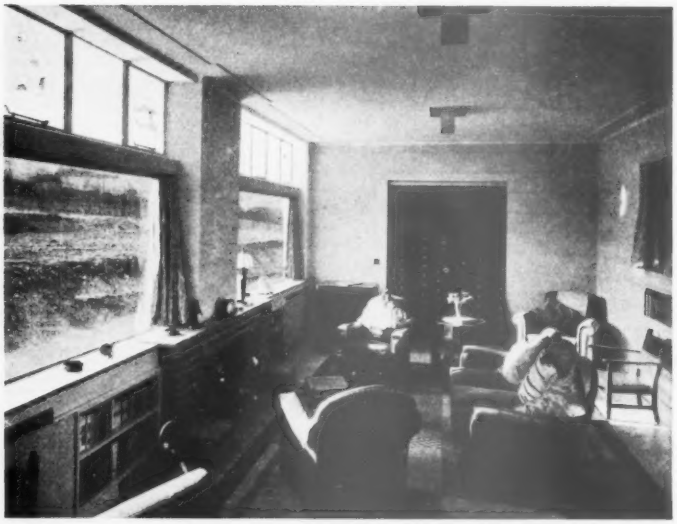
The photographs show: tile listing to chimneys; and a general view of the garden front.

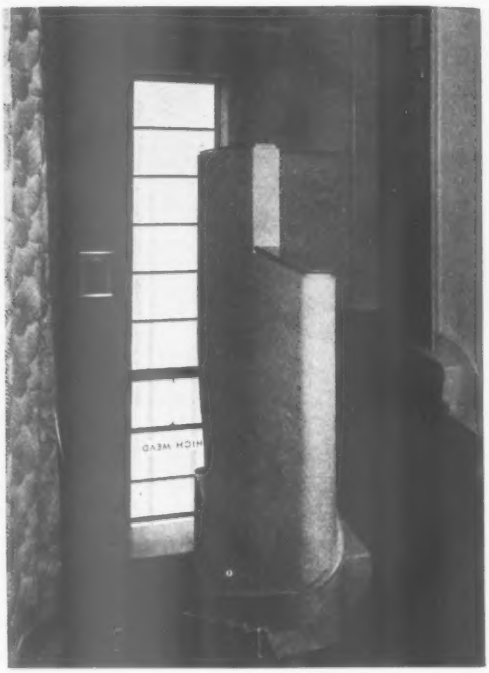




GROUND AND FIRST FLOOR PLANS

HOUSE AT SANDERSTEAD, SURREY



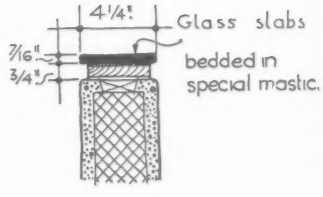


INTERNAL FINISHES.—*The living room and all bedrooms are wall-papered, and have distempered ceilings and carpeted floors. Kitchen and bathrooms have glass slab wall linings and hard gloss paint. The floors are covered with linoleum turned up at walls on a coved wood angle piece. Doors are polished beech.*

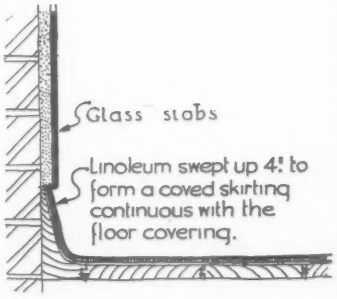
The living room, shown above, was required to be open in character, well-lighted and to have a good view of the garden as well as much sunshine as possible. Two plate glass windows, each eight feet wide, are arranged on either side of the fireplace and separated only by the minimum amount of brick-work required for the flue. The "vision panel" or plate glass part of the windows is carried up only to a height of 7 feet. Above the transomes is a series of fanlights glazed with slightly tinted light-diffusing glass; every second panel has a pictorial design in pale colours worked into the glass. This arrangement of "vision panel" and fanlight reduces the high contrast usually experienced between strong day lighting near the window and poor lighting at the back of the room and, instead, provides relatively even lighting throughout the room. One of the pictorial designs, executed by Edith Bayne, is shown below. The photograph on the right shows the staircase and window.

For list of general and sub-contractors, see page 430.

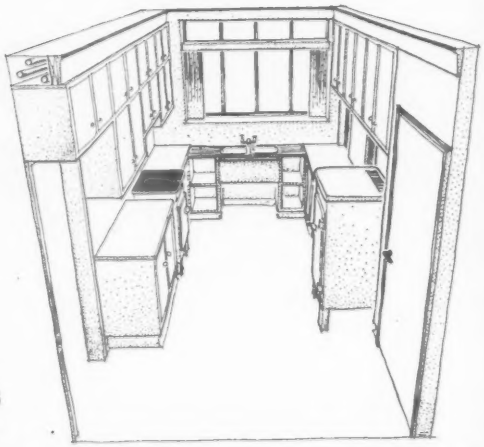
SKETCH SECTION OF BALUSTRADE CAPPING



SKETCH SECTION OF COVED SKIRTING IN KITCHEN



SKETCH SHOWING KITCHEN



DESIGNED BY OSCAR A. BAYNE

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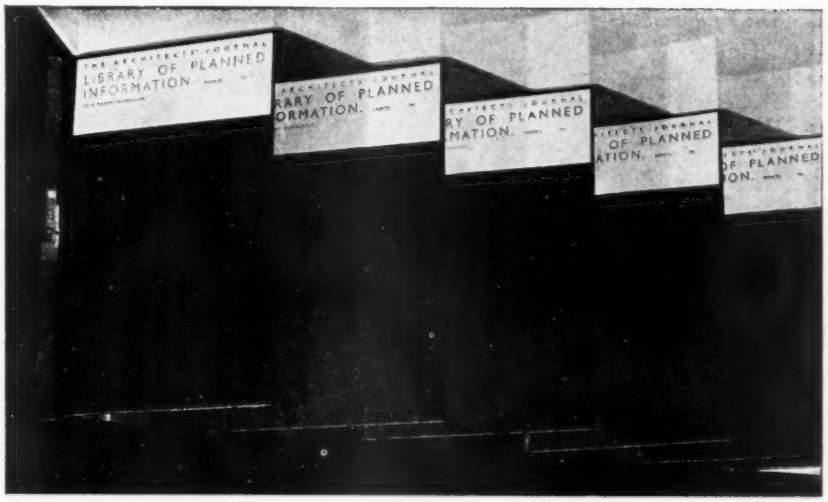
INFORMATION SHEET

SUPPLEMENT

SHEETS IN THIS ISSUE

607 The Equipment of Buildings

608 Water Heating



In order that readers may preserve their Information Sheets, specially designed loose-leaf binders are available similar to those here illustrated. The covers are of stiff board bound in "Rexine" with patent binding clip. Price 2s. 6d. each post free.

Sheets Issued since Index :

501 : Aluminium
502 : Fixing Blocks
503 : Approximate Estimating—XII
504 : Aluminium
505 : Aluminium
506 : Approximate Estimating—XIII
507 : Plumbing : Jointing of Copper Pipe
508 : Roofing—Valley Flashings
509 : The Equipment of Buildings
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511 : Elementary Schools—II
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559 : Flashing
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603 : Hot Water Boilers—III
604 : Gas Cookers
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606 : Heating Equipment

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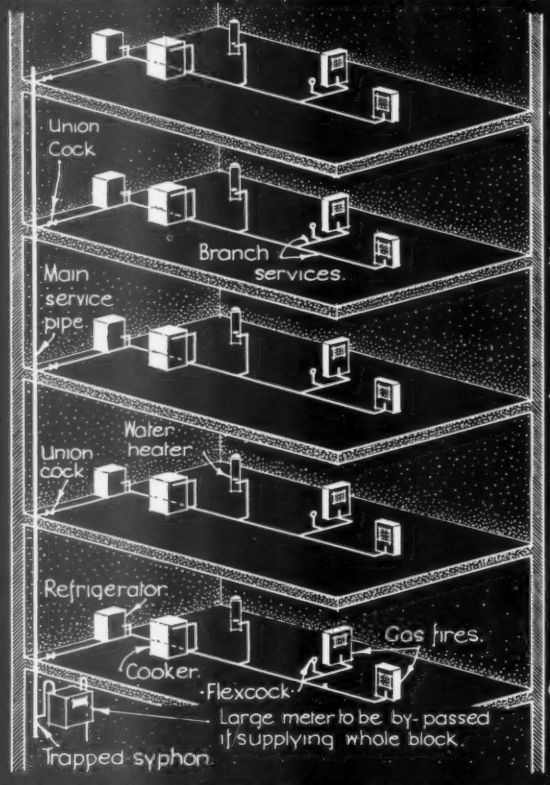
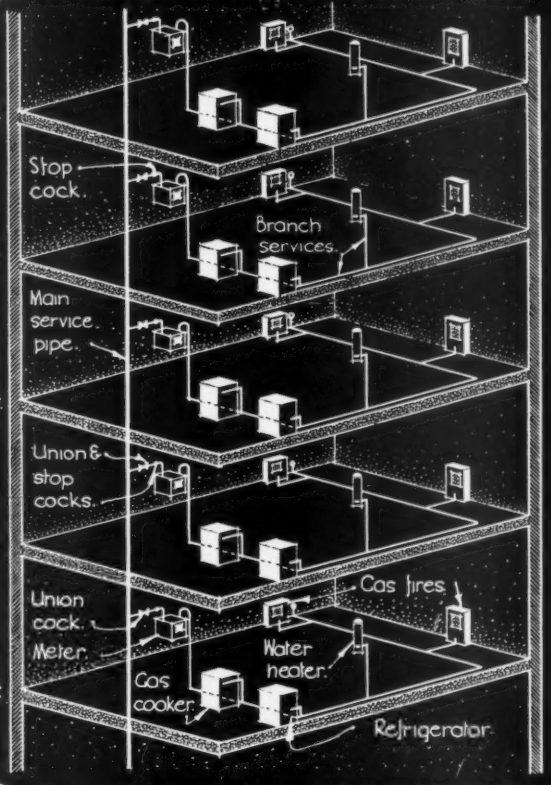
TYPICAL METHODS OF GAS SERVICING LARGE BLOCKS OF OFFICES & FLATS BEFORE THE SUBDIVISION OF THE FLOORS.
All branch service piping may be run in the thickness of floors or partition walls. Main service pipe should be run in a duct.

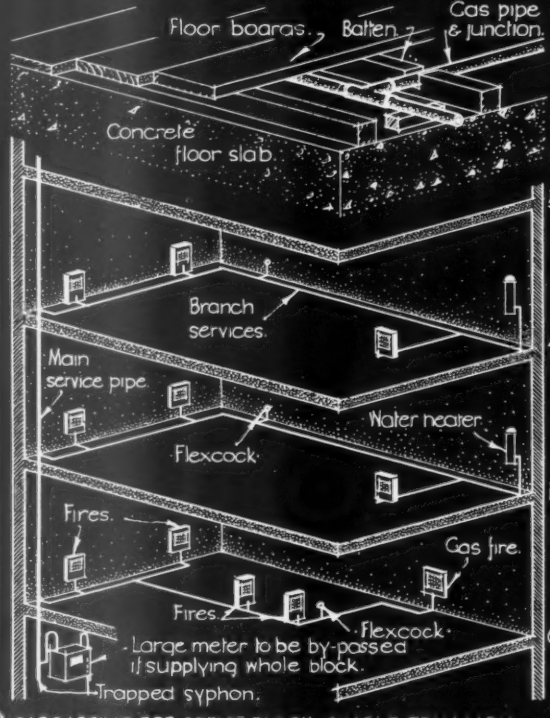


① CARCASSING FOR BLOCK OF FLATS WITH SINGLE METER.



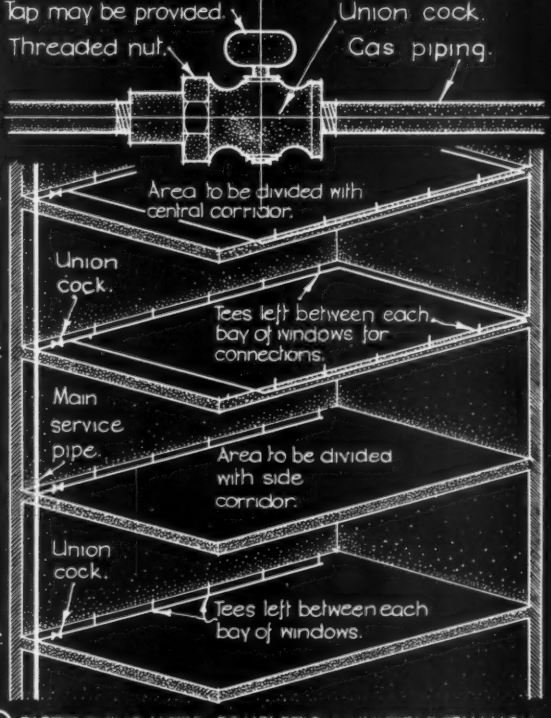
② CARCASSING FOR BLOCK OF FLATS WITH SEPARATE METERS.

DIAGRAM SHOWING GAS PIPING IN POSITION.



③ CARCASSING FOR OFFICE BLOCK, SINGLE TENANCY.

DETAIL SIDE ELEVATION OF UNION COCK.



④ PARTITIONING AFTER COMPLETION, MULTIPLE TENANCY.

Issued by The British Commercial Gas Association.

INFORMATION SHEET : THE EQUIPMENT OF BUILDINGS : CARCASSING MULTISTOREY BUILDINGS N°7
SIR JOHN BURNET TAIT AND LORNE ARCHITECTS ONE MONTAGUE PLACE BEDFORD SQUARE LONDON WC1. Erica A. Boyne

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INFORMATION SHEET

• 607 •

THE EQUIPMENT OF BUILDINGS

Subject : Gas Installations.
Carcassing to blocks of Flats and Offices.

This is the seventh of the series of Sheets on the installation of gas services in buildings. The Sheet deals with carcassing in a block of flats and an office building.

General :

The carcassing of large buildings may be grouped under three headings :—

(1) Buildings occupied by one tenant only, or in which the cost of the gas supplied to each tenant is included in the rental, requiring only one main meter.

(2) Buildings in which each tenant has a separate meter.

(3) Buildings in which the requirements of the tenants are not known until the building is partitioned after completion.

Types 1 and 2 are easily dealt with, but type 3 requires careful consideration. It should be so carcassed that even if the floor area is divided into the smallest possible unit, each unit should be crossed by a pipe. Since partitions are usually only placed between windows, the best practice is to provide connections between each window.

It is advisable in buildings of type 3, to keep fittings such as fires or flexcocks on outside walls, since partitions in office blocks are liable to be altered periodically. Water heaters, usually in lavatories in such buildings are not likely to be moved, or wanted elsewhere.

Flats.—It is unusual to alter the planning of flats after completion, so that the difficulties in 3, above, do not arise.

The main service pipe should be run in a duct easily accessible from outside the flat or office. Branch services may be run in the thickness of floors or partition walls. A separate control cock should be fitted close to each appliance, apart from any control on the appliance itself. Condense traps should be fitted in an accessible position at the foot of long vertical pipes, and all horizontal services should fall slightly towards these condense traps. Where a single large meter supplies a block of flats or offices it is necessary for it to be by-passed.

Detail 1.—This shows the carcassing to a series of flats in a multi-storey block, in which the gas supplied is measured by one large meter. A riser runs the full height of the building and branches are taken off at each floor level, each having a double connector near the riser, accessible from outside the flat for the purpose of cutting off the supply should the flat be unoccupied.

The diagram shows the branch service supplying a gas refrigerator, cooker, water heater, two gas fires, and a connector or flexcock for portable apparatus. A point should be provided adjacent to all coal fire grates for a gas poker. Additional fittings can, of course, be added as required.

Detail 2.—In this detail each flat of the block, is shown with a separate meter, which may be either the ordinary or pre-payment type.

As before, the main riser runs the full height of the building, and branches are taken off at each floor level to the meters. A double connector and stopcock are fitted between the main and the meter. The apparatus shown will vary according to requirements.

Detail 3.—This detail shows an office building in which the cost of the gas for heating is included in the rental, only one meter being required. The carcassing is similar to the block of flats in Detail 1.

The apparatus generally required is fires, water heaters (in lavatories) and flexcocks for portable heaters, and rings for boiling water.

Detail 4.—When the floor space of a building is to be divided after completion into suites of offices for different tenants, the branch services from the main should be run to serve each floor. Plugged tee pieces should be left at each pier between windows, in floor or skirting traps for easy connection, and the service to each floor should have a connector and stopcock adjacent to the main service pipe, so that the gas can be turned off in one flat or suite of offices without interfering with the other tenants.

Calculation of Meter and Pipe Sizes for Gas Appliances :

The size of the meter and carcassing in a gas installation depends on the number of cubic feet consumed by the apparatus over a given period of time, usually taken as one hour. The calorific value of gas is usually 500 B.Th.U.'s per cubic foot, and one therm always contains 100,000 B.Th.U.'s.

Meter Sizes.—Gas consumption is roughly proportional to the cube of the buildings, and for very rough approximations of meter size, the maximum rate of consumption in cubic feet per hour is between 1/40 to 1/50 of the cubic content of the building.

Pipe Sizes.—When calculating pipe sizes for carcassing it is necessary to consider not only the volume of gas required by the apparatus, but also the pressure of the gas in the main. The flow of gas along a pipe is naturally accompanied by a loss of pressure. This loss of pressure, other things being equal, being greater the smaller the pipe. The pipes should always be selected so as to ensure that with the maximum flow of gas the pressure of the gas at the point of combustion shall be adequate and preferably not less than 3 ins. water gauge. Where there is insufficient room for one large riser it is often possible to substitute two smaller pipes preferably spaced at opposite ends of the installation. The use of two risers sometimes permits of a reduction in the size of the horizontal distributing pipes and may lead to a better distribution of gas in the building.

Note.—Where neatness requires a pipe smaller than ⅜ in. diameter, the use of copper is desirable.

The use of tees, elbows, etc., in a pipe run increases the friction in the pipe, and the following table shows the friction added by fittings and bends expressed in equivalent lengths of straight pipe.

Nominal Diameter of Pipe in ins.	Elbows	Tees	90° Bends
⅜ in. to 1 in....	2 ft.	2 ft.	1 ft.
1¼ ins. to 1½ ins.	3 ft.	3 ft.	1½ ft.
2 ins.... ...	5 ft.	5 ft.	2 ft.
3 ins.... ...	8 ft.	8 ft.	3 ft.

The size of pipes should always be calculated so that when the demand is at maximum, the pressure of gas at every appliance is adequate.

Generally, the lowest pressure in the main at maximum demand may be taken at 3 ins. water column gauge, and most modern heating appliances require 2½ ins. water gauge pressure at the tap for efficient working. This allows a maximum pressure loss of half an inch, or 5/10 in., between the main and the appliance, which may be accounted for as follows :—

Service pipe from main to meter ... 1/10 in.
Meter ... ... 2/10 in.
House piping ... ... 2/10 in.

In some cases the maximum demand may be the aggregate consumption of all the appliances installed, as in a factory, whereas in a private house it is unlikely that all the appliances will be in use at one time, so that maximum demand might be only two-thirds of the aggregate consumption of the appliances.

The table below gives data for determining the size of pipe for supplying individual appliances under normal circumstances.

Formulæ by which the discharge of gas through pipes may be determined are used by gas engineers, but for the purpose of deciding on approximate pipe sizes for preliminary carcassing schemes, the tables given are more convenient and of quite sufficient accuracy.

Issued by : The British Commercial Gas Association
Address : Gas Industry House, 1 Grosvenor Place, S.W.1
Telephone : Sloane 4554

Table showing Discharge for Straight Horizontal Pipes in Cubic feet per hour

Based on a differential pressure (or pressure loss) of 3/10 in. and is valid for gas of a density of 0.40 to 0.50 relative to air. Figures refer to B.S.S. steam weight tubes.

Size of Pipes in Inches (nominal Bore)	Length of Pipe in feet															
	10	20	30	40	50	60	70	80	90	100	125	150	175	200	250	300
⅜ ...	55	39	32	—	—	—	—	—	—	—	—	—	—	—	—	—
½ ...	108	76	62	54	—	—	—	—	—	—	—	—	—	—	—	—
¾ ...	225	160	130	110	100	92	83	—	—	—	—	—	—	—	—	—
1 ...	470	330	270	235	210	190	175	165	155	145	—	—	—	—	—	—
1¼ ...	930	655	535	465	415	380	350	330	310	295	260	240	220	205	185	170
1½ ...	1,300	920	750	650	580	530	490	460	435	415	370	340	310	290	260	240
2 ...	2,640	1,865	1,525	1,320	1,180	1,075	995	930	880	835	745	680	630	590	530	480
2½ ...	5,055	3,575	2,920	2,525	2,260	2,065	1,910	1,785	1,685	1,600	1,430	1,335	1,210	1,130	1,010	925
3 ...	8,240	5,830	4,760	4,120	3,685	3,365	3,115	2,915	2,750	2,605	2,330	2,130	1,970	1,840	1,650	1,505

Pipe Sizing : These figures are those of maximum consumptions for the purpose of pipe sizing. They do not represent actual consumption rates or take account of the economies due to automatic or hand control. They should not therefore be used for calculating costs or comparing gas heating with any other heating agency.

Appliance Served	Approximate max. rate of Consumption in cubic feet per hour (C.V. 500 B.Th.U. per cubic foot)	Size of Pipe Required	Limiting Length of Pipe for Consumption given	Remarks
Refrigerator, 1 lighting burner, gas iron or bowl fire.	6	⅛ in.	6 ft.	Surface work only ¼ in. where chased in walls.
Up to 3 lighting burners ...	10-15	¼ in.	15 ft.	—
Low gas rate storage heater	10	¼ in.	18 ft.	—
Small cooker	50	½ in.	20 ft.	—
Larger cooker	100	¾ in.	20 ft.	—
Fire—10 rads	40	½ in.	30 ft.	Smallest diameter pipe under floorboards.
Wash copper	40	½ in.	30 ft.	—
Small circulator	30-40	½ in.	30 ft.	—
Fire—12 rads. (or more) ...	50	¾ in. ½ in. for short length.	40 ft.	—
Circulator	60-80	¾ in. ½ in. for short length.	30 ft.	—
Instantaneous water heater	120 upwards	Not less than ¾ in.	—	—

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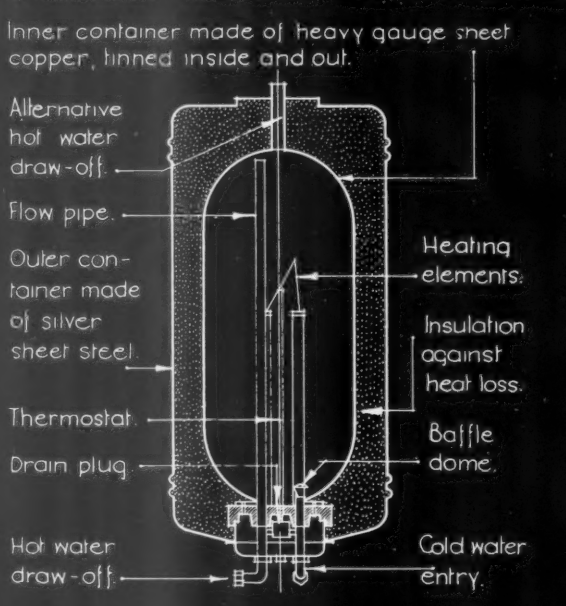
DIAGRAMS SHOWING SIZES AND MODELS OF THE SADIA ELECTRIC WATER HEATERS:



SECTION THROUGH THE PRESSURE TYPE HEATER SHOWING WORKING UNITS.

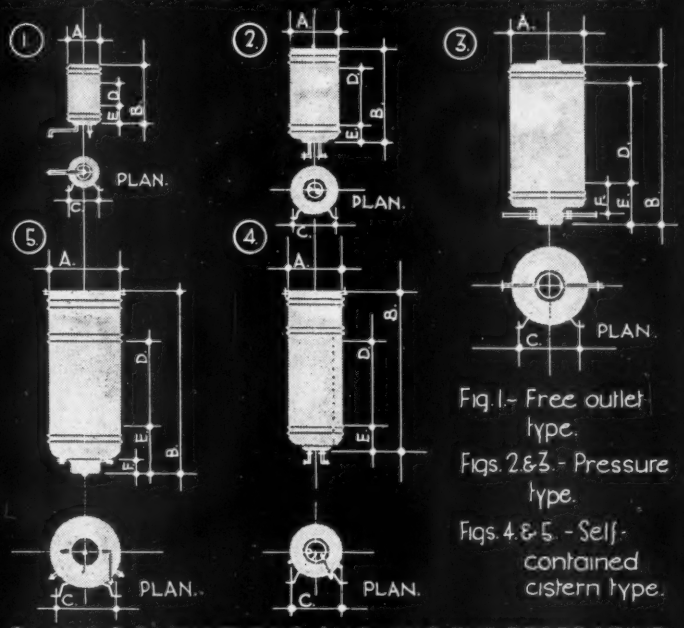


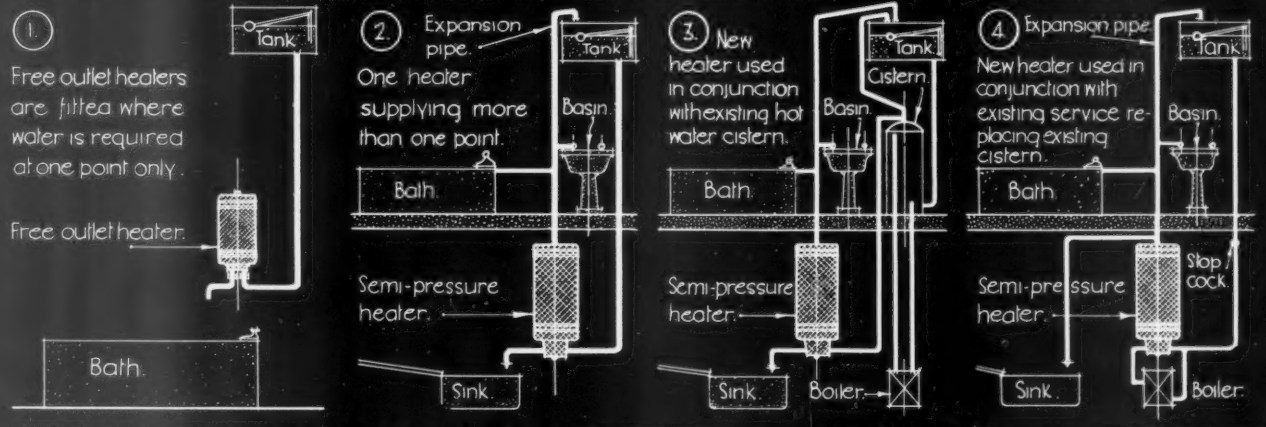
Fig. 1.- Free outlet type.
Figs. 2 & 3.- Pressure type.
Figs. 4 & 5.- Self-contained cistern type.

PLANS & ELEVATIONS SHOWING THE RESPECTIVE SMALLEST SIZE OF EACH TYPE OF HEATER.

Type.	Fig. No.	Gall-ons.	Water Joints.	Loading watts.	Dimensions in inches. A.	B.	C.	D.	E.	F.
G. GX. GXI.	1.	1½	½" G.	500.	9¾.	19¼.	9.	12.	3⅝.	—
H. HX. HXI.	1.	3	½" G.	500.	11.	25.	9.	12	6⅝.	—
B.	2.	5	½" G.	500.	13¼.	28.	12.	16.	6¼.	—
C.	2.	12	½" G.	1000.	16½	38.	15.	24.	7¼.	—
D.	2.	17.	½" G.	1200.	16½	50.	15.	35½	7⅝.	—
E.	3.	20.	¾" G.	1500.	20½	45.	17½	24.	13.	10½"
F.	3.	30.	¾" G.	2000.	20½	61.	17½.	40.	13.	10½"
BBT.	4.	5.	½" G.	500.	13¼.	35.	12.	16.	6¼.	—
CBT.	4.	12.	½" G.	1000.	16½	45.	15.	24.	7¼.	—
DBT.	4.	17.	½" G.	1200.	16½	57.	15.	35½	7⅝.	—
EBT.	5.	20.	¾" G.	1500.	20½	52.	17½	24.	13.	4.
FBT.	5.	30.	¾" G.	2000.	20½	68.	17½.	40.	13.	4.

A & B denote overall sizes. - C & D denote distances between fixing points. - F denotes the distance between the bottom of the heater and the centre line of the hot and cold water pipes in figs. 4 & 5. In fig. 3 it denotes the distance between the centre line of the fixing brackets and the centre line of the hot and cold water pipes.

TABLES GIVING MODELS, SIZES, CAPACITIES AND WATTAGE OF HEATERS:



1. FREE OUTLET. 2. SEMI-PRESSURE. 3. EXISTING SYSTEM (with existing hot water cistern.) 4. EXISTING SYSTEM (without existing hot water cistern.)

METHODS OF CONNECTING PIPEWORK AND HEATERS FOR VARIOUS INSTALLATIONS.

Information from Aidas Electric Ltd.

INFORMATION SHEET: AUTOMATIC ELECTRIC WATER HEATERS:
SIR JOHN BURNET TAIT AND LORNE ARCHITECTS ONE MONTAGUE PLACE BEDFORD SQUARE LONDON WC1. Oscar A. Bayne.

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INFORMATION SHEET • 608 • WATER HEATING

Product : The Sadia Automatic Electric Water Heaters

General :

This Sheet describes the construction of the wall mounting, cylindrical pattern Sadia Water Heaters and gives the overall dimensions of the standard sizes. The Sadia electric water heater is of the storage type and is entirely automatic in operation. Diagrams are given of the possible methods of connection and also a table which is helpful in choosing the correct size of heater.

Construction :

The Sadia consists of two cylindrical tanks, one inside the other, the intervening space being packed with specially treated regranulated cork for insulation.

The water container is made of heavy gauge sheet copper, with copper welded joints and is tinned, inside and out. It is tested twice during manufacture, in each case to 120 lbs. per sq. in.

The outer container is made of silver steel sheet, treated with anti-rust composition on the inside and finished externally in white enamel.

All working parts are mounted on a hot pressed manganese bronze plate fitted at the bottom, which can be removed for cleaning The heating elements and thermostat, which stand upright, are totally immersed in the water and can be withdrawn separately without emptying the water.

Heating Elements : Consist of spirals of nickel chromium alloy wire totally enclosed in steatite bobbins which fit neatly in the outer copper sheath. The surface of the elements is very large in proportion to the loading in watts. This gives a low surface temperature and retards fur deposits from hard waters.

Thermostats : For use with D.C. supply, a thermostat is fitted having a mercury switch. This mercury switch is set for correct operation when the Sadia is mounted perfectly vertical. This D.C. thermostat will work equally well on A.C. supply.

For use with A.C. supply only a thermostat is fitted having a quick break metallic contact. This type will not operate with D.C. supply.

Method of Operation :

All Sadia storage type heaters operate on the displacement principle, the cold water entering at the bottom and displacing the heated water which is drawn off from the top. A baffle dome is fitted over the inlet to prevent undue mixing of hot and cold water.

The inner tank is kept continuously and automatically filled with water from the house supply, and this water is maintained at a temperature of 175 deg. F. by the thermostat.

When hot water is drawn off, and its place automatically taken by the incoming cold water, the thermostat immediately switches on the electric current. The current remains on until the water temperature again reaches 175 deg. F., when it is switched off automatically. The Sadia is controlled entirely by the opening and closing of the hot water taps and no electric switch is necessary.

Types and Installations :

There are three general types, free outlet, semi-pressure and cistern types.

1. *Free Outlet*

This type of Sadia, figure (1) at the top of the Sheet, is fitted where hot water is required at one point only. The Sadia may be connected directly to the main if the water authorities in the district allow this. (The Metropolitan Water Board have approved the 1½ and 3 gallon Sadia for direct connection to their mains.)

The flow of water is controlled by a tap on the inlet pipe and is emitted through a swivel swan neck outlet spout.

Figure (1) at the bottom of the Sheet shows diagrammatically how this type of heater should be connected.

2. *Semi-pressure*

Figures (2) and (3) at the top of the Sheet show this type of Sadia, which is used to supply hot water at any number of points. The Sadia should be fitted nearest to the tap at which hot water is drawn most frequently (usually the kitchen sink).

The semi-pressure Sadia should be fed from a ball tank and an expansion pipe run from the highest point in the hot water piping to 12 ins. above the level of the water in this ball tank. Figures (2), (3) and (4) at the bottom of the Sheet show diagrammatically how the Sadia is connected, (2) when used on its own, (3) when in conjunction with an existing system, and (4) when used in place of the storage tank in an existing system.

Where the heater is to replace the existing tank, it must be of at least 20 gallons capacity and the flow and return pipes from the boiler must be at least 1 in. diameter.

3. *Cistern Type*

Cistern type Sadia heaters (shown by figures (4) and (5) at the top of the Sheet) are used for connection direct to the main supply where it is impracticable to feed the Sadia heater from the existing cold water tank or as occurs in some cases where no cold water feed tank is available.

This model is so designed that the excessive pressure that would be imposed on the Sadia by the water in the main supply, is reduced to a more convenient level by the addition of a separate "patented" ball tank. The water from the main supply enters the ball tank until it is full ; this water is then fed through a pipe to the inlet at the base of the Sadia proper.

The self-contained ball tank, which is made of copper and heavily tinned, is similar in shape to the heater and fits neatly on top, adding 7 ins. to the height.

The water in the ball tank is entirely heat insulated from the hot water in the Sadia.

All parts of the ball tank which come in contact with the water are tinned with pure tin. The ball floats and arms are also heavily tinned.

Capacities :

The Sadia water heater is of the storage type, the water being heated and stored ready for use when required. The capacity is determined by the maximum amount of water required during any short period of time. In addition, this capacity, plus the recovery rate, must satisfy the hot water requirements in the recuperation period after the maximum drawoff.

The table below gives the average outputs to be expected from the various sizes of Sadia heaters. The baths referred to mean 30 gallons at 100 deg. F., and where larger baths are to be dealt with, the heater size must be increased accordingly.

The average hot bath requires 30 gallons of water at 100 deg. F., and this can be provided by 12 gallons of water at 175 deg. F. mixed with 18 gallons of cold water. Hence, for bath supply the smallest Sadia that can be used is the 12-gallon size.

Particular care should be taken in estimating for installations such as shower baths, hairdressing saloons, etc., where possible waste may occur owing to the taps being kept running. Spring taps should be used for wash basins and showers in public convenience so as to prevent waste.

Guarantee :

All Sadia heaters are guaranteed against any faulty apparatus for a period of 12 months.

Ordering :

All orders should state the type of fittings required, voltage, and whether to be used with alternating or direct current.

Prices :

For A.C. Supply Free Outlet only

Type	Gallons	Price £ s. d.
G & GX & GX1	1½	5 0 0
H & HX & HX1	3	6 15 0
ASAD	1½	5 12 6
ASAD	3	7 2 6

Pressure or Free Outlet

Type	Gallons	With Union Pressure £ s. d.	Tap and Spout Free Outlet £ s. d.
B	5	8 16 0	8 16 0
C	12	12 15 0	13 10 0
D	17	15 0 0	15 15 0
E	20	19 10 0	19 10 0
F	30	26 5 0	

Heaters with self-contained ball tanks

Type	Gallons	£ s. d.
BBT	5	12 8 0
CBT	12	16 10 0
DBT	17	18 15 0
EBT	20	23 5 0
FBT	30	27 15 0

D.C. 11s. 3d. extra up to 5 gallons.
15s. extra for larger sizes.

Manufacturer : Aidas Electric, Ltd.
Address : Sadia Works, Rowdell Road, Northolt, Middx.
Telephone : Waxlow 1607
Telegrams : Aidaselect, Greenford, London

Capacity of Heater in galls.	Loading Watts	Recovery Rate Galls./hour	Maximum Output of Hot Water 175 deg. F. Per 8 hr. day	Per 12 hr. day	Remarks
1½	500	1¼	Galls. 11½	Galls. 16½	Kitchen sinks and wash basins where a large amount of hot water is not required at any one time.
3	500	1¼	13	18	
5	500	1¼	15	20	Sinks and wash basins of large size, where several gallons are required in quick succession.
5	750	2	21	29	
12	1,000	2¾	34	45	Will supply bath, basin and sink in a small residence. Gives one bath, morning, afternoon and night, or alternatively will supply the normal domestic hot water requirements for washing up, etc., during the day, and one bath in the evening.
17	1,500	4	49	65	This is the normal size of heater for the small household. It will provide two small baths in quick succession, or alternatively one normal size bath in the morning, the usual domestic hot water requirements during the day, and two baths in the course of the evening with an interval of two or three hours.
20	1,500	4	52	68	This heater will give two medium-sized baths in quick succession, and is the normal size for a household requiring one bath in the morning, domestic supply during the day and two baths in the evening.
20	2,000	5½	64	86	
30	2,000	5½	74	96	Will give two really large baths in quick succession, or three medium-sized ones. Suitable for a household requiring two baths in the morning, domestic supply during the day and two or three baths in the evening.
30	3,000	8	94	126	

SCHOOLS

Senior Schools

A gymnasium at a German school. In the provision of well-equipped gymnasia, Germany is considerably ahead of this country.

PLAN UNITS: GYMNASIA

HITHERTO assembly halls have been almost universally used also as gymnasia in Senior Schools, but the Board of Education no longer regard this practice favourably. It prevents the use of the hall for other and more suitable purposes, it disturbs other classes, it makes the planning of adequate changing and lavatory accommodation difficult, and it wastes time clearing away apparatus. And halls can rarely be fitted for full gymnastic training.

The importance of a continuous system of physical training for all classes, in conjunction with a growing concern over national standards of physique, will probably lead to separate gymnasia as part of the normal equipment of Senior Schools.

A good deal of noise is generated in and around a gymnasium and this is a strong reason for detaching the unit from the main buildings. In addition, if the gymnasium adjoins the playing fields, changing-rooms can be used for games as well as for gym., and if it adjoins the hard playgrounds these can be easily used for outdoor physical training.

Size

For classes of about 30 an area of 60 ft. by 30 ft. should be the minimum, and where larger classes will be normal 70 ft. by 40 ft. is recommended. These sizes are in the clear, excluding piers and radiators.

The height to a flat ceiling should be between 16 ft. and 17 ft., with a minimum of 15 ft. to the soffits of trusses or beams.

Storage

A large storage room, at least 6 ft. wide, should be provided, preferably having access by double doors both to the gymnasium and the open air so that bulky equipment (horses, mats, etc.) can be easily moved in and out.

Windows

Provided that direct sunlight in the eyes of children using apparatus is prevented, a gymnasium cannot be too light. Continuous windows along both long sides are good. These windows can reach from ceiling level to a height just clearing the radiators, but in the case of fully continuous windows, the fixing of wall bars will need careful attention. Where not protected by wall bars windows less than 5 ft. from the floor will need wire guards.

Windows in end walls should be kept at least 9 ft. above the floor to avoid injury from ball games.

The maximum window area should be arranged to open outwards and open quickly. Winding gear should not be fixed on the face of piers

or in other obtrusive positions. On the side face of piers above the wall bars is one good position.

Roof lights are not desirable.

Artificial Lighting

The artificial lighting system should provide a good, fully diffused light over the whole gym.; 9-10 ft. candles is suggested.

Pendant lights are undesirable, the best type of fitting being set flush in the ceiling. Spherical fittings with reinforced globes fixed direct to the ceiling are also satisfactory.

White ceilings, walls with a white frieze 3 or 4 ft. in depth, and the remainder of the walls yellow or buff, is a suitable colour scheme for lighting purposes.

Heating

The gymnasium should be maintained at a steady temperature of 50–55 deg. Low-pressure hot water radiators are usually the cheapest heating system, and it is particularly desirable that they should be recessed in walls and all pipes run under the floor.

Ventilation

There should be good cross ventilation, and in addition two efficient roof extract ventilators.

Floor Finishes

The gymnasium floor is of the greatest importance in view of the wear it receives. The perfect wood surfacing has not been discovered as soft woods tend to splinter and hardwoods to become slippery. An open-grained timber, such as oak, is the most generally satisfactory.

Sleeper walls and floor joists may be used with a small air-space below the joists in order to diminish drumming, and felting on the joists adds to resilience and lessens noise.

A sprung floor is entirely unsuitable.

The floor boards should be laid in narrow widths, well cramped and secret nailed. The tongues and grooves of the boards should be square-cut and not splayed. The floor boards should be run across the gym. and not down its length so as to diminish chances of slipping when running up to apparatus.

Wood block floors should not be used. They are tiring and tend to become uneven.

Wall and Ceiling Finishes

The walls should be finished with a plain surface and be free from all dust-holding ledges; plain plaster, enamel, or oil-bound distemper on fair face brick are most suitable. If cavity walls are used the inner leaf should be 9 ins. if apparatus is to be fixed to it direct, but fixing beams or channels spanning between stanchions can also be used.

Ceilings should normally be flat. Where trusses or beams project below ceiling level they should be cased to avoid dust ledges.

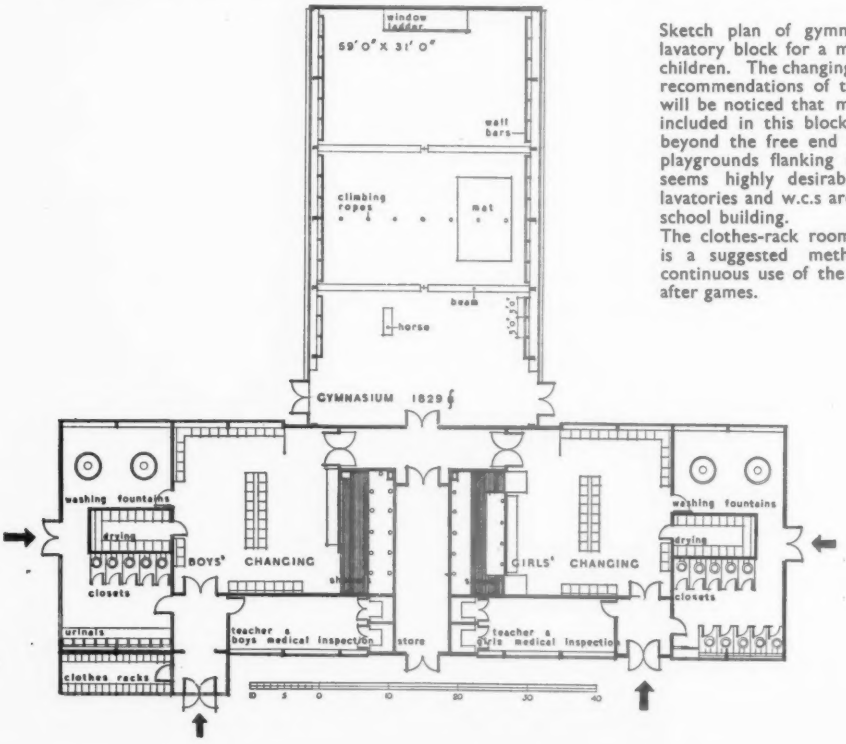
Equipment

The smaller equipment will not usually concern the architect. Fixed equipment, however, and fixings for a great deal of movable equipment must be carefully considered in the plan and construction of the gym. The principal apparatus to be set out is :—

Wall Bars.
Beams.
Climbing Ropes.
Window Ladders.
Hooks for mats when not in use.
Shelves for beam saddles, etc.

A normal layout for the principal apparatus is shown on the accompanying plan. The apparatus is usually purchased from a specialist.

Certain apparatus is hung from the ceiling and provision for fixing should be discussed



Sketch plan of gymnasium, changing-room and lavatory block for a mixed Senior School for 480 children. The changing-rooms are modelled on the recommendations of the Board of Education. It will be noticed that main lavatories and w.c.s are included in this block ; the playing fields being beyond the free end of the gymnasium and the playgrounds flanking it ; such an incorporation seems highly desirable. Small "emergency" lavatories and w.c.s are also included in the main school building.
The clothes-rack room added to the boys' wing is a suggested method of providing for the continuous use of the changing-rooms before and after games.

SCHOOLS

with the apparatus manufacturer, particularly in the case of reinforced concrete construction.

In order to allow for sufficient wall apparatus doors should be few in number and, in the long walls, be placed as near as possible to end walls. One end wall should be blank and openings in the other not more than two.

Changing-rooms

Changing-rooms, when provided for a gymnasium—and a gymnasium without them is almost entirely useless—are normally used for playing fields also, though Senior Schools which have both gymnasia and playing fields are still rare.

When changing-rooms are being used in connection with physical training, the normal unit is a class of 35–45, and for a school of 480 children two changing-room blocks (one for each sex in mixed schools) is adequate. Classes use the gym. one at a time in school hours, and if changing-rooms are equipped with seat space, pegs and boot racks for 45 children, there will be no difficulty in storing ordinary clothes during physical training.

When changing-rooms are used for games, however, a different situation arises. If a Senior School of 480 children has reasonable playing field accommodation which is fully used, 150 or more children may use the fields at the same time, and the problem of changing-room accommodation then becomes serious.

Three solutions are possible :—

(1) To provide changing-room space for all children likely to be playing at the same time. A costly method.

(2) To stagger slightly the times of changing and to equip changing-rooms for " continuous use," on the swimming bath principle, providing numbered racks for clothes. A solution which does not yet seem to have been tried.

(3) To do as in (2), but to equip coatrooms with lockers in which ordinary clothes and shoes can be stored during games. A method possessing serious faults, but better than not using the playing fields to capacity.

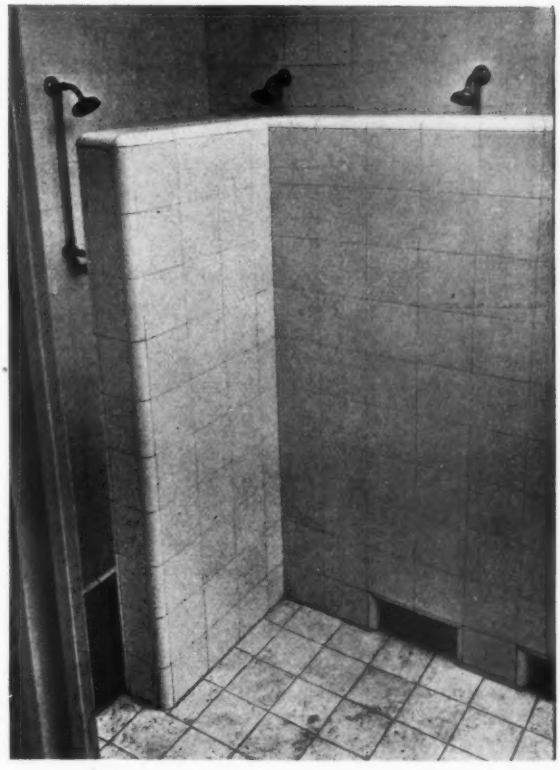
This problem, together with those of supplying, cleaning and drying games clothes must soon become very general, and it appears probable that while solution (1) is obviously the best, the second method might well be convenient in practice and, in the case of schools of 480 children and more, far cheaper.

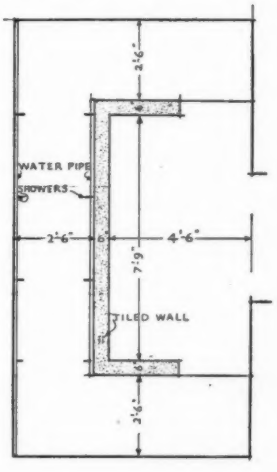
Such a " continuous use " store room for clothes is illustrated on the previous page.

Special Requirements

Units of the changing-room block as at present recommended are : *changing-room*, *showers*, *teachers' room*, large *store*. A gallery is not necessary and should not normally be included.

The Board of Education's *Memoranda on Gymnasia* (Physical Training Series No. 14) recommends a changing-room measuring 24 ft. by 10 ft. for 30 children and 24 ft. by 14 ft. for 40.



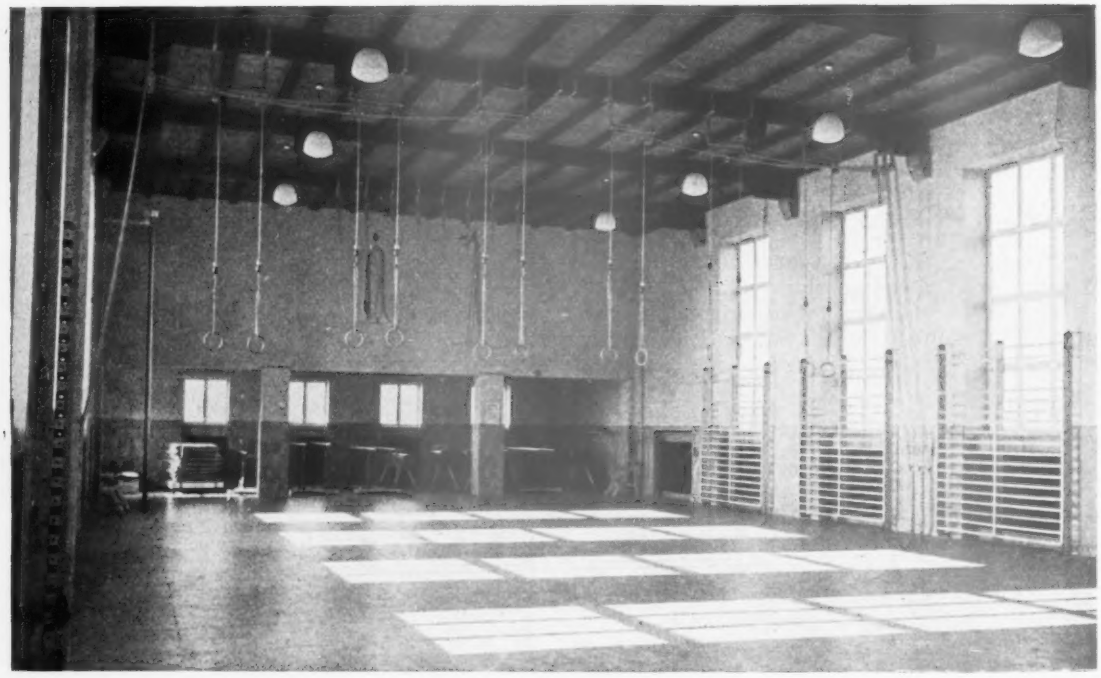


Detail and plan of the boys' showers at Linton Village College, Cambridgeshire. Architect, S. E. Urwin.

Benches 1 ft. 2 ins. wide should allow 1 ft. 6 ins. run per child. The floor should be of tiles or terrazzo.

Showers

A convenient size for the shower space is about 18 ft. by 8 ft. Fine sprays descending obliquely from the walls are preferable to overhead showers as they avoid wetting the hair. This is specially important in the case of girls. For boys, the compartment may be divided down the middle so that half the space is devoted to duckboard drip-space. Girls require more privacy and a central gangway with mackintosh-divided shower cubicles about 2 ft. 6 ins. square is the usual practice. Sprays should be supplied with a mixing valve so that the teacher can regulate water temperature. In the girls'



Gymnasium showing principal fixed equipment. It is important that provision for fixing equipment should be considered at an early stage in the design of a gym.

showers adjustable spray fittings that permit the child to control the height of the spray are desirable.

Teachers' Rooms

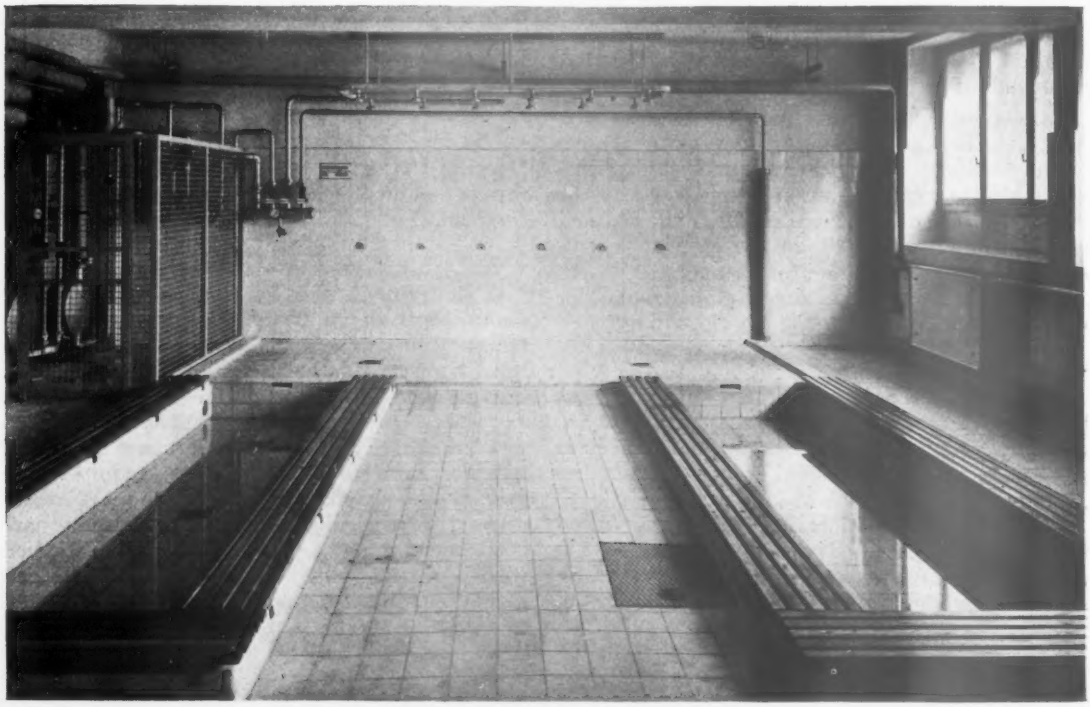
An instructor's room, or two rooms in the case of mixed schools, is necessary. It should be equipped with cupboards for the instructor's clothes and for small equipment.

When equipped with a small sink, couch and necessary storage accommodation for records, this room would serve effectively as a *medical inspection room.*

W.C. Accommodation

It has been so far assumed in the planning of gymnasia that children will use the ordinary school w.c. and urinal accommodation when attending gym. classes. The recent tendency to place gymnasia somewhat apart from the main block and adjoining the playgrounds and playing fields where these exist, makes it questionable whether w.c. accommodation should not be provided adjoining the changing-rooms. Gym. and play periods are times when w.c.s are most used and the grouping of the main accommodation near the gym., with supplementary units in the main building, seems a wise arrangement.

Girls' foot baths and showers in a Senior School at Vienna. The overhead sprinklers shown are inadvisable in this country where girls will not use the showers if they cannot avoid wetting their hair.



INFORMATION SUPPLEMENT

REFRIGERATION

[By E. H. BERRY]

BY 1938 domestic refrigeration may safely be assumed to have thoroughly established itself, and there is little doubt that in another ten years it will be almost universal in use.

The architect, therefore, should have at least a working knowledge of the principles involved, and of the costs and capacities of the various types; with so many makes and types available, however, he may be forgiven a certain bewilderment. It is the object of this supplement to clear up the position.

The above illustration shows an exceptionally well planned lay out. The refrigerator on the left is well placed in relation to the central table and preparation table adjacent to the cooker.

The necessity for refrigeration is outlined, followed by some explanation of the principles, while tables give details of available models in the domestic and built-in field, with scale drawings of a few typical models. Comparison is made between the absorption type, whether heated by oil, gas or electricity, and the mechanical compressor type, the old ice-box and the more recent dry cold in the form of solid carbon dioxide.

What is Refrigeration?

Refrigeration is the storage of perishable foodstuffs at temperatures which prevent the multiplication of bacteria which cause putrefaction. It has been proved that temperatures between 40 and 50 deg. Fahr. prevent the growth of bacteria, and are satisfactory for the storage of food in ordinary circumstances.

In every generation there are always those who assert that what was good enough for their forefathers is good enough for them. Even today, with radio, electric light and the telephone, some people still refuse to take to refrigerators.

Yet we no longer grow our own food in our own gardens, neither do we possess the cellars and cool wells our grandfathers had available for food storage. Today, food travels thousands of miles to markets, and refrigeration is called in to preserve it during the journey, in the wholesale store and at the retail shop before purchase. Obviously, the next step is for every home to be equipped with refrigeration, so that food may be kept in perfect condition until it is eaten.

Commercial and Domestic Refrigeration

Refrigeration may, roughly, be divided up into two classes, commercial

and domestic. Commercial refrigeration includes the large-scale plant installed in the ships which bring meat from abroad, in the large cold stores in such places as Smithfield Market, and so on down to the smaller plants which the retail butcher and dairyman employ.

Commercial refrigeration has been developed to a fine art. The subject has been investigated so thoroughly that it is now known how to store and keep practically every kind of perishable food in good condition.

All this development has taken place in the science of refrigeration, yet the public in general still defies the fact that this protection ceases as soon as the food reaches the larder.

The Use of Preservatives

Formerly the retailer used certain preservatives, such as benzoic acid and sulphur di-oxide, but these are now limited.

The Government has realized the importance of fresh food to the public—realized that it was not safe to allow food retailers to use preservatives beyond certain limits. By the Public Health (Preservatives in Food) Regulations, which affect such important foods as butter, cream, eggs, meat, bacon and ham, etc., the amount of preservative is restricted and so refrigeration is vitally necessary to prevent spoilage.

These regulations state definitely that : " No person shall manufacture for sale or sell any article of food which contains any added preservative " beyond specified proportions. It defines the word " preservative " as :—

"Any substance which is capable of inhibiting, retarding or arresting the process of fermentation, acidification, or other decomposition of food, or of masking any of the evidences of putrefaction."

(Part 1. Par. 2.)

Refrigeration has superseded these added preservatives ; keeping the temperature of the food store below 50 deg. F.—above which putrefaction begins—arrests food decay and makes the storage of most foodstuffs possible for any length of time.

As a general rule, the architect is not worried to any extent with problems connected with large cold storage plants, and at any rate experts are available should the need for their advice arise.

Domestic Refrigeration

Obviously, if refrigeration has superseded the use of preservatives, it is desirable for homes to be equipped for the continuation of the ideal conditions that have usually been provided for the food before it reaches the housewife. All this care may be nullified in a few hours if food is stored in the ordinary larder.

It is well known that the temperature of a safe larder should not be higher than 50 deg. F. and not lower than 32 deg. F., and that the humidity must not be excessive. In point of fact there are only twenty or thirty days in the year when perfect conditions exist in the average larder. A refrigerator maintains them indefinitely.

Food can be preserved in other ways, but not so effectively. It can be dried or pickled or canned, but these methods are only a small contribution to the problem.

The ordinary larder does not provide the necessary conditions to ensure the safety of the food stored therein from decay every day throughout the year.

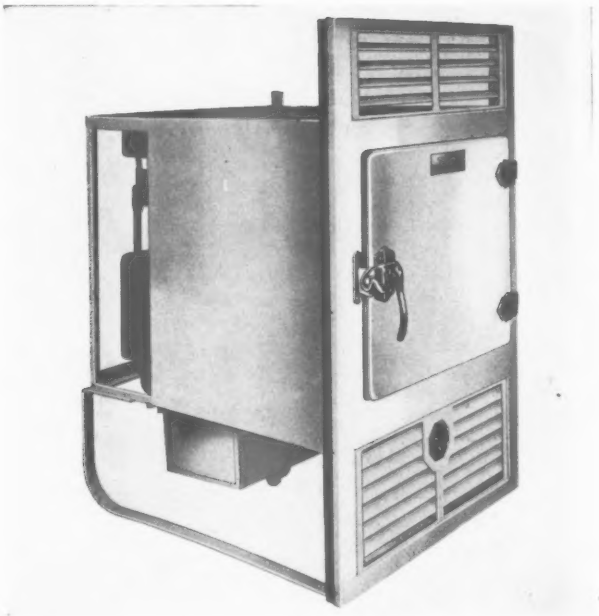
For most of the year, either the temperature is too high, or the humidity of the atmosphere is too great for the perfect preservation of food.

The Vanishing Larder

Just as the centre of interest in these servantless days has shifted from bathrooms to design of the kitchen, so the larder is passing.

Foods destined for human consumption are now sharply divided into perishable and non-perishable. No larder, with north aspect, slate or marble shelves and ventilating grille is required for the non-perishable. On the other hand, the passing of legislation prohibiting the use of preservatives such as boric acid and formalin has intensified the necessity for providing some definitely cooled space.

Artificially-cooled space means expense, but an expense for which most clients get a more than adequate return. The smaller size of modern families, together with the wide range of " canned " goods available, has very considerably reduced the volume of perishable foods in the home and a comparatively small volume of cooling space is required. This can usually be provided for a charge which is within the means of the tenant of moderate means, even of those whose income is of the £250 p.a. class. Incidentally, the growth of the cocktail habit, an increased consumption of salads and the popularity of ice-cream have all assisted to persuade the average householder that some form of refrigerator is more a necessity than a luxury.



The gas-operated " Electrolux " specially designed for " building-in." The sledge construction facilitates pushing and removing and shows attention to detail. The louvres above and below the door permit of free ventilation to cool the condenser.

Freezing Foods Not Necessary

It must be realized that a refrigerator need not, and in most cases should not, freeze the food to be preserved. It must be emphasized that in most cases the freezing of foods is definitely deleterious. The freezing chamber is provided for the convenience of the user who desires to make ice or ice cream. A temperature of about 40 deg. to 50 deg. F. is sufficient to retard the growth of harmful bacteria.

In a climate such as ours the same urgency for refrigerators has not been felt as in the more extreme climates experienced by America, the Continent and the Tropics. Nevertheless, the last three summers have brought domestic refrigerators to the fore, and many architects have felt the necessity for information about them.

Small Scale Types

Small-scale refrigeration falls into two types, the self-contained cabinet, and the centrally-operated unit. The latter, of course, is used in blocks of flats,

while the self-contained unit, by far the more common, is the type installed in private houses.

The architect will be called upon to decide, when a block of flats is to be erected, whether the units should be individual or centrally-operated. He will want to know the total capital cost of the two methods, while if the premises are to be let on rental, it will be necessary to know what refrigerator space can economically be provided for an increased rental of, say, half-a-crown a week.

Before it is possible to do this, it is necessary to have an outline of how refrigerators operate and of all types available with their relative merits and costs. The understanding of the complete theory of refrigeration is complex. If, however, we invert the general conception of what is meant by refrigeration, an understanding of its principles is simple.

Principles of Refrigeration

The principle of refrigeration is the same for all types of plant or installation, and consists of the removal of heat from the storage chamber and the goods stored therein. It is better to regard refrigeration in this way than to picture it as the production of cold. For instance, if you abstract heat from water it changes from the liquid state to its solid state—ice. A large and constant quantity of heat must be abstracted to bring this change about. Having abstracted this large quantity of heat from the water and made ice, if we wish to reverse the process we must give back a large quantity of heat to the ice to change it back to water. If now we have a cabinet containing foods we must abstract heat from it and its contents to make it sufficiently cool. If we introduce a lump of ice into this cabinet, the cabinet and its contents will gradually part with their heat to the ice which will be changed from its solid state to its liquid state—water. Basically, refrigeration depends upon a change of state of some substance from one state to another. This change, which requires the abstraction of heat, takes place at some convenient point. The substance, in a form which requires heat to regain its original form, is then supplied to the space it is required to use for refrigeration purposes. Ice was used for many years and is still quite extensively employed as a refrigerant in the ordinary ice-box. Ice has, however, certain disadvantages. It is bulky for a given quantity of cooling. You cannot produce ice by surrounding a vessel of water with ice.

There are available for this purpose certain salts which, when dissolved in water, produce a temperature sufficiently low to make ice. Equal parts of sal ammoniac and saltpetre dissolved in $2\frac{1}{2}$ times the same weight of water will produce a mixture some 12 deg.

A standard L22 Electrolux gas refrigerator with shortened legs built-in under a draining board. As a standard domestic model has been used, it has been necessary to provide the grille shown above the draining board to provide ventilation. This appears bad practice, for a cursory inspection suggests that water might easily be splashed through the grille.

Above, a "Coldair" model. This smaller domestic type can contain much more foodstuff than would be at first imagined.

Left, the B.T.H. International. The method of construction is such that the motor is sealed within the unit and is remarkably silent in operation.

below freezing point. The "freezing mixtures" and ice are, however, expensive, bulky, messy and, incidentally, not always easily obtainable. Eliminating these methods as not having the advantages of self-contained refrigerators, self-contained types available can be considered.

Motor-Operated Types

All self-contained self-cooling refrigerating machines operate by compressing some gas and removing the heat produced in the process. The compressed gas, which when cooled is usually in a liquid state, is then allowed to expand back to its gaseous condition in some chamber situated in the space it is desired to cool. It requires to take in heat to become a gas again and absorbs this from its surroundings.

The most generally used is the mechanical compressor type. In this type some non-inflammable gas is compressed by means of an electric motor driving a compressor until the pressure is such that when passed through a condenser it is liquefied. This liquefaction is usually brought about by the electric motor which drives the compressor also driving a fan to assist the dissipation of the heat from the condenser. This liquid gas is then permitted to flow through a chilling unit, in which the pressure is low. The liquid gas changes back into its gaseous form and, requiring heat to do so, abstracts it from the space it is required to cool. The following sketch shows in a diagrammatic form the operation of the self-cooled compressor unit.

In the sketch, "A" is the compressor, which may be of the piston type as shown, or of a more complex form. "B" is a valve which opens outwards from the cylinder, and "C" a valve opening inwards. "D" is the condenser in which the compressed gaseous refrigerant is cooled by a stream of air from a fan, or by water in some larger types. "E" is the valve which permits of a quantity of the refrigerant in pipe "G" to enter pipe "H."

"F" is the chilling unit in the cold chamber.

Before this apparatus can work, it must be charged with the selected refrigerant. The refrigerants most commonly used are sulphur dioxide, ammonia or methyl-chloride.

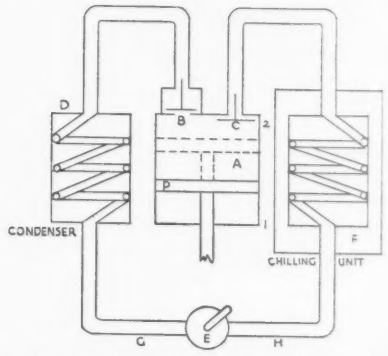


Diagram illustrating the operation of the compression type of refrigerator.

A neat example of a built-in gas-operated "Electrolux." The "framing up" in keeping with the unit fixtures gives a clean job. The grilles below and above are to permit of free ventilation. The absorption type require more energy in the form of heat, and as this must be dissipated attention must be paid to proper air circulation.

During manufacture the system is charged with a quantity of the gas in liquid form sufficient to fill "D" and most of "F" with liquid, the remainder of the space then being occupied by gas. All the air is expelled by the gas, and the whole is then hermetically sealed.

On starting the motor the compressor begins to operate. The piston "P," on moving from position 1 to 2, compresses the gas in "A," valve "C" closes, and valve "B" does not open until the pressure in "A" is greater than that in "D." On the pressure rising, valve "B" opens and the compressed gas, which cannot liquefy because of the heat generated during compression, flows into the condenser "D." Here the stream of cool air or water causes it to liquefy, and it flows through "G" and "E." The valve "E" opens and permits some of the liquid gas to flow through "H" to "F." "F" is filled partly with the refrigerant in liquid form and partly gaseous. On the piston moving from position 2 to position 1 the pressure is reduced in "A" and valve "C" opens with the pressure of the gas produced in "F" from the heat taken in from the cold chamber. When valve "C" opens the cylinder "A" fills with gaseous refrigerant ready to be compressed once again.

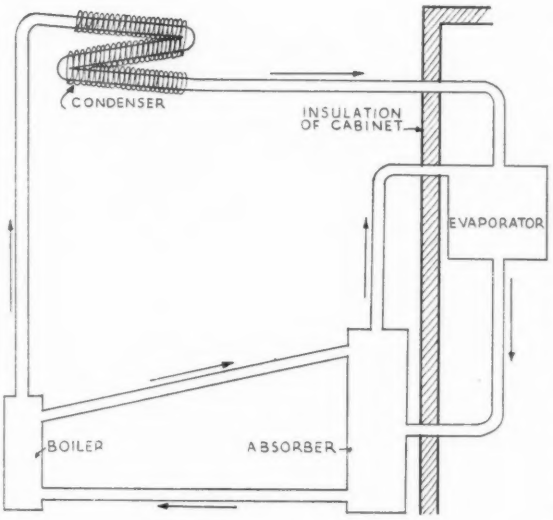
This process of compressing the gas, cooling to liquid, reducing pressure and taking in heat, expanding to gas again is repeated time after time until the cool chamber is sufficiently cold to cause the thermostat to shut off the electric motor which drives the compressor.

Principle of the Absorption Type

The other main type of small refrigerator is known as the absorption type. The working principle is exactly the same as in the compressor, but more difficult for the layman to understand, and the construction is entirely different.

While nearly all the mechanical compressor type use sulphur dioxide or methyl chloride as the refrigerant because of the relatively low pressures at which they liquefy, the reduced tendency to leakage at joints and the ease with which they liquefy by air cooling, the absorption type use ammonia. This medium is selected for the peculiarity that water at a low temperature dissolves several hundred times its volume of this gas, which can then be almost completely expelled on boiling the solution. This simplifies the apparatus. Instead of the mechanically operated compressor, we have a boiler containing a strong solution of ammonia gas in water. On applying heat, the gas is driven out of the water and collects in the cooling coils. As the system is sealed, the pressure rises sufficiently to bring about liquefaction of the ammonia gas. The coils are cooled by free air circulation in the smallest models or by water in the largest. The liquid gas then passes to the evaporation or chilling unit where, owing to the absorption of heat by the evaporator, it changes into its gaseous form again. It then comes into contact with a weak solution of ammonia which is kept cool, is reabsorbed, forms a strong solution, and is returned to the boiler. It is then ready to be driven off once again. Thus the cycle is complete.

In the Electrolux, which is manufactured by Electrolux, Ltd., the action is made continuous by an ingenious system of circulation. A stream of strong solution is constantly flowing into the top of the boiler, while the



Absorption Type Refrigerator

There are two refrigerators which are being sold at present which work on the absorption principle and will be more fully described later. One is designed to work with gas only (although an electrically-heated model has been manufactured in the past); the other is designed to work with electricity only. The gas-operated refrigerator works on the continuous absorption cycle. Its principle is shown in the diagram, the actual construction, however, being much more complex. The refrigerant used is ammonia, and the unit is charged with this gas at a pressure of some 180 lbs. per square inch. As there is no compressor, the refrigerant is absorbed in some liquid, water in this case, in which it is readily soluble. When heat is applied to the boiler, ammonia gas is driven off under pressure. The liquid contained in the boiler is known as strong solution. After the ammonia gas leaves the boiler, it passes through a condenser, usually air cooled. Because of the pressure existing in the unit the ammonia vapour condenses into liquid ammonia, after it has passed through the condenser. The liquid ammonia now flows by gravity into the evaporator. When it reaches the evaporator it meets a suitable quantity of hydrogen gas which has come from the absorber. In the presence of the hydrogen the ammonia is able to evaporate, and in consequence heat is abstracted from the cabinet. From the evaporator a mixture of ammonia vapour and hydrogen gas flows into the absorber, where it meets a weak solution of ammonia in water, which has circulated from the boiler. Note.—*This is known as "weak solution" because it has already parted with the ammonia gas originally contained in it. In the absorber, the ammonia is re-absorbed by the water, which then forms a strong ammonia solution, releasing the hydrogen gas which returns to the evaporator. The strong ammonia solution circulates back into the boiler again, keeping the latter supplied with strong solution, and once again the cycle recommences. The process is therefore continuous so long as heat is applied to the boiler. As there are no valves or moving parts in the whole unit there is nothing to go wrong. Simplicity is, however, gained at some expense of efficiency.*

weak solution after the gas has been boiled off leaves the boiler at the bottom. It then passes into the absorbing vessel, where it is cooled, strengthened and then returned to the top of the boiler. In the Electrolux a small gas flame is used to heat the boiler. Any other source of heat is equally suitable, however, whether derived from an electric heating element or a small oil flame.

The Intermittent Absorption Type

While the Electrolux unit is of the continuous absorption type there are available other intermittent absorption types.

Such a one is the Zeros, a product of Ismay Zeros, Ltd., Dagenham. In this type, employing the Normelli system, a sealed cylinder is filled with calcium chloride impregnated with ammonia. This hollow cylinder contains an electric heating element. The element is automatically switched on for 1½ hours in each eight hours by means of a time clock actuated by the electric supply. It will be seen that the current is only on for 4½ hours of the 24 hours in any day.

On the application of heat the ammonia is liberated from the calcium chloride in gaseous form. It then passes through the air-cooled condenser, where it is cooled and liquefied. It flows by gravity to the storage container, which holds sufficient liquid ammonia to serve the evaporation coils for 6½ hours cooling. On abstracting heat from the cooling cabinet the ammonia vapourizes, bubbles back through the liquid ammonia and is immediately re-absorbed by the calcium chloride. A constant temperature is maintained in the cabinet by means of a tank holding a liquid which surrounds the evaporator coils.

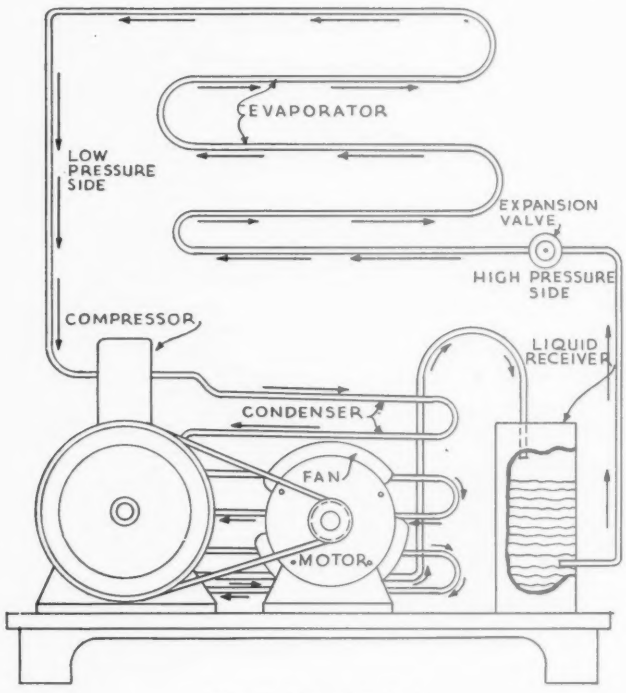
After the heating period is terminated by the automatic time switch, the temperature of the absorber-generator drops as the warm absorber is able to re-absorb the refrigerant, which now evaporates and produces cold. This cold producing takes place for 6½ hours and is concentrated in the cold storage box, which becomes a solid and permanent ice block and thus acts as a reserve of cold storage which ensures a constant temperature in the cabinet at all times.

Solid Carbon Dioxide Types

One other method which is being used to some extent and which is virtually a development of the old ice-box, is the cold box using solid carbon dioxide. This medium vaporizes immediately from solid to gas without going through a messy liquid intermediate stage as is the case with ice. Some 10,000 tons of this medium was sold in England last year, principally to travelling ice cream vendors. It is, however, popular abroad and reasonably cheap where a large quantity is produced and efficient distribution arranged. No fine control is possible, however, as is maintained by the thermostat in the self-cooled models. The cooling effect of the medium, which has a temperature o

Left, the new Master 2 type of Frigidaire. Selling at about £23, it is an attempt to put refrigerators within the reach of those who can afford a wireless set.

Right, a Kelvinator model suitable for the larger house. It has a large ice-making capacity, and is therefore useful to those who entertain frequently.



The Refrigeration Cycle

The term cold is purely relative and is used to express in a comparative way a degree of heat. Cold cannot be created and a refrigerating system does not produce cold, but is a method of extracting heat.

In mechanical refrigeration use is made of the fact that when a substance changes from a liquid state to a gaseous state, heat is absorbed, and vice versa.

The substance used in refrigeration is called the refrigerant, and is one that has a relatively low boiling or evaporating point. In most cases this point is so low that at normal atmospheric temperatures the refrigerant exists as a gas. When a gas is compressed, it gets hot, and if the compressed gas is cooled it turns into a liquid.

The complete cycle is as follows: The liquid refrigerant is circulated through a coil which is located in the space to be cooled. Although the temperature of this space is low, it is greater than the boiling point of the refrigerant. The refrigerant boils and changes into a gas, and in so doing absorbs heat from the space to be cooled. This coil is usually called the evaporator. The gas is next passed through a compressor, where it is compressed and where the temperature inevitably rises through the action of compression, just as the end of a bicycle pump gets hot when in use. The hot gas is passed through another coil, which is cooled either by air or water, and, being cooled, it condenses into a liquid. This second coil is usually called the condenser. The liquid is then circulated to the evaporator and the cycle begins again. The refrigerator thus consists of three essential parts, the evaporator, the compressor and the condenser.

minus 110 deg. F., is much greater than that of ice. A smaller cabinet is therefore possible. A block of some 20 lbs. is placed in a vacuum vessel with a metal plate at one end. A vent is provided to allow the carbon dioxide gas to escape as it is formed. The plate, which is intensely cold, sets up a downward current of cold air, which abstracts heat from the commodities to be cooled. As the air is then warmer, it gradually rises, again comes in contact with the cold plate and falls again. Ice cream can be made by putting a container as nearly as possible under the contact plate. A block of 20 lbs. will provide about a week's cooling, and as it can be bought for about 2s. 3d. the cost works out at about 4d. a day.

Defrosting

All refrigerators should be defrosted every one, two or three weeks, depending upon the type of freezing unit and kind of use, for the following reason. As the temperature of the cabinet is lowered, a critical point is reached—known as dew point—when moisture in the air inside the cabinet is condensed. As the freezer is the coldest part of the cabinet, condensation takes place at this position and later on the moisture is frozen. From time to time as fresh food is put into the cabinet and fresh moisture-laden air is admitted the frost gets thicker and thicker. Frost, however, acts as a heat insulator and gradually restricts the amount of heat which can be abstracted from the cabinet. When the frost is about ¼-in. thick it becomes necessary periodically to clean the frost from the freezer. This is known as "defrosting." By turning the control switch to the slowest freezing speed, or, in many cases, to the special position marked "defrost" the temperature of the freezer is allowed to rise. As soon as it gets above freezing point the frost melts and drips as water into the tray below. The freezer is then ready to be lowered to its normal working temperature and in some models is done automatically.

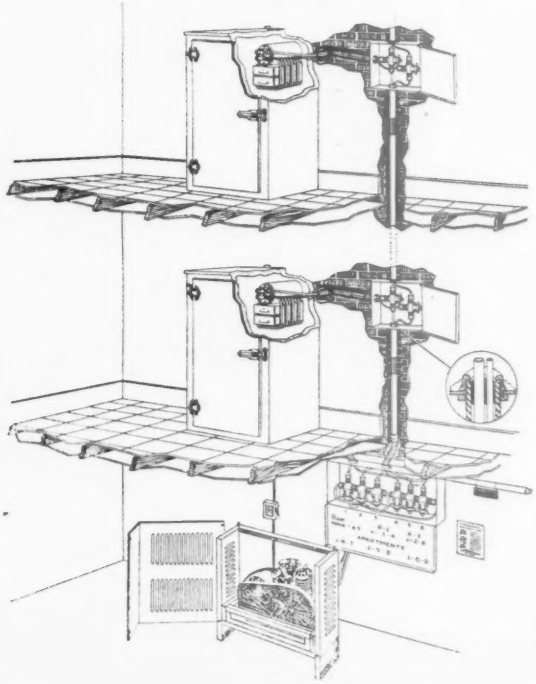
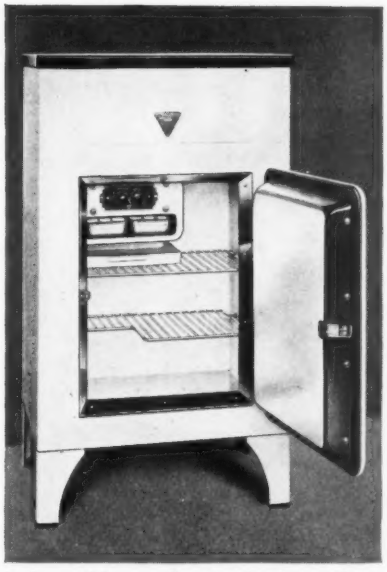


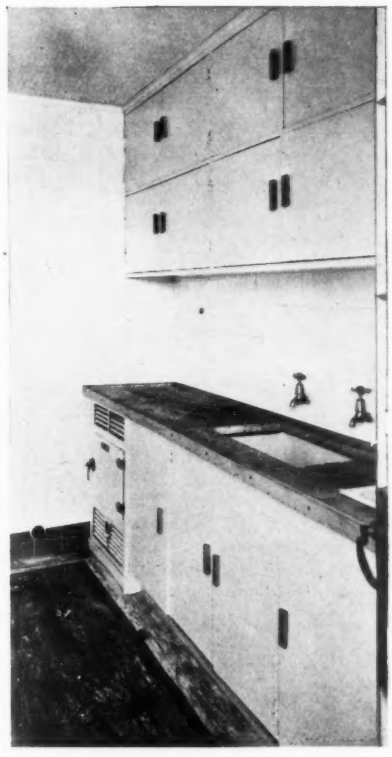
Diagram of central compressor installation as used for flats

Central Compressor Systems

The property owner or architect who is deciding whether he should provide a refrigerator as an added attraction to letting his flats or houses, will have to consider the various systems. If a large block of flats is under consideration there is a case for a centralized refrigeration plant. Centralized refrigeration has been widely used in the United States and two recent examples in London were those carried out at Lansdowne House and Arlington House.

In general, a 1 h.p. compressor will operate some 36 cabinets which vary





Left, packing an H.M.V. model. If packing is done with care the capacity is very large. The joint just visible in the bottom is stated to weigh 16 lbs. Centre, the "Prestcold" table top model is useful in a small flat, since it provides an additional preparation table. Right, the M2 "Electrolux" gas refrigerator "built in" under the draining board. The saving in first cost of the "built-in" compared with the portable domestic will pay for the cost of the draining-board.

in capacity in individual flats from some 3¼ to 5 cu. ft. If still larger refrigerators are required 24 cabinets of 8 cu. ft. will operate from the same sized compressor.

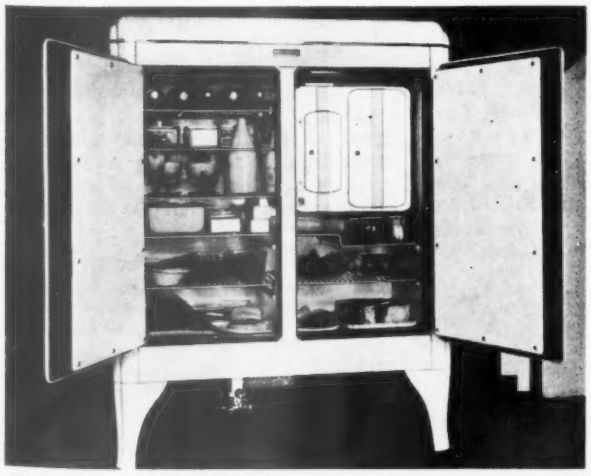
The running cost of such a central compressor supplying flats works out at the ridiculously low figure of some 6s. per annum per flat over a normal English year.

While in the multiple system the smallest, i.e. the 3¼ cu. ft. capacity, involves a slightly higher initial expenditure than if separate units were installed, all other sizes are cheaper, the P.C. provision for 8 cu. ft. capacity being only £33-£34 per refrigerator, as against some £50 to £60 for the same capacity of individual units.

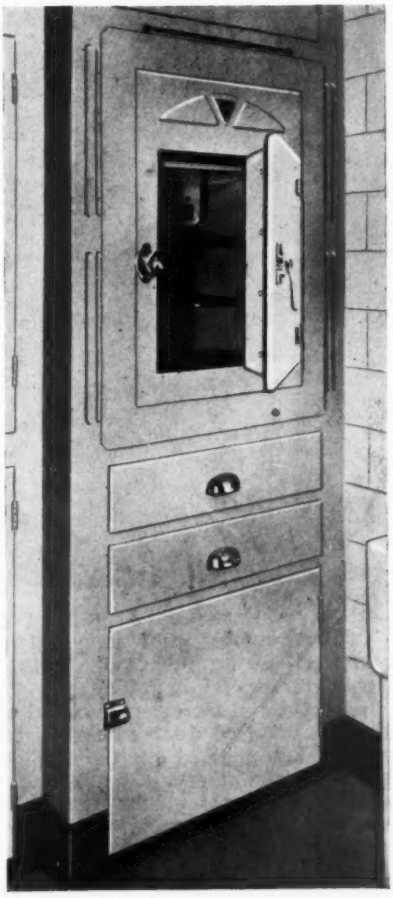
Actually, the multiple type of installation is rapidly gaining ground among property owners generally because of low initial and operating costs.

With this type of installation the compressor, or compressors, are installed in some position, such as a basement, and are under the control of the caretaker or maintenance staff.

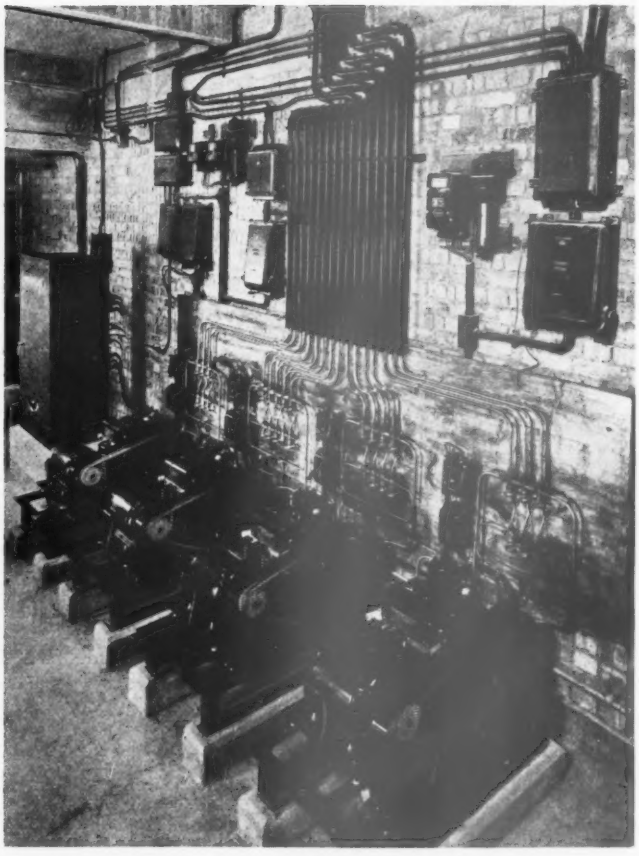
In these cases the proprietor usually assumes the responsibility for this service and it is included in his rental. That such a service can economically be provided will be gauged from the fact that flats rented at 23s. 6d. a week are so provided.



This gas-operated absorption type "Electrolux" contains a special quick cooling chamber at the top right. Here a lower temperature is maintained than in the main cabinet, while the adjacent and smallest chamber takes the usual ice-making trays.



Built-in models similar to that shown here are cheaper than the more expensively finished portable models. This one is mounted at a convenient height. This Prestcold model is one of a range to suit varying demands. The necessary ventilation is provided by the louvres shown on each side of the cabinet.



A neat central compressor installation. Some idea of the service demanded for modern high-class flats is shown by the number and size of the compressors.

A stainless steel sink and refrigerator unit. A number of models similar to this "Prestcold" are available in this unit form from other manufacturers. These units rest on the floor so that no inaccessible spots call for dusting and cleaning.

Two advantages, not immediately apparent, of central plant is that periodical general defrosting can be carried out and the tenants notified of it, or a standard day and time fixed and plainly marked on the cooling cabinet. The other advantage is that individual control of the supply of refrigerant to the cabinet makes it possible to cut off the service in the event of non-payment.

But there is one drawback. Central compressors, especially of the water-cooled types, must be located where they can be safeguarded from freezing temperatures during the winter months, and must receive intelligent attention on the part of the maintenance staff.

Maintenance Service

If architects or their clients do not wish to undertake the installation of central plants, there are at least two leading refrigerator manufacturers who are prepared to supply built-in refrigerators at a rental hire basis of some 2s. 6d. per week and guarantee service and maintenance for a period of five years. At the end of this period one of the manufacturers is prepared to relinquish all title and make it an outright purchase for a final payment of 10s.

This question of maintenance and service is an important one for the user as most refrigerators are sold under a one-year guarantee. Many of the better types of modern refrigerators are good for a twelve-year life, and some have been operated in such a manner on test as to have reached "breakdown" conditions after the equivalent of 37 years' normal use. Nevertheless, the possibility of trouble must be faced and hire maintenance with option to purchase represents "leaving the manufacturer to carry the baby."

Obviously, the supplier on these terms must have a good product and faith in it.

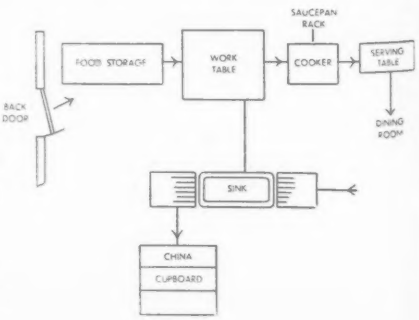
Capacity Required Per Person, and Costs

How to estimate the possible requirements of cooled space, and some details of costs and efficiencies should form a suitable conclusion to this article.

The most general figure, operating satisfactorily in practice, is to estimate at the rate of 1 cu. ft. per person. If the family is four (children count as half) then 4 cu. ft. is adequate capacity for the suggested refrigerator.

Comparing the absorption type with the compressor type, it is reasonable to assume that the absorption type will require from two to three times the energy that the compressor type does in the ordinary domestic sizes. This means to say that the running cost—other factors being equal—will be at least double. This applies to the absorption type generally, whether the medium of heating be gas, oil or electricity.

Twice or three times the energy must be supplied to refrigerate the same space. In general also, the speed of freezing is longer, usually three times as long being required to produce a given volume of ice. Nor can the speed of freezing be accelerated



over such a wide range, and with such close control. In the smallest sizes the absorption type is also more expensive initially for the same internal volume as a mechanical compressor type. For instance, mechanical compressor types are offered at £29 8s. for a 3·8 cu. ft. capacity, as against £29 10s. for a 2·2 cu. ft. capacity in the absorption type. This represents a 50 per cent. increase in capacity for the most popular sized model for the same expenditure if a mechanically operated type is purchased.

While some mechanically operated types claim to use some half unit of electricity per 24 hours—i.e. if electricity is 1d. per unit the cost is only ½d. per day to run, it is more usual to assume that up to 6 cu. ft. the mean average consumption is one unit per 24 hours. This figure can be accepted and is, if anything, on the high side.

(*continued on page 428*)

REFRIGERATOR TYPES*

Make	Reference	Motor	Refrigerant	Cubic Capacity	Price	Remarks
					£ s. d.	
Aerofrige	No. 3	1/6 h.p.	SO_2	3·5	29 8 0	
Aerofrige	No. 1	1/6 h.p.	SO_2	5·3	37 16 0	
Apex-Vactric ..	A–301	1/5 h.p.	SO_2	3·01	30 0 0	
Apex-Vactric ..	B–410	1/6 h.p.	SO_2	4·10	40 0 0	
Apex-Vactric ..	B–625	1/5 h.p.	SO_2	6·25	50 0 0	
Apex-Vactric ..	B–665	1/5 h.p.	SO_2	6·65	60 0 0	
Apex-Vactric ..	B–800	1/5 h.p.	SO_2	8·00	70 0 0	
B.T.H.	FT 34	1/8 h.p.	SO_2	3·4	30 9 0	
B.T.H.	GL 48	1/8 h.p.	SO_2	4·8	40 19 0	
B.T.H.	FT 50	1/8 h.p.	SO_2	5·0	42 0 0	
B.T.H.	GL 68	1/8 h.p.	SO_2	6·8	54 12 0	
B.T.H.	GL 94	1/8 h.p.	SO_2	9·4	69 6 0	
B.T.H.	RM 170	1/6 h.p.	SO_2	17·3	96 12 0	
B.T.H.	RM 240	1/6 h.p.	SO_2	22·8	115 10 0	
B.T.H.	Coldrator	1/6 h.p.	SO_2	4·4	47 5 0	D.C. only.
Century	F–45	1/6 h.p.	Methyl chlor.	4·5	25 4 0	
Chillaire	Table Model	1/6 h.p.	SO_2	4·5	34 13 0	
Chillaire	Stand Model	1/6 h.p.	SO_2	5·0	37 16 0	
Chillaire	De Luxe	1/6 h.p.	SO_2	5·5	54 12 0	
Chillaire	De Luxe	1/6 h.p.	SO_2	7·5	89 5 0	
Chillaire	Chef	1/6 h.p.	SO_2	12·5	94 10 0	
Coldair	3 TA	1/6 h.p.	SO_2	3	29 10 0	Table top model available.
Coldair	33 A	1/6 h.p.	SO_2	3·1	31 10 0	
Coldair	5 A	1/6 h.p.	SO_2	5·25	39 10 0	
Coldair	5 TA	1/6 h.p.	SO_2	5·0	46 0 0	
Coldair	5 SA	1/6 h.p.	SO_2	5·0	62 10 0	
Coldair	8 A	1/4 h.p.	SO_2	8·0	59 10 0	
Coldair	12 A	1/4 h.p.	SO_2	11·0	72 10 0	
Coldair	20 A	1/4 h.p.	SO_2	16·0	85 0 0	
Coldspot	Spl. Three	1/6 h.p.	SO_2	3·83	29 8 0	
Coldspot	Spl. Four	1/6 h.p.	SO_2	4·65	35 14 0	
Coldspot	Spl. Five	1/6 h.p.	SO_2	5·75	37 16 0	
Coldspot	Spl. Six	1/6 h.p.	SO_2	6·75	46 4 0	
Coldspot	Super Six	1/5 h.p.	SO_2	6·85	54 12 0	
Coldspot	Super Eight	1/4 h.p.	SO_2	9·00	65 2 0	
Crosley Shelvador ..	T 30	1/8 h.p.	SO_2	3·0	30 9 0	
Crosley Shelvador ..	S 31	1/8 h.p.	SO_2	3·16	31 10 0	
Crosley Shelvador ..	S 35	1/8 h.p.	SO_2	3·5	34 13 0	
Crosley Shelvador ..	S 36	1/8 h.p.	SO_2	3·6	36 15 0	
Crosley Shelvador ..	S 41	1/6 h.p.	SO_2	4·1	38 17 0	
Crosley Shelvador ..	S 43	1/6 h.p.	SO_2	4·3	40 19 0	
Crosley Shelvador ..	DL 43	1/6 h.p.	SO_2	4·3	44 2 0	
Crosley Shelvador ..	DL 50	1/6 h.p.	SO_2	5·0	48 6 0	
Crosley Shelvador ..	DL 60	1/6 h.p.	SO_2	6·0	54 12 0	
Crosley Shelvador ..	DL 70	1/6 h.p.	SO_2	7·0	60 18 0	
Electrolux	L100	none	Ammonia	1·0	19 10 0	
Electrolux	L22	none	Ammonia	2·2	29 10 0	
Electrolux	L38	none	Ammonia	3·8	40 19 0	
Electrolux	L55	none	Ammonia	5·5	52 10 0	
Electrolux	L750	none	Ammonia	7·5	62 10 0	
Electrolux	L1000	none	Ammonia	10·0	75 0 0	
Express	3 Star	1/6 h.p.	SO_2	3·0	28 7 0	
Express	4 Star	1/6 h.p.	SO_2	4·0	34 13 0	
Express	5 Star	1/6 h.p.	SO_2	5·0	42 0 0	
Express	7 Star	1/6 h.p.	SO_2	7·0	50 8 0	
Express	10 Star	1/6 h.p.	SO_2	10·0	68 5 0	
Express	A	1/6 h.p.	SO_2	5·0	35 0 0	Plus larder.
Express	B	1/6 h.p.	SO_2	3·5	45 0 0	Multi-cab. type.
Express	BX	1/6 h.p.	SO_2	7·0	59 17 0	Upper larder refrigerated.
Express	BI	1/6 h.p.	SO_2	3·5	45 0 0	Multi-cab.
Express	BIX	1/6 h.p.	SO_2	7·0	63 0 0	Upper larder refrigerated.
Express	CS	1/6 h.p.	SO_2	3·5	45 0 0	Under sink model.
Frigidaire	Master R–3	·07 h.p.	Freon–114	3·1	30 9 0	Sealed rotary unit, a.c.
Frigidaire	Master R–4	·07 h.p.	Freon–114	4·0	42 0 0	Sealed rotary unit, a.c.
Frigidaire	Master R–6	·07 h.p.	Freon–114	6·2	52 10 0	Sealed rotary unit, a.c.
Frigidaire	T3	1/5 h.p.	Freon–12	3·1	30 8 0	Twin cylinder unit, a.c.–d.c.
Frigidaire	T4	1/5 h.p.	Freon–12	4·0	42 0 0	Twin cylinder unit, a.c.–d.c.
Frigidaire	T6	1/5 h.p.	Freon–12	6·2	52 10 0	Twin cylinder unit, a.c.–d.c.
Frigidaire	Super 7	1/4 h.p.	Freon–12	7·24	71 8 0	Twin cylinder unit, a.c.–d.c.
Frigidaire	Super 9	1/4 h.p.	Freon–12	9·1	87 3 0	Twin cylinder unit, a.c.–d.c.
Frigidaire	Super 12	1/4 h.p.	Freon–12	12·1	102 18 0	Twin cylinder unit, a.c.–d.c.
Frigidaire	Super 15	1/3 h.p.	Freon–12	15·1	123 18 0	Twin cylinder unit, a.c.–d.c.

* This list was correct when prepared but alterations may since have been made in models or prices which will account for any inaccuracy.

Make	Reference	Motor	Refrigerant	Cubic Capacity	Price £ s. d.	Remarks
Grunow	51 D	1/5 h.p.	Carrene	5·1	46 0 0	Rotary compressor.
Grunow	67 D	1/5 h.p.	Carrene	6·7	56 0 0	Rotary compressor.
Grunow	67 SD	1/5 h.p.	Carrene	6·7	63 0 0	Rotary compressor.
Grunow	82 SD	1/5 h.p.	Carrene	8·2	70 0 0	Rotary compressor.
H.M.V.	Pop. Mod. 326	1/6 h.p.	SO_2	3·25	29 10 0	" Silent circulator " rotary.
H.M.V.	Econ. Mod. 327	1/6 h.p.	SO_2	3·25	32 10 0	" Silent circulator " rotary.
H.M.V.	Econ. Mod. 427	1/6 h.p.	SO_2	4·24	41 10 0	" Silent circulator " rotary.
H.M.V.	Stand. P 526	1/6 h.p.	SO_2	5·22	50 8 0	" Silent circulator " rotary.
H.M.V.	Stand. P 527	1/6 h.p.	SO_2	5·24	52 10 0	" Silent circulator " rotary.
H.M.V.	Stand. P 626	1/6 h.p.	SO_2	6·22	60 18 0	" Silent circulator " rotary.
H.M.V.	Stand. P 627	1/6 h.p.	SO_2	12·65	60 18 0	" Silent circulator " rotary.
H.M.V.	Stand. P 727	1/6 h.p.	SO_2	14·60	69 6 0	" Silent circulator " rotary.
H.M.V.	Hostess P 111	1/4 h.p.	SO_2	23·11	99 15 0	" Silent circulator " rotary.
Kelvinator	SU–25	1/6 h.p.	Methyl chlor.	2·50	26 5 0	
Kelvinator	SU–30	1/6 h.p.	Methyl chlor.	3·13	28 7 0	
Kelvinator	TU–354	1/6 h.p.	Methyl chlor.	3·16	30 9 0	
Kelvinator	GR–440	1/6 h.p.	Methyl chlor.	4·15	42 0 0	
Kelvinator	GR–557	1/6 h.p.	Methyl chlor.	5·16	49 7 0	
Kelvinator	GR–657	1/6 h.p.	Methyl chlor.	6·16	54 12 0	
Kelvinator	GR–770	1/6 h.p.	Methyl chlor.	7·18	59 17 0	
Kelvinator	SD–723	1/6 h.p.	Methyl chlor.	7·04	75 12 0	
Kelvinator	SD–946	1/4 h.p.	Methyl chlor.	9·20	100 16 0	
Kelvinator	SD–1464	1/4 h.p.	Methyl chlor.	13·12	126 0 0	
Leda	SMO	1/6 h.p.	SO_2	3·5	31 10 0	
Leda	SM–1	1/6 h.p.	SO_2	5·0	34 13 0	
Leda	SM–2	1/6 h.p.	SO_2	7·0	47 5 0	
Leda	Junior	1/6 h.p.	SO_2	3·0	29 5 0	
Leda	B–1	1/6 h.p.	SO_2	2·0	26 5 0	
Leda	B–2	1/6 h.p.	SO_2	5·0	42 0 0	
Marco	T–25	1/6 h.p.	Methyl chlor.	2·5	25 4 0	Table top type d.c. 2 gns. extra.
Marco	D–437	1/6 h.p.	Methyl chlor.	3·0	31 10 0	
Marco	D–637	1/6 h.p.	Methyl chlor.	5·0	38 17 0	
Marco	D–837	1/6 h.p.	Methyl chlor.	7·0	47 5 0	
Moffat	M–32	1/6 h.p.	Methyl chlor.	3·2	32 0 0	Porcelain finish inside and out, all models.
Moffat	M–45	1/6 h.p.	Methyl chlor.	4·5	42 0 0	
Moffat	M–66	1/6 h.p.	Methyl chlor.	6·6	52 0 0	
Prestcold	STD–24		SO_2	2·4	25 4 0	
Prestcold	STD–35		SO_2	3·5	30 9 0	Table top type available.
Prestcold	De Luxe 35		SO_2	3·5	34 13 0	
Prestcold	STD–56		SO_2	5·5	40 19 0	

The absorption type takes some 2-3 units per day, depending upon the external temperature.

Cost of Gas Refrigerators

The cost of running refrigerators on gas is usually more expensive than using the mechanical type run on electricity. Accepting the manufacturers' figures of gas consumption of the 3·8 cu. ft. size, running will cost some £2 18s. per annum, with gas at 8·6d. per therm, whereas the same size refrigerator with a consumption of one unit per day and with electricity at 1d. per unit, will cost, at the most, £1 10s. 5d. In many cases gas is more expensive and electricity cheaper than at the rates quoted. The actual cost of running the 2·2 cu. ft. model, accepting the manufacturers' figures of average consumption is £1 18s. 4d. with gas at 9d. per therm and calorific value of 500.

Normally, therefore, it would appear that mechanical compressor refrigerators are cheaper than ice, carbon dioxide or absorption types for domestic purposes, both from the point of view of cost per cubic foot of cooled space and the cheapest also in running costs. This statement is based on the fact that over 80 per cent. of the population of this country have electricity available at ¾d. or less per unit.

Absorption type requires free air circulation to be provided, and the manufacturers' requirements in this respect must be met if satisfaction is to be obtained in everyday use.

No attempt has been made to discuss the finer points of appeal in individual refrigerators, the placing of foods, the ventilation of heat - operated absorption refrigerators, etc., as these are points to be settled between individuals.

Planning the Kitchen

It should be remarked that while the refrigerator supersedes the larder, which must be located on and ventilated to an outside wall, space is still required for the storage of dry, non-perishable goods. These are usually stored in a cupboard or one of the kitchen cabinet type of units. This allows of a more logical and systematic layout in the kitchen planning. A sequence can be followed in design, for the refrigerator can be located in any desired position. The sequence accepted by many architects is as shown in the plan.

It is quite usual nowadays for units comprising cooker-refrigerator combinations or cooker-sink to be incorporated in the planning. Quite a number of manufacturers produce " outline " or building-in models. These are usually appreciably cheaper, for with the exception of the front the remainder is rough finish as it will be hidden when framed up. The tendency will be for refrigerator prices to fall as the quantities absorbed by the market increase and the specifying of built-in models will assist in this. The tendency to plan a logical sequence in the kitchen and visualize the provision of complete service is obvious and no kitchen can be regarded as complete without some refrigerator. It appears probable that units comprising refrigerators will become increasingly common in the well-planned home.

Work-Table

The work-table is, in effect, the focal point of all the important kitchen operations. It should be of adequate area, say not less than 8 sq. ft., at a height convenient for standing or sitting, say 35 ins., knee space being provided under part, if not all, of it. It should be situated in a good light and within easy reach of the cooker and sink.

Food Storage

A small refrigerator can be economically justified and may have built round it a cupboard for non-perishable food and a drawer or bin for vegetables. These three units can be built up together, ventilating bricks being provided for air circulation. Alternatively, a small larder may be provided in the usual manner and the refrigerator placed alongside. A sliding shelf can be provided over the refrigerator to facilitate the handling of food.

Make	Reference	Motor	Refrigerant	Cubic Capacity	Price	Remarks
Prestcold	De Luxe 56		SO_2	5·5	45 3 0	
Prestcold	De Luxe 80		SO_2	8·0	60 18 0	
Prestcold	De Luxe 108		SO_2	10·5	78 15 0	
Savoy	STD. Mod. 3	1/6 h.p.	SO_2	3·5	30 9 0	
Savoy	V–4 Deluxe	1/6 h.p.	SO_2	4·5	40 19 0	
Savoy	V–4 Deluxe	1/6 h.p.	SO_2	4·5	44 2 0	Table top model.
Savoy	V–8 Deluxe	1/4 h.p.	SO_2	8·5	65 2 0	Twin compartment model.
Sparton	S–227	1/6 h.p.	SO_2	2·25	25 4 0	
Sparton	S–317	1/6 h.p.	SO_2	3·1	29 8 0	
Sparton	S–467	1/6 h.p.	SO_2	4·6	38 17 0	
Sparton	D–467	1/6 h.p.	SO_2	4·6	43 1 0	De luxe model.
Sparton	S–616	1/6 h.p.	SO_2	6·1	46 4 0	
Sparton	S–617	1/6 h.p.	SO_2	6·2	50 8 0	
Sparton	D–617	1/6 h.p.	SO_2	6·2	61 19 0	De luxe model.
Sparton	D–747	1/6 h.p.	SO_2	7·2	71 8 0	De luxe model.
Sparton	D–947	1/6 h.p.	SO_2	9·0	81 18 0	De luxe model.
Sternette	DM–3·3	1/6 h.p.	Methyl chlor.	3·3	29 10 0	A.c. or d.c. motors fitted, according to supply.
Sternette	DM–4·3	1/6 h.p.	Methyl chlor.	4·3	40 19 0	
Sternette	DM–6·3	1/6 h.p.	Methyl chlor.	6·3	52 10 0	
Sternette	DM–8·1	1/6 h.p.	Methyl chlor.	8·1	68 5 0	
Stewart-Warner ..	357	1/6 h.p.	SO_2	3·5	34 13 0	
Stewart-Warner ..	457	1/6 h.p.	SO_2	4·5	39 18 0	
Stewart-Warner ..	557	1/5 h.p.	SO_2	5·64	51 9 0	
Stewart-Warner ..	567	1/5 h.p.	SO_2	5·64	55 13 0	
Stewart-Warner ..	657	1/5 h.p.	SO_2	6·3	55 13 0	
Stewart-Warner ..	667	1/5 h.p.	SO_2	6·3	58 16 0	
Stewart-Warner ..	567–P	1/5 h.p.	SO_2	5·64	58 16 0	"P" = Porcelain finish inside and out.
Stewart-Warner ..	667–P	1/5 h.p.	SO_2	6·3	64 1 0	"P" = Porcelain finish inside and out.
Stewart-Warner ..	767	1/5 h.p.	SO_2	7·4	64 1 0	
Stewart-Warner ..	867	1/5 h.p.	SO_2	8·1	71 8 0	
Stewart-Warner ..	767–P	1/5 h.p.	SO_2	7·4	71 8 0	"P" = Porcelain finish inside and out.
Stewart-Warner ..	867–P	1/5 h.p.	SO_2	8·1	78 16 0	"P" = Porcelain finish inside and out.
Universal	S–4	1/6 h.p.	SO_2	4·2	34 13 0	
Universal	D–5	1/4 h.p.	SO_2	5·0	46 4 0	
Universal	D–6	1/4 h.p.	SO_2	6·0	57 15 0	
Universal	D–8	1/4 h.p.	SO_2	8·0	80 17 0	
Westinghouse ..	ED–30	1/8 h.p.	SO_2	3·2	33 12 0	Sealed unit.
Westinghouse ..	ED–40	1/8 h.p.	SO_2	4·0	41 5 0	Sealed unit.
Westinghouse ..	ED–50	1/8 h.p.	SO_2	5·0	47 10 0	Sealed unit.
Westinghouse ..	ED–60	1/8 h.p.	SO_2	6·0	54 0 0	Sealed unit.
Westinghouse ..	ED–70	1/8 h.p.	SO_2	7·0	63 0 0	Sealed unit.
Westinghouse ..	EDX–78	1/6 h.p.	Freon	7·8	72 10 0	Sealed unit.
Westinghouse ..	EDX–95	1/6 h.p.	Freon	9·5	83 0 0	Sealed unit.
Zeros	ZR–1	None	NH_3	2·25	26 5 0	Absorption type.
Zeros	ZR–2	None	NH_3	3·0	29 8 0	Absorption type.
Zeros	ZR–3	None	NH_3	4·25	35 14 0	Absorption type.
Zeros	ZR–4	None	NH_3	7·25	52 10 0	Absorption type.
Zeros	ZR–5	None	NH_3	3·0	42 0 0	Stainless sink unit.
Zerozone	Z–436	—	Not spec.	4·5	31 10 0	
Zerozone	Z–736	—	Not spec.	7·1	48 6 0	
Zerozone	Z–936	—	Not spec.	9·0	56 14 0	

A well-sited central type unit. This type requires no provision whatever for ventilation. This "Frigidaire" model has been incorporated in some large blocks of modern flats, where it is just one of the requirements of the present-day tenant.

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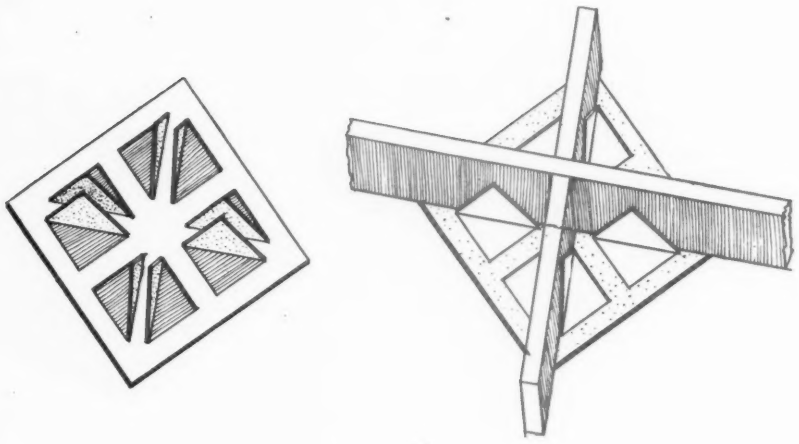

TRADE NOTES

[EDITED BY PHILIP SCHOLBERG]

Jointless Floor Fittings

NO matter how much care and trouble the sub-contractors take, there is a suspicion in the minds of most architects that jointless floors are only too liable to crack. Most of this prejudice is due to the fact that a number of small firms with inadequate equipment and hardly any experience started laying floors of this type at cut prices, with the inevitable result. The more respectable elements of the industry are taking what steps they can, and are in process of producing detailed recommendations on the technique of laying these floors and stringent specifications for materials. But whatever recommendations they produce, there is still lots to be said in favour of ebonite strips to divide up the floor surface so that the cracks, if any, will all be along well-defined lines at the side of the strips, and therefore more or less invisible. Redfern's have just produced a useful clip for holding these strips in position while the floor is being laid, and a series of ten different sections of strip to go with them. The clip, which is made of aluminium, has upstanding lugs arranged at right angles (see the drawing at the head of these notes), the strips being placed in the channels between the lugs, which are then pressed into the side of the strip to hold it firmly. The clips can easily be cut if a quarter or half-section is enough to do the job.

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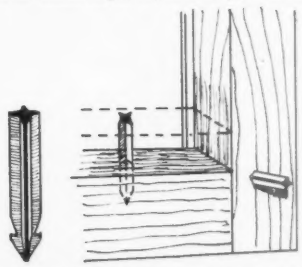
The clips themselves are fixed to the sub-floor by a material which is melted and run in like ordinary sealing wax, or the material can be ground up and placed in position, being finally fused with a torch. The trade name of these clips, by the way, is Redfern-Pickford, and the design is patented.—(*Redfern's Rubber Works, Ltd., Hyde, Cheshire.*)



The Star metal dowel, see note on this page.

Metal Dowels

The ordinary wooden dowel pin is such a common object that it is generally taken for granted, though it is liable to start splits and fissures if it is at all over size, a not too pleasant habit in windows or any other outside work. In an attempt to get over this difficulty, and at the same time give a saving in costs, Messrs. Bruce Dawson have recently introduced the Star metal dowel, for which they claim several advantages. The dowels are made of a stainless metal and can be driven like ordinary nails without any danger of splitting the wood. Star shaped in section, one end is pointed and barbed, and the hold given is very good. While these dowels are suggested mainly for use in the construction of window frames, there seems to be no reason why they should not be equally suitable for all sorts of joinery, and since they are so simple to use it seems quite likely that they would show some reduction in manufacturing costs. Seven sizes are available, ranging from ¾ in. to 2 ins. in length, the prices varying from 11s. 6d. to 16s. 6d. a thousand. —(*Bruce Dawson & Co. (London), Ltd., 43–45 Great Tower Street, London, E.C.3.*)

Steel Developments

While there is a demand for constructional steels with properties superior to the ordinary mild steels, but at a reasonable price, yet not very many are so far available. The demand is not filled by the alloy steels which, although they are widely used for automobile and other high duty applications, are quite outside the bounds of practical use in the constructional world, not only on account of their high cost, but also because their properties are only fully developed after heat treatment. To meet these demands the Appleby-Frodingham people, who are a part of the United Steel Companies, have recently introduced Kuplus weather-resisting mild steel and a high tensile version of the same thing, known as high tensile Kuplus or H.T.K.

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The ordinary Kuplus does not, of course, pretend to possess the same degree of non-corrodibility as the stainless steels, but it is considerably more resistant to atmospheric corrosion than is ordinary mild steel. Tests by the method of measuring weight loss showing that it loses only about one-quarter the amount lost by mild steel in dilute acids, one may assume that it is well worth using for structural work in industrial areas, for industrial plant of all kinds, but particularly on factory jobs where there are often plenty of light steel trusses employing quite small sections which always tend to suffer from corrosion because their surface area is high in comparison with their weight.

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High tensile Kuplus has the same resistance to corrosion as the ordinary Kuplus, but its permissible working stress is 50 per cent. higher than mild steel, these figures being obtained without any loss in ductility. The higher yield point and tensile strength are not the result of heat treatment or of rolling manipulation at a critical temperature, but are inherent in the steel and are not liable to modification as the result of subsequent hot working. Machining properties are much the same as for ordinary mild steel, the only difference being that somewhat more attention must be paid to maintaining good cutting edges. As a general recommendation, press work should be carried out hot. This steel is put forward for use in all cases where weight is worth saving, either in the structure itself or in transport and erecting costs: it complies with B.S.S. 548—High tensile structural steel for bridges and general building construction.—(*The Appleby-Frodingham Steel Co., Ltd., Scunthorpe, Lincolnshire.*)

Glazed Tile Data

Carter's of Poole have just sent me a catalogue of glazed tiles and fittings for interior work, and their letter forbids me, if I wish to be polite, to describe it as "more than a mere catalogue." Their reasons for this appeal are extremely sound, for "it seemed to us that what the architectural profession and the building trade wanted was exactly what might be regarded as a 'mere' catalogue—a catalogue designed entirely with a view to providing the requisite information in the most concise and convenient form for reference." Quite so; this admirable precept should be graven on every catalogue-maker's heart, but I would suggest, with all due diffidence, that some catalogues are less than mere. Not every day does one find a sentence like "Ditto but larger, price 55s. 6d., chromium plating extra," but there are catalogues beside which this (found last week) is a model of precision.

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But, mere or not, this catalogue really is just what a catalogue should be, and I am glad to see that another one dealing with exterior tiles is in course of production. In most offices both of them will be worn out before they are thrown away, and one cannot say fairer of any catalogue than that. But since nothing is quite perfect, I must ask one question. On page 11 I find "special tiles can be made . . . provided sufficient time is available." Enough is as good as sufficient, but how much is it?—(*Carter & Co., Ltd., Poole, Dorset.*)

Information about Lighting

A note in these columns a fortnight ago suggested that G.V.D.'s should give more information about the way they get their

results, and it has brought a reply from Mr. Downer, whose letter is printed below :

The general principles on which we work are quite simple and well known, and I have frequently expounded them in articles and letters to the press, as well as in the booklet itself. Certain general applications of these principles to various forms of lighting units are described more fully in my patent specifications, and these cover a fairly wide field, including most of our work hitherto. These specifications can be purchased at the Patent Office for 1s. each, or can be studied free of charge at the Patent Office Library.

Each individual job, however, requires individual treatment, and the devices covered by my patents are simply tools which my firm find useful in carrying out various lighting schemes, and they frequently require modification and adaptation to the particular job in hand. The publication of full details of a given installation would not enable the reader to carry out a different installation with equally good results, nor would it enable him to form a better idea as to our competence to undertake other jobs, than the general explanations which we have already given and which you have yourself published at times during the last few years.

However, I entirely disagree with the suggestion that architects or "intelligent clients" either need or desire to understand in detail exactly how and why we can give them certain results before they entrust us with their work. The traveller does not expect to understand the design and operation of a locomotive before entrusting his person to a particular railway company, nor does the average man, before purchasing a radio set, require particulars of the circuits and other technical details of the various makes available, and even if given such details he would be unable to understand them or to judge between one set and another on technical grounds.

In all walks of life the customer or client judges the specialist by results, either by trying various samples himself, by personal recommendation, or on the general reputation of the specialist, attained by consistently producing satisfactory results.

In view of our already considerable and rapidly growing reputation, the known results to which we can point and the enthusiastic opinions of others on our work, I should consider a client who "wanted to know why, etc." (apart from general principles) the reverse of intelligent, for he would be wasting his own time as well as ours ; and so far from architects "refusing to take things for granted, etc.," I am happy to state that we find more and more architects are taking our qualifications for granted and specifying G.V.D. lighting, although often they do not understand or even ask about the detailed manner in which we propose to carry out our work.

I must also take exception to your statement that a current saving, in some cases of 75 per cent., "*is claimed*." This suggests a claim based on theory or supposition, unsupported by practical results. We do not go in for "claims" in this sense, but merely state facts as to what we have actually done and can certainly do again in suitable cases. We make no pretence to be able to save 75 per cent. current in every case or even in most cases, but as a matter of fact there *are* cases where we can save even more.

Taking the last paragraph first, I should like to make it quite clear that the words "is claimed" were not used in any pejorative sense, but merely to indicate that I had not myself seen the installations in question. Any definite statements made in these columns are either the results of personal observation or of independent testing authorities. With the first two paragraphs of Mr. Downer's letter I agree, though I cannot raise any real enthusiasm at the thought of applying to the Patent Office. With the third and fourth I disagree entirely : the architect is an independent consultant who should be able to give reasons for what he is doing, and Mr. Downer's parallel of the average man and the radio set is therefore not a true one because it leaves out the independent consulting engineer. Given a cold you can get a good portmanteau remedy from any decent chemist, but I cannot see that this invalidates the old-fashioned habit of training doctors to write their own prescriptions.

IN PARLIAMENT

The Housing Bill

Sir K. Wood moved the second reading of the Increase of Rent and Mortgage Interest (Restrictions) Bill. He said that with regard to the houses in Class B the Government had adopted the recommendation of the Ridley Committee, and it was embodied in the Bill that generally, and subject to certain conditions as to the time and notice, houses in Class B of a yearly value or rateable value exceeding in 1931 £35 in Scotland and in the Metropolitan Police District, and £20 elsewhere, should be decontrolled at the expiration of the present Acts. It was also provided that the remaining controlled houses in Class B and Class C should form a single class and should be subject to the same conditions of control now applying to houses in Class B. The Government agreed with both the Marley and the Ridley Committees that the question of continuing the control of any particular class of house must be regarded as dependent on whether the shortage of houses in that class was at an end or was likely to end within a reasonable period.

The Government had also given careful consideration to the question of the matter of future decontrol. In Scotland the question of further decontrol must be subject to special considerations, and the Government did not feel that they would be justified in framing any general system of decontrol until the conditions had materially improved there. The Government believed that in the case of England, Wales and Scotland it was in the national interest that decontrol should be effective as soon as there was an adequate supply of housing accommodation. They believed that an indefinite continuance of control would be indefensible, and the ultimate object of the Government was to bring control to an end as soon as it was no longer needed in the general interest.

The Government agreed that decontrol should be progressive, should be related to areas, and be determined in the light of local conditions apart from the fact that the present overcrowding standard was at present necessarily a lower one because it was based on penal provisions. The Government considered that while the degree of overcrowding was an important factor, it was not the only factor, and there were other considerations to be taken into account in answering the question whether in any area the shortage of houses was at an end, or was likely to be at an end within a reasonable period.

Thus it would not be wise to attempt at this moment to lay down an automatic time-table some years ahead in regard to matters about which there must inevitably be an element of uncertainty. The exact method and time at which such local decontrol should be brought about in England and Wales were matters which called in due course for further examination. That meant the appointment of another committee, and as at present advised, he contemplated that the enquiry of that committee should be completed by the autumn of 1941 so that its report might be available for consideration at the time when the general review of housing finance would be taking place.

The Government agreed with the majority of the Ridley Committee that there was not now such a shortage of Class B houses that if control were removed scarcity rents could be exacted. The Government also agreed with the Ridley Committee that the highest rented houses in Class B differed little from Class A houses and could be merged into Class A and decontrolled without giving rise to any appreciable hardship.

The Government saw no reason to disagree with this recommendation. It would involve the decontrol, as from September next, of a maximum number of some 400,000 houses in England and Wales with controlled rents of about 27s. to 34s. a week in the Metropolitan Police District and about 16s. to 26s. a week in the rest of the country. But houses which were on December 6 last, when the Ridley Committee reported, sublet and occupied as two or more dwellings would continue to be controlled until the landlord obtained vacant possession. This provision was necessary because in London and some other large cities thousands of these B Class houses were occupied by two or more working-class families, one being the tenant and the others sub-tenants, and the immediate decontrol of such houses would cause hardship. There would be the same safeguards, when they came to consider the decontrol of the upper Class B houses, for tenants and landlords as were laid down in the Act of 1933.

With regard to the lower Class B houses, Clause 3 made provision for the remaining controlled houses in Class B and Class C to form a single class, subject to the conditions of control as now applied to houses in Class C. This carried into effect the judgment of all the members of the Ridley Committee.

It was proposed in Clause 4 that decontrolled Class B houses in the lower range of rateable values should be registered, that there should be no further registration of decontrolled Class C houses after three months from the amending legislation, and that for Class B houses the registers should be finally closed within a year of amending legislation. Clause 5 contained various amendments which were designed to assist landlords and tenants. It was proposed that in Court proceedings the onus should be placed on the landlord to prove that the house was decontrolled. This was a reversal of the High Court decision of 1936, which in its turn reversed the previous practice which had obtained since the inception of the Acts. The decision in this case placed on the tenant an obligation which he was seldom in a position to fulfil and had led to much discontent. The landlord was in general in a much better position to know the history of a house.

The Ridley Committee recommended that rent books should be provided for all working-class houses which were not in service occupation. This recommendation was to be welcomed on general housing grounds as the provisions of the Housing Acts requiring the insertion of notices in rent books were rendered to some extent ineffective when there was no rent book. This would involve an amendment of the Housing Acts and could not be dealt with in a Rent Restriction Bill and it would have to be the subject of future legislation at an appropriate time. A majority of the Ridley Committee considered that certain cases brought to their notice in connection with the general procedure of levying distress in England and Wales called for some alteration of the law in regard to uncontrolled houses. The Government agreed that there was undoubtedly a case for examination. It would involve a general alteration in the law of landlord and tenant, and it was proposed to set up immediately a committee to examine the whole question under the chairmanship of His Honour Judge Lilley.

The Government adopted the recommendations of the majority reports of both the Marley and Ridley Committees that it was not desirable to retain control longer than was necessary and that the question of continuing control on any class of houses must be dependent on whether the shortage was ended or was likely to end in a reasonable period.

Mr. Johnston moved :—

"That this House regrets the proposal to deprive many tenants of the protection of the law and thus increase the hardships of a section of the community : it rejects the assumption that the remaining measure of control can only be temporary and records its opinion that, as the need for protecting tenants will continue indefinitely, permanent tenancy courts should be established to control the relations between landlord and tenant in respect of all dwelling houses."

In this measure the Minister was opening the

door for a further increase of rents. Its essential purpose was to provide the machinery whereby the occupants of 450,000 houses, 50,000 of them in Scotland, might have their rents increased. In the vast majority of cases the increases would be almost immediate.

Replying to prolonged debate, Mr. Elliot, Secretary of State for Scotland, said that the Government were producing house room at the rate of nearly 4,000 new rooms every day. For every two persons who were added to the population they were adding three houses or nearly 12 rooms. They were eating into the problem in a way that would give tenants in the future a far better chance of houses at reasonable rents.

The amendment was rejected by 258 votes to 138—majority 120—and the Bill was read a second time.

Questions

Sir M. Manningham-Buller asked the Home Secretary whether, in view of the proved value in Barcelona of underground air-raid shelters, he had considered the feasibility of constructing such shelters under the squares and open spaces in London and elsewhere, and reducing the cost of such shelters by utilizing them normally for parking motor cars.

Mr. G. Lloyd said that under the Act the duty of making arrangements for the provision of such shelters for the protection of the public as might be necessary rested upon the local authorities. Air raid shelters specially constructed for this purpose would not necessarily be suitable as garages, though underground garages could, in certain circumstances, afford protection in air raids, and in considering any proposals for the construction of underground garages local authorities would doubtless keep in mind the suggestion of his honourable friend.

Mr. Mander asked the Minister of Health whether he would consider the advisability, before approving a resolution to prepare a scheme under the Town Planning Act, of satisfying himself that the planning authority was possessed of an adequate and qualified staff or adviser for the purpose of preparing the scheme, and that competent architectural advice would be made use of by the interim development authority in the consideration of proposals submitted during the interim period.

Sir K. Wood said that Parliament had entrusted local authorities with the responsibility of preparing planning schemes, and he had no jurisdiction to prescribe the number or qualifications of their staff in this connection. He might, however, say that having regard to the active part now taken by county councils in the preparation of schemes, and to the extension of the joint committee system, the general standard of administration under the Act of 1932 was steadily improving. As regarded interim development applications, the hon. member was aware that the voluntary panels of architects were now widely called into consultation by authorities, and he was ready to bring this system further to the notice of the authority in any area where he had reason to think that it was desirable to do so.

Captain Plugge asked the Prime Minister whether any final decision had yet been reached to clear away certain houses in Abingdon Street in connection with the scheme for the erection of the King George V. memorial; what was the total cost of clearing this site; and whether he would instead consider using the money in question to assist in the clearing and improvement of Parliament Square on the lines proposed in the memorandum recently circulated by the Middlesex County Council.

Mr. Chamberlain said he understood that no final decision had yet been taken by the Committee responsible for the National Memorial to King George V. as to the precise extent of the area to be cleared and to be laid out as open space, and it was not possible, therefore, to state the total cost of clearing the site required. The promise which, subject to the approval of Parliament, was made to the Lord Mayor's Fund, was that the Government would make a contribution in the shape of a free gift of all State property within the area selected by the Committee: but this contribution was, in its essence, inseparable from the site on which the property stands.

THE WEEK'S BUILDING NEWS

LONDON AND DISTRICTS

BATTERSEA. *Tenements.* The L.C.C. has acquired a site in the Didcot Street area of Battersea for the erection of 40 tenements.

BERMONDSEY. *Flats.* The Bermondsey B.C. has approved plans for the erection of 31 flats in Lynton Road, at a cost of £19,716.

BERMONDSEY. *Flats, etc.* The Bermondsey B.C. has approved the layout of the Ainsty Street clearance area, providing for the erection of 164 flats and four shops.

DARTFORD. *Houses.* Plans passed by the Dartford Corporation: 93 houses, North Road, Mr. H. R. Canning; 12 houses, Wentworth Drive, J. B. Heale & Co.

ENFIELD. *Flats, etc.* Plans passed by the Enfield U.D.C.: 40 flats, Bridge Close, Carterhatch Lane, and 12 houses, Bridgenhall Road and Baker Street, Mr. J. Neilson; factory, Hertford Road, G. P. Walker and Sons; four shops and 16 flats, Cuba Drive, Mr. E. W. Palmer; 18 houses, Great Cambridge Road, Mr. R. Bohan; six houses, Durants Park Avenue, R. F. Peachey and Sons; 61 houses, Oatlands Road, W. Goodchild & Co.; 87 houses, Great Cambridge Road, Mr. D. Thomson; radio factory, Great Cambridge Road, Comm. Structures, Ltd.; 13 shops, 64 houses and offices, Larsens Nursery, Hertford Road, Mr. M. C. Jewell; six houses, Bincote Road, Mr. H. Andrews; six houses, Parsonage Lane, Mr. James Neilson.

FRIERN BARNET. *Houses.* Plans passed by the Friern Barnet U.D.C.: 18 houses, Oakleigh Park South, Mr. H. Brooks; 32 flats, off Torrington Park, Mr. E. W. Palmer.

HAMMERSMITH. *Factory.* Plans passed by the Hammersmith B.C.: Factory, Beavor Lane, Mr. H. Courtenay Constantine; two blocks of shops and maisonettes, Old Oak Common Lane, Marshall and Tweedy.

ILFORD. *Hospital.* The Ilford Corporation is to erect at the isolation hospital a cruciform cubicle pavilion for 20 beds.

ILFORD. *Flats, etc.* Plans passed by the Ilford Corporation: 16 bungalows, Merrivale Avenue, and 18 flats, High Road, Chadwell Heath, Mr. W. M. Edwards; 24 flats, Aldborough Road, Mr. F. K. Harms; 89 houses, Ewellhurst Road, etc., G. W. Ansell and Son; 55 houses, Colvin Gardens, etc., Mr. J. R. Crewes; 32 flats, Woodford Avenue, Clayhall Park Estates, Ltd.

KENSINGTON. *Extension to Nurses' Home.* The L.C.C. is to extend the nurses' quarters at St. Mary Abbotts Hospital, Kensington, at a cost of £6,615.

SOUTHALL. *Council Offices, etc.* The Southall Corporation has approved plans by Mr. R. H. Uren for the provision on the South Road site of new municipal buildings, comprising council suite and offices, branch health centre, assembly hall and caretaker's quarters.

PROVINCES

OLDBURY. *School.* The Oldbury Education Committee has approved plans for the erection of a school for 500 infant and junior children at Quinton.

OLDBURY. *Houses.* The Oldbury Corporation has approved a layout and type plans for the erection of 168 three-bedroom type and 22 four-bedroom type houses on the Moat Farm Estate.

OLDBURY. *Houses.* Plans passed by the Oldbury Corporation: 14 houses, Hill Top Road, Mr. S. Spollen.

ROMFORD. *Offices.* The Essex C.C. is to erect buildings as offices for the staffs of the Southern Area Guardians Committee in Laurie Square, Romford, at a cost of £28,200.

RUISLIP. *School.* The Middlesex Education Committee is to erect an elementary school in White Heath Avenue, Ruislip-Northwood.

SHEFFIELD. *Factory, etc.* Plans passed by the Sheffield Corporation: 12 houses, Shenstone Road, Mr. J. Mason; factory, Pitt Street, The Portobello Steel Works; factory, Arundel Street, Pinder Bros., Ltd.; 21 flats, Westbourne Road, Mr. C. B. M. Wilson; basket factory, Penistone Road North, John May (Sheffield), Ltd.; 12 houses, Beauchief Rise, Mr. S. L. Clark; 12 houses, Airedale Road, Newhouses (Builders), Ltd.; 10 flats, Scotland Street, M. Panzieri & Co.; additions to cinema, Norfolk Street, Odeon (Sheffield), Ltd.

SOUTHAM. *School.* The Warwickshire Education Committee has approved plans for the erection of a senior school at Southam.

SOLIHULL. *School.* The Warwickshire Education Committee has purchased a site for junior and infants' schools for about 2,000 children in the neighbourhood of Elmdon Hall, Solihull.

SOLIHULL. *Library.* The Warwickshire C.C. has purchased a site for a branch library in Drury Lane, Solihull.

STAINES. *School.* The Middlesex Education Committee has acquired a site in Long Lane, Staines, for the erection of an elementary school.

UPMINSTER. *Clinic.* The Essex C.C. has approved plans for the erection of a combined treatment centre at Upminster, at an estimated cost of £3,559.

WEST RUGBY. *School.* The managers of St. Matthew's C.E. School propose to provide a new senior boys' school for 320 children in West Rugby.

WISBECH. *Hospital.* Messrs. Ward and Woolnough have prepared plans for the Wisbech Joint Isolation Hospital Board for the erection of an isolation hospital in Barton Road, Wisbech.

WOODFORD. *School.* The Essex Education Committee has approved plans for the erection of a senior boys' school at North Woodford, at an estimated cost of £29,590.

THE BUILDINGS ILLUSTRATED

NURSES' HOME, WESTMINSTER HOSPITAL (pages 403–405). — The general contractors were Holloway Brothers, Ltd., who were also responsible for the foundations, reinforced concrete, stone, fireproof construction, plumbing, plaster, joinery and stonework. The sub-contractors and suppliers included: H. J. Moyes, Ltd., demolition; Limmer and Trinidad Lake Asphalt Co., asphalt; J. A. King & Co., Ltd., pavement and roof lights; R. Y. Ames, bricks; Dorman Long & Co., Ltd., structural steel; Trussed Concrete Steel Co., Solcheck tiles and special roofing; Hemel Hempstead Patent Brick Co., Ltd., partitions; Haywards, Ltd., lantern lights and dome lights; Korkoid Decorative Floors, patent flooring; J. Jeffreys & Co., central heating, boilers, and ventilation; F. H. Wheeler & Co., electric wiring, electric heating, and bells; Doulton & Co., Ltd., and Henry Wiggin & Co., sanitary fittings; Gas Light and Coke Co., gas fixtures; Roneo, Ltd., stair treads; Nettlefold and Sons, Ltd., door furniture; Crittall Manufacturing Co., Ltd., casements and window furniture; Frederick Jukes, metalwork; Birmingham Guild, Ltd., metalwork; Ace Laminated Products Co., joinery; W. B. Simpson and Sons, Ltd., tiling; John P. White and Sons, Ltd., wardrobe fittings; Furdecor, Ltd., wardrobe fittings and furniture; Waygood-Otis, Ltd., lifts.

HOUSE AT SANDERSTEAD (pages 406–408). —Architect: Oscar A. Bayne. The general contractors were E. H. Burgess, Ltd., and the sub-contractors and suppliers included: Crittalls Manufacturing Co., Ltd., metal windows; Hopes Heating and Lighting, heating and hot water system; Roberts Adlard, hand-made sand-faced clay roofing tiles; C. Schawaller, sanitary fittings; Watkins and Richardson, electric lighting, power and radio; Joseph Sandell, doors; W. T. Lamb and Sons, facing bricks, and quarry tiles (Ruabon, Ltd.); F. Knight & Co., door furniture; Carter & Co., Ltd., tiling to entrance door; James Clark and Son, Ltd., and Thermolux Glass Co., Ltd., glass, decorative glass and glass wall linings; Cellulin, Ltd., linoleum floors; Venesta, Ltd., plywood flooring laid to form squares in living room, dining room and entrance hall.

PRICES

On the following pages appears Prices for Measured Work—Part I, with prices last published on February 10, brought up to date.

★ *ANSWERS TO QUESTIONS*

While the JOURNAL, *naturally, cannot presume to undertake the responsibilities of a quantity surveyor, it has arranged with the authors of this Supplement to answer readers' questions regarding any matter that arises over their use of the Prices Supplement in regard to their work, without any fee. Questions should be addressed to the Editor of the* JOURNAL, *and will be answered personally by Messrs. Davis and Belfield. As is the normal custom, publication in the* JOURNAL *will omit the name and address of the enquirer so that it is unnecessary to write under a pseudonym.*

The complete series of prices will consist of four sections, one section being published each week in the following order :—

1. Current Market Prices of Materials, Part I (published on February 24).
2. Current Market Prices of Materials, Part II (published last week).
3. Current Prices for Measured Work, Part I.
4. A.—Current Prices for Measured Work, Part II.

   B.—Prices for Approximate Estimates.

● *Prices are for work executed complete and are for an average job in the London Area, all prices include for overhead charges and profit for the general contractor.*

PART 3

CURRENT PRICES FOR MEASURED WORK—I

BY DAVIS AND BELFIELD, P.A.S.I.

PRELIMINARIES

Water for the works		
Third party and other insurances to persons and property, employer's liability, unemployment and Public Health insurances, and fire insurances (based on value of contract)		1½%
Single scaffolding	per yard super	2/–
Independent scaffolding	per yard super	2/8

EXCAVATOR

		Ordinary Ground	Clay
Surface digging average 9″ deep and wheeling and depositing on spoil heap, not exceeding two runs	per yard super	–/9	1/1

EXCAVATOR—(*continued*)

		Ordinary Ground	Clay
Excavating not exceeding 5′ 0″ deep to form basement and getting out	per yard cube	1/11	2/10½
*Ditto, exceeding 5′ 0″ deep and not exceeding 10′ 0″ deep	per yard cube	2/5	3/6
Excavating not exceeding 5′ 0″ deep, to form surface trenches and getting out	per yard cube	2/7	3/10
Ditto, exceeding 5′ 0″ deep and not exceeding 10′ 0″ deep	per yard cube	3/7	5/0
Ditto, not exceeding 5′ 0″ deep to form basement trench excavation commencing 10′ 0″ deep, and getting out	per yard cube	3/4½	4/6
Returning, filling in and ramming around foundations	per yard cube	1/1	1/5

*** Items marked thus have fallen since February 10th.**

CURRENT PRICES.

BY DAVIS AND BELFIELD, P.A.S.I.

EXCAVATOR, CONCRETOR AND BRICKLAYER

EXCAVATOR—(*continued*)

	Ordinary Ground	Clay
Filling barrows and wheeling and depositing excavated soil not exceeding two runs per yard cube	1/1	1/5
Spreading and levelling from excavated heaps in layers not exceeding 12″ per yard cube	–/9	1/–
Filling into carts or lorries and carting away per yard cube	4/6	4/10
Planking and strutting to sides of basement, excavation, including strutting per foot super	1/–	–/9
Planking and strutting to surface trenches (both sides measured) .. .. per foot super	–/4½	–/3
Hardcore, broken brick, filled in under floors and well rammed and consolidated per yard cube	6/6	
Hardcore, broken brick, deposited, spread and levelled, and rammed to a true surface 6″ thick per yard super	1/4	

CONCRETOR

Foundations and Mass Concrete

✱Portland cement concrete 1 : 6 with unscreened ballast, in foundations and masses exceeding 12″ thick .. .. .. per yard cube ..	20/6
✱Ditto, 1 : 3 : 6, with one part of cement and three parts of sand and six parts of clean gravel per yard cube	21/–
✱Ditto, 1 : 2 : 4 with one part of cement, two parts of sand and four parts of ¾″ crushed graded shingle per yard cube	25/10
Add if mixed by hand labour .. per yard cube	2/–
Add if in foundations not exceeding 12″ thick per yard cube	2/3
Add for mechanical hoisting .. per yard cube	1/6
Add for hand hoisting per 10 feet .. per yard cube	2/3

Surface Beds

Portland cement concrete 1 : 6, bed 6″ thick, spread and levelled .. .. per yard super	3/11
Add or deduct for each inch over or under 6″ in thickness per yard super	–/5¾
Add for surface finished with spade face per yard super	–/3½
Add if laid in two layers with fabric reinforcement (measured separately) .. .. .. per yard super	–/3½

Upper Floors and Flats

Portland cement concrete 1 : 2 : 4 as before described. 6″ thick, packed around fabric reinforcement (measured separately) finished with spade face per yard super	5/3½
✱Add or deduct for each inch over or under 6″ in thickness per yard super	–/7½

Casings

Portland cement concrete 1 : 2 : 4 as before, in encasing to steel joists .. .. .. per foot cube	1/3
Ditto, packed around rods (measured separately) in lintols, sectional area not exceeding 36 inches per foot cube	1/5½
Ditto, ditto, over 36 inches and not exceeding 72 inches sectional area .. .. .. per foot cube	1/4½
Ditto, ditto, over 72 inches and not exceeding 144 inches sectional area .. .. .. per foot cube	1/3½
Ditto, ditto, over 144 inches sectional area per foot cube	1/2½

Walls in Situ

Portland cement concrete 1 : 6 with unscreened ballast in 9″ walls packed around rods (m/s) per yard super	6/7
Ditto, in 12″ walls ditto .. .. per yard super	8/–

Reinforcement

✱⅝″ diameter and upwards mild steel rod reinforcement, cut to lengths, including bends and hooked ends and embedding in concrete lintols .. .. per cwt.	24/–
✱Under ⅝″ diameter ditto .. .. .. per cwt.	25/6

Formwork

Close boarded formwork to soffites of floors and strutting up .. .. per yard super	3/9
Vertical formwork to sides of concrete walls, including struts, etc. (both sides measured) per yard super	3/–
Formwork to sides and soffites of concrete lintols and beams per foot super	–/6
Wrot ditto .. .. per foot super	–/7

• **Items marked thus have risen since February 10th.**

BRICKLAYER

	Flettons £ s. d.	Second Stocks £ s. d.	Blue Staffordshire Wirecuts £ s. d.
Reduced brickwork in lime mortar 1 : 3 with ¼″ joints .. .. per rod	23 0 4	32 9 0	
Ditto, ⅜″ joints .. per rod	22 13 4	31 7 3	
Reduced brickwork in cement mortar 1 : 3 with ¼″ joints .. .. per rod	24 15 4	34 3 8	51 15 8
Ditto with ⅜″ joints .. per rod	24 14 0	33 7 0	50 6 4
Add if lime mortar hand mixed .. .. per rod	5/8	5/8	
Ditto cement mortar .. per rod	12/9	12/9	9/–
Half brick walls in lime mortar 1 : 3 ¼″ joints .. .. .. per yard super	5/1	7/2	
Ditto in cement mortar 1 : 3 .. .. .. per yard super	5/5½	7/6½	11/3
Labour forming 2″ cavity to hollow walls including wall ties etc. per yard super			9/–

	£ s. d.
Add to the price of reduced brickwork for brickwork in underpinning .. .. per rod	4 0 0
Ditto, for brickwork circular on plan to flat sweep per rod	5 0 0
Ditto, ditto, to quick sweep .. .. .. per rod	10 0 0
Extra for Internal fairface and flush jointing per yard super	1/1½
Extra for grooved bricks as key for plaster per yard super	3d.
Raking out joints ditto .. .. .. per yard super	4½d.
Hacking concrete ditto .. .. .. per yard super	6d.
Horizontal double slate damp-proof course 4½″ wide bedded in cement mortar .. .. per foot run	4d.
Ditto exceeding 4½″ in width .. .. per foot super	10d.
Vertical ditto .. .. per foot super	1/–
" Ledkore " (Grade B) D.P.C. .. .. per foot super	9d.
•Plumbing angles .. .. per foot run	1d.
Rake out joints and point to lead flashings per foot run	2d.
Ditto stepped .. .. .. per foot run	3d.
Bedding door frames .. .. .. per foot run	1d.
Ditto and pointing one side .. .. per foot run	2d.
Ditto and pointing both sides .. .. per foot run	3d.
Parge and core flues .. .. each	4/–
Set and flaunch only chimney pots .. .. each	5/–
Hoisting and fixing metal windows size 3′ 6″ × 4′ including cutting and pinning lugs to brickwork and bedding frames in cement mortar and pointing in mastic on one side .. .. each	5/–
Ditto, including screwing to wood frame (measured separately) .. .. each	3/–

	9″ × 3″	9″ × 6″
Form opening for air brick including slate lintol and render around in cement and sand to 13½″ wall and build in Terra Cotta air brick .. each	2/6	3/3
Galvanized cast iron School Board pattern air bricks and building in .. .. .. each	9d.	1/3
Fixing only fireplace simple interior and surround each	27/6	

Partitions

	2″	2½″	3″	4″
Breeze set in cement mortar per yard super	2/11	3/5	4/1½	5/1½
Clay tile ditto .. per yard super	4/5	4/11	5/8	6/4½
Pumice ditto .. per yard super	4/6	5/2½	6/3	7/2
Plaster ditto .. per yard super	4/–	4/11	6/–	7/2
White glazed both sides best quality bricks, set in cement mortar and pointed in Parian cement per yard super ..		42/5		

Facings

Prices are extra over Fletton brickwork and are for raking out joints and pointing with a neat struck weathered ¼″ joint in cement mortar. For raking joints and pointing in white cement add an extra 11d. per yard super to the following prices.

	Flemish Bond	English Bond	Stretcher Bond
Stock facings p.c. 95/– .. per yard super	5/1	5/6	4/2
Rustic Flettons p.c. 70/6 .. per yard super	3/4	3/6	2/11
Blue pressed p.c. 174/– .. per yard super	11/3	12/6	8/10
Sand faced hand made reds p.c. 120/– per yard super	8/–	8/7	6/4
White glazed, headers p.c. 470/– and stretchers 480/– .. per yard super	32/–	36/–	24/8
For a variation of 10/– per M. in p.c. of facing bricks size 8¾″ × 2⅝″ on face with ¼″ joints add or deduct per yard super	9d.	10d.	6¾d.

✱ **Items marked thus have fallen since February 10th.**

CURRENT PRICES

BY DAVIS AND BELFIELD, P.A.S.I.

BRICKLAYER, DRAINLAYER, ASPHALTER AND PAVIOR

BRICKLAYER—(*continued*)

Facings—(continued)

	Rustic Flettons	Stock Facings	Sand Faced Hand Made Reds
Half brick wall stretcher bond in cement mortar built fair and joints raked out and pointed in cement mortar on one side .. .. .. per yard super	8/7½	9/10½	12/–
Ditto and pointed both sides per yd. super	10/6	11/9	13/10
One brick wall in cement mortar built fair and joints raked out and pointed in cement mortar on one side per yard super	15/5	17/11	22/1
Ditto and pointed both sides per yd. super	17/3	19/9	23/10
Half brick wall built in best quality white glazed one side bricks, stretcher bond, in cement mortar built fair and pointed in parian cement .. .. .. per yard super			31/–
Ditto white glazed both sides and pointed both sides per yard super			41/9
Labour and material in hand made sand faced red brick on end window head and pointing to face and 4½″ soffite per foot run			1/3
Hand made, sand faced brick on edge coping including double course of tile creasing with two cement angle fillets to one brick wall .. .. per foot run			2/3

DRAINLAYER

Excavate to form drain trenches for 4″ pipes and get out, including planking and strutting, filling in and ramming, and wheeling and spreading surplus.

Prices per 12″ average depth per foot run:	Ordinary ground	Clay
Trenches not exceeding 3′ 0″ deep	–/2½	–/3
Ditto, exceeding 3′ 0″ and not exceeding 5′ 0″	–/5½	–/7
Ditto, exceeding 5′ 0″ and not exceeding 10′ 0″	–/8½	–/9½
6″ thick Portland cement concrete bed 6 : 1, 12″ wider than diameter of pipe, and flaunched halfway up sides of pipe .. per foot run	–/8½	–/10
6″ ditto, and completely encasing per foot run	1/7	1/11

Agricultural land drain pipes, laid complete with butted joints, exclusive of digging .. .. per yard run	2″ –/4	3″ –/6	4″ –/8	6″ 1/1

British Standard Quality Salt Glazed Socketed Stoneware Drainpipes and Fittings

	4″ pipes Over 2-ton lots	4″ pipes Under 2 tons, 100 pieces upwards	6″ pipes Over 2-ton lots	6″ pipes Under 2 tons, 100 pieces upwards	9″ pipes Over 2-ton lots	9″ pipes Under 2 tons, 100 pieces upwards
Pipes jointed in 1:1 cement and sand per foot run	1/1	1/3	1/7	1/10	2/8½	3/4
Extra for bends .. each	1/4	1/7	2/–	2/4	3/6	4/–
Ditto, single junction each	1/10	2/2	2/–	2/4	3/6	4/–
Trapped yard gulleys with galvanized iron gratings, and setting in concrete and jointing to drain each	9/–	11/6	13/–	14/–	19/–	22/–
Ditto, with horizontal back inlet .. .. each	10/6	13/3	14/6	15/9	20/6	23/9
Ditto, with vertical back inlet .. .. each	11/3	14/–	15/3	16/9	21/3	24/9
Intercepting trap with Stanford stopper and setting in manhole and making good .. each	20/6	24/–	25/6	29/–	—	—

Coated Cast Iron Socketed Drain Pipes

	4″	6″	9″
Pipes in 9′ 0″ lengths and laying in trench, including caulked lead joints per foot run	3/6	5/3	9/3
Cutting and waste .. .. each	1/9	3/6	—
Extra for bends, including extra joints and cutting and waste on pipe each	10/10	20/9	59/5
Ditto, junction ditto .. .. each	17/5	32/6	99/5
Intercepting trap .. .. each	49/–	79/4	183/4

DRAINLAYER—(*continued*)

	4″	6″	9″
H.M.O.W. large socket gulley trap with 9″ gulley top and heavy grating and one back inlet	45/5	79/6	—
H.M.O.W. gulley trap with 9″ inlet with high invert outlet for use with raising pieces	33/5	48/–	—
4″ inspection chamber with one 4″ branch	each	66/–	
4″ ditto with two 4″ branches one side	each	99/–	
6″ ditto with one 4″ branch	each	95/3	
6″ ditto with two 6″ branches one side	each	140/–	
9″ ditto with one 9″ branch	each	212/6	
9″ ditto with two 9″ branches one side	each	326/–	

	White glazed	Salt glazed
4″ half-round straight main channel 24″ long each	5/10	2/1
Ditto, channel bends (ordinary) .. .. each	8/6	3/–
4″ Three-quarter round branch bends (short) each	8/6	6/9
Manhole covers and frame bedded in grease and set in cement mortar .. .. .. each	4/–	

ASPHALTER

Various qualities of asphalte are marketed by different firms. The term " Best " is intended to imply the best quality produced by a single representative firm, and not necessarily the best or most expensive asphalte obtainable.

	Natural Rock Asphalte Best Quality	Natural Rock Asphalte Second Quality
Basement (Tanking).		
1½″ horizontal d.p.c. in three layers on concrete per yard super	8/5	6/10
¾″ vertical ditto in three coats on brickwork or concrete .. .. .. per yard super	11/6½	10/–
Double angle fillet .. .. per foot run	–/6¼	–/5¼
Hard Graded Paving.		
1″ thick .. .. .. per yard super	7/4	6/3½
¾″ thick .. .. .. per yard super	6/3½	5/3½
½″ dampcourse finish, with smooth surface to receive lino or other floor covering	5/3	4/8½
Roofing (Flat).		
¾″ thick in 2 layers .. .. per yard super	6/3½	5/3
1″ ditto .. .. .. per yard super	7/4	6/3½
Extras.		
Felt supplied and fixed .. per yard super	–/6¼	—
Expanded metal reinforcement ditto per yard super	1/0½	—
6″ skirting and fillet on brickwork per foot run	1/0½	–/11½
6″ ditto on wood (reinforced) per foot run	1/2½	1/1½
Nosing at eaves on lead apron (measured separately) .. .. per foot run	–/3¼	–/3¼
Parapet outlets .. .. each	4/2½	3/8

PAVIOR

	1″	1½″	2″
Granolithic paving .. per yard super	2/7½	3/6	4/7
Add for dusting with carborundum powder per yard super			–/9
Cement and sand paving (1 : 3) per yard super	1/10	2/4½	—
½″ Jointless flooring, red, buff or brown, finished to a smooth trowelled surface, on concrete sub floors per yard super			5/3
¾″ Ditto, in two coats on spade faced concrete or wood sub floors			6/7
⅝″ thick ditto, reinforced with laths and galvanised wire netting .. .. .. per yard super			6/0½
Add for polishing .. .. per yard super			–/6¼
Terrazzo paving, white chips set in white cement, panelled into squares with 1¼″×¼″ deep ebonite strips, on and including cement and sand screed. Total thickness 1¼″ per yard super			19/5
Ditto, but white chips set in grey Portland cement per yard super			17/4
Terrazzo tiles, white chips set in white cement :—			
•Size 9″ × 9″ × ¾″ .. .. .. per yard super			20/6
•Size 12″ × 12″ × 1″ .. .. per yard super			18/8
Ditto, but white chips set in grey Portland cement :—			
•Size 9″ × 9″ × ¾″ .. .. .. per yard super			18/11
•Size 12″ × 12″ × 1″ .. .. per yard super			17/1

	⅛″	3/16″	¼″
Sheet rubber .. .. per yard super	12/1	15/3	18/4½
Rubber tiles .. .. per yard super	15/3	18/4½	21/6
	9/16″	⅜″	¼″
•Cork tiles, polished .. per yard super	12/10½	11/–	10/–

• Items marked thus have risen since February 10.

CURRENT PRICES

BY DAVIS AND BELFIELD, P.A.S.I.

MASON, SLATER, TILER AND ROOFER, AND CARPENTER

PAVIOR—(*continued*)

Hard red paving bricks laid flat (9″ × 4½″ × 2⅝″)	per yard super	9/–
Ditto, laid on edge	per yard super	11/9

		⅝″ thick	¾″ thick
6″ × 6″ best quality red quarry tiles	per yard super	10/–	11/–
6″ × 6″ best quality buff quarry tiles	per yard super	10/6	11/6
2″ Yorkshire stone paving, square joints and bedding	per yard super		22/–
2″ Finished path of coarse gravel finished with good binding gravel to slight camber	per yard super		1/7½
3½″ Path of clean hard clinker and 1½″ gravel finished to slight camber	per yard super		2/3
7½″ Carriage drive of 3″ clinker, 3″ coarse gravel and 1½″ binding gravel finished to slight camber	per yard super		3/9
2½″ Tar paving in two layers finished with Derbyshire spar	per yard super		4/9

MASON

		Bath	Portland
Stone and all labours of usual character covering 7″ on bed, roughly squared at back, fixed and cleaned down complete	per foot cube	11/9	17/–

Yorkstone

		Thickness 3″	4″	6″
Templates tooled on exposed faces, sawn beds and joints, and set in cement mortar :—				
Size 9″ × 9″	each	1/8	2/3	3/4½
„ 14″ × 9″	each	2/7½	3/6	5/3
„ 18″ × 14″	each	5/3	7/–	10/6
„ 22½″ × 14″	each	6/6	8/8	13/–
„ 27″ × 14″	each	7/10½	10/6	15/9

Artificial Stone

In steps, copings, band courses, etc., per foot cube, from		9/–

Reconstructed Stone

In steps, dressings, band courses, etc., per foot cube		12/6

Slate

		1″	1¼″	1½″
Slate slabs, sawn to size, not exceeding 10 ft. sup. and planed, with rubbed face and fixing as shelving, etc.	per foot super	4/6	5/–	6/–
Ditto, not exceeding 20 ft. sup.	per foot super	5/4	5/10	7/–
Rubbed edges	per foot run	–/4½	–/4½	–/4½

SLATER, TILER AND ROOFER

Bangor and Portmadoc Slates

		20″ × 10″	16″ × 8″	24″ × 12″
Slates laid to a 3″ lap and fixed with zinc nails	per square	79/–	77/–	80/–

Old Delabole Slates

		20″ × 12″	16″ × 10″
Grey medium gradings	per square	86/–	84/6
Unselected greens (V.M.S.) (weathering greens and grey greens mixed)	per square	96/6	94/6

Randoms		No. 1 Gradings 24″/22″ to 12″/10″
Ordinary grey greens	per square	91/3
Weathering grey greens (V.M.S.)	per square	101/9

		No. 2 Gradings 24″/22″ to 12″/10″
Weathering greens (V.M.S.)	per square	107/–

Westmorland Green Slates

Randoms		Bests 24″ to 12″ long proportionate widths
No. 1 Buttermere, fine light green	per square	122/9
No. 2 Buttermere, light green (coarse grained)	per square	120/9
No. 5 Buttermere, olive green (coarse grained)	per square	117/6

SLATER, TILER AND ROOFER—(*continued*)

Tiles

Hand made sand faced 10½″ × 6½″ laid to 4″ gauge, fourth course nailed with galvanized nails	per square	65/–
Machine made ditto	per square	56/7

Pantiles

Berkshire hand made surface red laid dry,	per square	65/–
Bridgewater hand made red laid dry	per square	65/–
Bridgewater double Roman laid dry	per square	48/3

Sundries

Stripping, slating down to and including, 18″ × 9″	per square	4/6
Ditto smaller sizes	per square	6/–
Add for carrying down and stacking	per square	1/8
Ditto stripping battens down to and including 18″ × 9″	per square	1/4½
Ditto, ditto, smaller sizes	per square	2/3

Cedarwood Tiles

Canadian Cedarwood shingles laid to 5″ gauge	per square	47/4

Asbestos

Russet brown asbestos cement roofing tiles 15¾″ × 15¾″ laid diagonally with 2¾″ lap,	per square	38/–

CARPENTER

Centering

Turning piece to flat soffites 4½″ wide (For Formwork see "Concretor.")	per foot run	–/4

Fir Sawn and Fixed

Plates, dragon ties, sleeper joists and lintols, ground floor (4″ × 2″ and 4″ × 3″)	per foot cube	3/9
Upper floor ditto (7″ × 2″)	per foot cube	4/4
Partitions (stud) (4″ × 2″ and 4″ × 3″)	per foot cube	5/–
Rafters and ceiling joists (4″ × 2″ and 4″ × 3″)	per foot cube	4/9
Purlins, (6″ × 4″)	per foot cube	5/4
Hand labour wrot face	per foot super	–/2
Machine ditto	per foot super	–/1
Rebates, grooves, beads, chamfers and splays, per foot run		–/1
1½″ × 9″ ridge including cutting ends of rafters against same	per foot run	–/6¾
1½″ × 11″ hips or valleys ditto	per foot run	–/8¼
Extra labour trimming 6″ × 2″ floor joists around fireplace, including notching ends of joists at 14″ centres to trimmer joist 7′ 0″ long and two tusk tenons	each	6/–
Boring small hole per inch of depth	per doz.	–/6
Ditto large	per doz.	1/–

Deal Battening for Slates and Tiles

2″ × 1″ spaced for Countess (20″ × 10″) slates to 3″ lap	per square	11/–
2″ × 1″ ditto for Ladies (16″ × 8″)	per square	14/6
2″ × 1″ ditto for Duchess (24″ × 12″) ditto	per square	9/–
2″ × 1″ ditto for randoms 24″/22″ to 12″/10″	per square	12/2
1½″ × ¾″ ditto for plain tiles (10½″ × 6½″) to a 4″ gauge	per square	15/4
1½″ × 1″ ditto for pantiles to approximately 11½″ gauge	per square	6/7

Roof Boarding

		¾″	1″
•Deal roof boarding in batten widths close jointed	per square	29/2	35/6
Ditto, prepared for patent flat roofing and including firrings to falls	per square	39/7	45/10
Small tilting fillet	per foot run		–/2
Large ditto	per foot run		–/4

Felt

Sarking or slaters felt, fixed with 2″ side laps and 6″ end laps	per yard super	–/10½
Roofing felt ditto	per yard super	1/1
Bituminous hair felt ditto	per yard super	2/–

Weather Boarding

Rough deal feather edge boarding in batten widths ½″ average with 1¼″ laps	per square	31/3
Western Red Cedar ditto	per square	32/10

Fascia and Soffite Boards

1″ × 6″ deal splayed fascia fixed to rafter feet	per foot run	–/4½
1″ × 9″ deal soffite tongued both edges, including grooves	per foot run	–/7½

(*To be continued in next Issue*)

• Items marked thus have risen since February 10.