'PHORPRES' BRICKS FOR FACTORIES

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3


4

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Negligible upkeep costs
No delay in construction through late delivery of material

— these are the assets obtained by building with 'Phorpres' bricks —

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Four light factories at Slough Trading Estate built with 'Phorpres' bricks

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Contractors: 1. F. W. West, Ltd., Taplow
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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, December 2, 1937. NUMBER 2237 : VOLUME 86

PRINCIPAL CONTENTS

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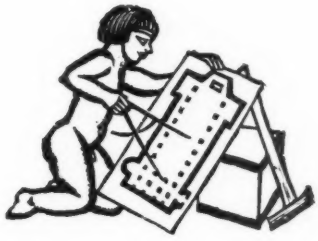
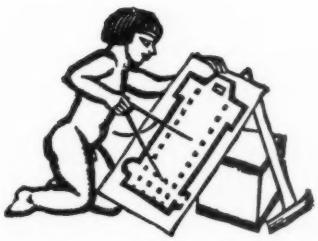


THIS ISSUE

This issue contains, in addition to the two illustrated articles on "Design" and "Equipment," a special section devoted entirely to completed schemes. In this section each scheme has a title giving the nature of the product manufactured, the location of the building, and the name of the architect. The factories titled in this manner are as follows :—

FACTORY AT WEMBLEY

Factory for printing, interleaving and packeting cigarette papers, designed by Mr. H. Courtenay Constantine. The frame, floor slabs, roofs and staircases are in reinforced concrete; the elevations are faced with brick. Further illustrations appear on pages 896-897.



THE FUTURE OF FACTORIES

THE main object of this issue is to provide a reference to the work done in the last few years in the design of factories. Its secondary object is to draw the attention of architects generally to what will probably become one of the largest fields of practice.

The employment of architects for factory design on any extensive scale is a comparatively new development—of the last ten years almost entirely and chiefly of the last five. The development has three aspects of special interest to all architects: Why it began and is now increasing; the technical problems involved in factory design; and why it is likely to become so much more important.

The development of clean light industries, the migration southwards from older heavy industrial areas, the increase in road transport, realization of the importance of careful planning of production flows and the higher standards demanded by the Factory Act are all partly responsible for architects being asked to design factories. The new light industries tended to gather round London. Road transport suggested main roads as sites—prominent sites; the necessity for exact planning of circulations and work spaces and appreciation that good factory surroundings nearly always mean good work, suggested the architect. And one assumes that business has found that an architect pays.

The technical aspects of the light industry factory the JOURNAL has tried to deal with, in some degree, in this issue. In detailed production processes and layout, in equipment and air-conditioning each factory is individual; but in spite of this the new factories are generally similar. A large manufacturing area, usually single-floored, has an administrative block along one side and subsidiary departments grouped around the others. In this issue many such buildings are illustrated, together with others which, from their multi-floor type, formed more intricate problems. In addition, the regulations and planning questions which apply to all factories are reviewed by experts.

The individual standard light industry factory is therefore the industrial building type on which architects were first employed and are still chiefly employed. But more and more such factories is not likely to be the limit of architectural interest in factories—or at any rate should not be.

Just a week ago the annual Report of the Commissioner for the Special Areas (England and Wales) was published. In that Report the JOURNAL believes it easy to read Sir George Gillett's view that the Government cannot continue for long to touch industry only at top and bottom—by quotas and tariffs at the top, and by factory regulations and unemployment relief at the bottom. Sometime and sometime soon, we believe, they must try to guide it in the middle.

Our belief in this development is very relevant to future opportunities for the architect in factory design. If the Government, on the advice of the present Royal Commission, decide to try to guide industrial location there is no doubt of the lines on which they will work. The researches of Sir George Gillett and his predecessor, Sir Malcolm Stewart, have led them both to give substantially the same advice.

That advice is, very briefly, this: In the three Special Areas, and to a smaller degree elsewhere, a great number of local industries have permanently come to an end. In the meanwhile new industries are springing up elsewhere. The interests of the country will be best served if this "natural" process is controlled and to some extent prevented. The easiest way of doing this is by attracting new industries to old industrial areas by tax rebates, by clearing up the mess of old industries to form attractive sites, and by building ready-to-use factories. Finally, the period of temporary depression before the new industries are in full blast might be overcome by the nation paying for clearing up the old mess.

The most practical people ought to find no difficulty in agreeing with such sensible and moderate suggestions. *Laissez-faire* is already abandoned in individual industries and for individual workers and owners in a thousand ways, by negative regulations and minimum standards; and what is left of it can hardly be considered precious enough to prevent all new industry being given a good push in the right direction.

The right direction, from the point of view of the whole country, means two things. Firstly, that new industry should be tempted back to the old areas; secondly, that factories everywhere should be grouped on sites designed to provide the cheapest services, most convenient arrangement, good working conditions, and good appearance.

Today there is the opportunity to do this. New factories have broadly similar requirements, are not geographically tied, and transport has reached an efficiency which makes a doorstep market much less important. With new factories grouped in 200 Trading Estates throughout Britain, costs would be cheaper for the manufacturers, sporadic development would be prevented and "industrial area" would no longer be phrase of ubiquitous reproach.

In these Trading Estates, whether managed by the Government or private firms, is the architect's chance of getting back his usefulness to industry—a quality he has lost for a hundred years. In Trading Estates—real Trading Estates and not the chaos in miniature so common under that title now—is also the chief hope of clearing up, in time, the mess that industry has made in Britain.

The idea, since it pays manufacturers *and* the country, seems worth looking into, and a Royal Commission is now doing so. Their Report ought to be read by architects with exceptional interest.

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NOTES & TOPICS

INDUSTRY

LAST week, just in time to make this issue still more topical, the annual Report of the Commissioner for the Special Areas was published. Journalists, or perhaps columnists is the better term in this case, are very fond of telling their readers that they must not miss reading something. I now follow their example and tell everyone who realizes how much industry and town planning is going to affect their income not to miss this Report.*

*

We have been very fortunate in Sir Malcolm Stewart and Sir George Gillett. Both were appointed, one feels sure, in the hope that, while mitigating the distresses of the Areas, they would be far too sound business men to encourage this nonsense about planning industry.

*

Both, after examining the problems of the Areas, stated with calm reasonableness what they think should be done ; and this is to guide industry as a whole in the way it ought to go—starting with new industries. This is, of course, quite different from planning industry.

*

The method of coaxing manufactures to the Special Areas is well known and its good results are listed in the Report. But some of the other possibilities and facts discussed by Sir George Gillett are not known.

*

The population of the Areas has decreased by 40,000 in two years, while the rest of England and Wales has increased by 250,000. The Government have regulated industry by tariffs at the top and Factory Acts at the bottom and cannot reasonably be held to have no concern with the middle bit. Industry might possibly be compelled, by some form of insurance, to clear up the mess it makes. The probable best way of assisting the areas and preventing concentration round London is to clear up old industrial sites and so prepare them as to be attractive propositions for new industries.

* H.M.S.O. Price 3s. 6d.

. . . . AND SLUMPS

"Architecture and the Next Slump" is the title of the first Informal Meeting of the Session at the R.I.B.A. Organized by the Junior Members Committee, the meeting is on Wednesday, December 15, at 6.30 p.m., and those who remember 1932 may feel like turning up and hearing the things that we might do to avoid similar unpleasantness.

*

It is rumoured Professor H. J. Laski may be persuaded to come with a full opposing programme. Mark the date.

EMPIRE EXHIBITION'S PROMISING START

While the matter is still *sub judice* one cannot say much about the odd position (which only that race of genius, the Scots, could have got itself into) at Bellahouston Park, Glasgow.

*

Coincident with all the publicity ("the Paris Exhibition closes this week : next summer all the world will be flocking to Glasgow") that anticipates the riot of enjoyment and instruction that Bellahouston will provide, the serious question is being debated—it is being settled this week—whether or not alcoholic drinks will be permitted to be sold in the Exhibition grounds.

ISOBAR

Mr. Pritchard's "Isobar," the new club which was inaugurated last week in the Lawn Road (Isokon) flats, is not especially a club for architects ; but it may well become so. It has a favourable start, situated in one of London's pioneer efforts at modern building and itself charmingly decorated inside by Marcel Breuer.

*

"Black-balled from the Isobar" may in time become the accepted label of architectural caddishness.

*

I learnt at the opening that the club subscribes to five papers for the benefit of its members : *The Times*, *The Daily Worker*, *The New Statesman*, *The New Yorker* and *The Architectural Review*.

*

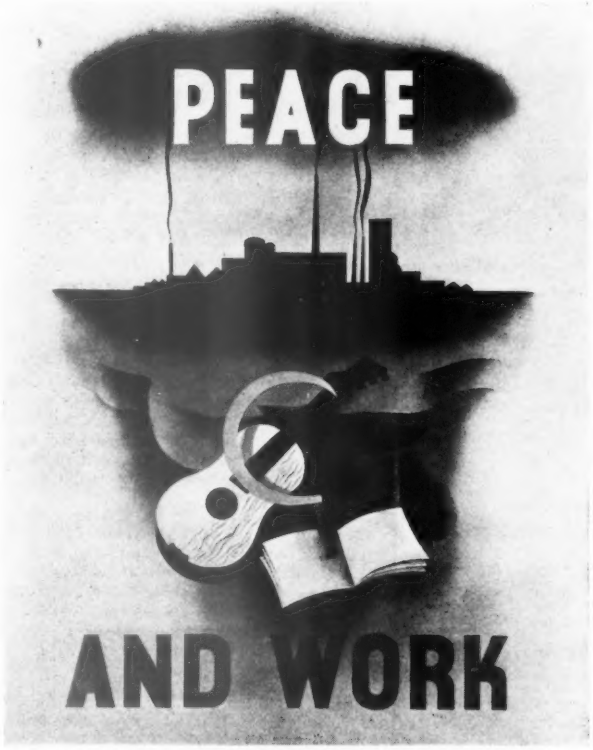
The club's decorations have also the slightly melancholy distinction of being the last work of Marcel Breuer in this country. As we have all learnt with regret, he has now left us to join Professor Gropius in America—both in private practice in Boston and as a fellow-professor of Harvard University.

OFFICIAL ARCHITECTS AGAIN

Official and salaried members cannot get adequate representation on the Council because of the fixed proportion of Fellows — most Fellows being private architects.

*

A fortnight ago I said that if the majority of salaried and official Members feel strongly about this and preferred to be represented by official architects, it was queer that official Fellows did not often seem to be elected. My conviction that most official architects have no such



A poster, by Mr. Nigel Bruce, at the exhibition held recently at the Reimann School, London.

grievance is now complete—for a correspondent who has examined election results for the period 1931–1936 sends me the following figures :—

1931 : W. T. Curtis (212), R. Wynn Owen (100) ; 1932 : R. Wynn Owen (115) ; 1933 : S. D. Meadows (154) ; 1934 : W. T. Curtis (279), S. D. Meadows (143) ; 1935 : W. T. Curtis (224) ; Sir James West (216), Pointon Taylor (195), John Bennett (172) ; 1936 : A. L. Roberts (202).

*

These men are at the top of the tree of official architecture and are as well known to private architects as to their assistants. But official members only award them about one-eighth of the votes necessary for a Council seat.

*

And now what *did* the President really say in 1937 ?

*

What he put forward for quiet consideration, in only *one* part of his speech, as a matter of interest to those who are concerned about the highest possible standards in the art of architecture, was a theory that if the country wants the very best kinds of public buildings, best in planning and design, most brilliant, and, when desirable, most original in conception, it is more likely to get them and the art of architecture is more likely to advance if an opportunity is given to the ablest and most brilliant men in the country (whether in private practice or in official employment) to design them.

*

He suggested that the highest standard of design was not so likely to be attained if the responsibility for a vast number of buildings of civic importance all over the country remained in the hands of a small number of departmental chiefs—largely, if not entirely selected for administrative ability rather than for proved capacity as designers—controlling vast numbers of anonymous subordinates, and turning out millions of pounds' worth of work every year.

*

He added that much of the work actually produced reached a high standard of quality, considering the conditions under which it was produced, and reflected great credit on the men who had to work the great official machines. The standard might be, and probably was in many cases, higher than if the work had been given to the *average* architect in private practice. But *not* so high as it would be if the best designers in the whole country were free to use their talents upon it.

THE NEW HERO

The feuilleton-film-hero in the past, invariably a young playwright starving in a garret, is changing professions. According to a notorious film critic who shall be nameless, he is giving up the Play that Gets his Name in Lights on Broadway on the last page in favour of a roll of blue-prints.

*

The reason is instructive. The starving playwright's advantage was not merely that he could starve and still be a gentleman ; he was always on tap ; he never had to account for seven hours in an office which would hold up the action of the plot until some time after tea each day, besides making it unfeasible for him to get trapped, kidnapped, marooned, hunted, or to go after his jolly girl if she got ditto. The disadvantage is that as the century advances it gets more and more *rentier* to write a successful play and indulge yourself and possibly your jolly girl upon the proceeds. Anti-social. The starving masses don't get the benefit.

*

This is where the unsuccessful young architect comes in—there is a new one, the hero of that good and moving film " Dead End." He looks up at the slum in which he lives, and his jolly girl looks up too, and a tear quivers in his voice as he says : " I live for the day when I can tear down this haunt of et cetera and see rising in its place a gleaming et cetera." You see with the architect success and social service march hand in hand, today practically a dramatic necessity, and as long as he sticks like a limpet to that symbol—that *signal*—the roll of blue-prints, he can turn up in odd places just as freely as the playwright.

*

I asked the film critic if he thought the change did architects any good. He looked strangely at me. " Do you realize," he said, " that there sitting somewhere in the ninepennies is a future Nuffield? In ten years there won't be a building goes up without it goes up from the blue-prints of some unsuccessful young architect."

*

" And get this," he continued, poking the butt of his fountain pen into the V of my waistcoat, " every time the word architect is mentioned in a cinema more than half the audience hears it for the first time." ASTRAGAL

NEWS

POINTS FROM THIS ISSUE

THE PARIS EXHIBITION

The Paris Exhibition closed on Thursday last. Whether the exhibition will be re-opened next year is still uncertain, for although the Government is in favour the ultimate decision rests with the Chamber of Deputies and the Senate.

LIVERPOOL ARCHITECTURAL SOCIETY

Mr. H. C. Bradshaw addressed the Liverpool Architectural Society last week on "Art Commissions and Advisory Committees." Describing the work of the Royal Commission, he said it was important to realize that it had no power to enforce its recommendations, but simply reported to the Ministers or authorities concerned. Authorities were free to seek advice if they felt they required it, and if they felt justified in doing so, they might enforce the recommendations made to them. From his experience, however, he had observed that people did not seek advice unless they felt themselves to be in need of it.

APPOINTMENTS

With a view to co-ordinating the architectural work in Monmouthshire, Monmouthshire County Council has accepted the recommendation of the Staffing Committee that Mr. Colin L. Jones, the present education architect, should be the county architect.

Mr. E. W. Roberts, F.R.I.B.A., has been appointed County Architect of Nottingham in succession to the late Mr. Leonard Maggs.

SOME HOUSING STATISTICS

Sir Kingsley Wood, the Minister of Health, speaking last week at the National Housing and Town Planning Conference, gave the following facts concerning housing in this country :—

Since the Armistice more than 3,400,000 houses had been built in this country.

The taxpayers had contributed over £180,000,000 to housing alone.

Since the war some 13,500,000 persons—equal to about 35 per cent. of the population—had moved to new homes.

Some 800,000 slum-dwellers were already in new houses.

In a number of cities and towns some 25 per cent. of the overcrowding had already been abated.

Out of 37 million acres in England and Wales, 23 millions were now under planning control and this figure was increasing at the rate of 200,000 acres a month.

THE ARCHITECTS' DIARY

Thursday, December 2

ARCHITECTURAL ASSOCIATION. 36 *Bedford Square, W.C.1. Exhibition of photographs taken by members on the A.A. Excursion to Paris. Until December 17.*

SOUTH WALES INSTITUTE OF ARCHITECTS (CENTRAL CARDIFF BRANCH). *At the Engineers' Institute, Cardiff. "Housing from a Woman's Point of View." By Elizabeth Denby. 7.15 p.m.*

INSTITUTION OF CIVIL ENGINEERS, YORKSHIRE ASSOCIATION. *At the Hotel Metropole, Leeds. "Reconstruction of Bridge at South Shields." By E. L. Triffit. 7.30 p.m.*

INSTITUTION OF ELECTRICAL ENGINEERS. *Savoy Place, W.C.2. "Rural Electrification." By J. S. Pickles. 6 p.m.*

Monday, December 6

R.I.B.A., 66 *Portland Place, W.1. Concert arranged by the R.I.B.A. Musical Group. 8.15 p.m.*

BLUE CIRCLE PLAYERS, *at the Arts Theatre, Gt. Newport Street, W.C. "The late Christopher Bean." Until December 11. Each evening at 8.30.*

Tuesday, December 7

INSTITUTE OF WELDING. *At the Institution of Mechanical Engineers, Storey's Gate, S.W.1. "The Application of Surfacing Metals by Oxy-Acetylene." By C. G. Bainbridge. 6.30 p.m.*

Wednesday, December 8

INSTITUTE OF WELDING (MANCHESTER AND DISTRICT BRANCH). *At the Manchester College of Technology. "Impressions of Continental Welded Steelwork." By E. P. S. Gardner. 7.30 p.m.*

SLUM CLEARANCE PROPOSAL IN STEPNEY

The acquisition and clearance of over 17 acres of land in Stepney—the largest single clearance area yet dealt with by the L.C.C.—was recommended to the Council on Tuesday last by the Housing and Public Health Committee. About 12 acres of the land, which is in a badly congested district situated south of Mile End Road and east of White Horse Lane, consist of slum properties. These properties, mainly of the terrace type, two or three storeys in height, besides being badly planned, are insanitary and in a bad state of repair. The estimated cost of acquiring and clearing the area is £230,000, while the rehousing of the persons to be displaced (about 4,500) will cost £535,000, making a total estimated expenditure of £765,000. Fifteen blocks of flats, with accommodation for over 4,000 people, will be erected on about 15¼ acres of the site when cleared. Land lying between Trafalgar Square gardens and Duckett Street will not be built upon, but will be added to the existing public gardens as an amenity to the new estate.

ARCHITECTS' REGISTRATION BILL

Below we print the text of the Architects' Registration Bill which has now been presented in the House of Commons by Mr. Lovat-Fraser, the Member responsible for it. The debate on the Second Reading of the Bill takes place at 11 a.m. on Friday, December 17. The Bill is substantially the same as that introduced in Parliament last Session, the only alteration other than technical drafting alterations being the addition of a proviso to Clause 2 giving to any person refused admission to the Register by the Council a right of appeal to a Tribunal consisting of three persons appointed by the Lord Chancellor, the Minister of Health and the President of the Law Society respectively. In order to ensure the complete impartiality of the Tribunal it is also provided that no member of the Architects' Registration Council may be a member of the Tribunal.

A
BILL
TO

Restrict the use of the name Architect to Registered Architects and to extend the time within which practising architects may apply for registration.

Be it enacted by the King's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows :—

1. A person, not being a registered person within the meaning of the principal Act, who after the expiration of two years from the commencement of this Act, shall take or use the name, style or title of "Architect" or any name, style or title containing the word "Architect" shall be deemed to have committed an offence under section ten of the principal Act and the provisions of the said section including the provisos thereto shall apply accordingly

Provided that nothing in this section shall affect the use of the designation "Naval architect," "Landscape architect" or "Golf-course architect."

2. Notwithstanding anything in the principal Act, a person shall, on application made to the Council in the prescribed manner and on payment of the prescribed fee, be entitled to be registered under the principal Act, if the Council are satisfied on a report of the Admission Committee that his application for registration was made within two years after the commencement of this Act and that at the commencement of this Act he was, or had been practising as an architect in the United Kingdom :

Provided that any person aggrieved by the refusal or failure of the Council to cause his name to be entered on the Register on an application made by him under this section shall be entitled to appeal to a Tribunal to be constituted for the purpose of this Act consisting of three persons, not being members of the Council, to be appointed from time to time as follows :—

One person to be appointed by the Lord Chancellor ;

One person to be appointed by the Minister of Health ;

One person to be appointed by the President of the Law Society ;

and the decision of the Tribunal on any such appeal shall be final.

3. In this Act the expression "principal Act" means the Architects (Registration) Act, 1931.

4.—(1) This Act may be cited as the Architects Registration Act, 1938.

(2) This Act shall be construed as one with the Architects (Registration) Acts, 1931 and 1934, and those Acts and this Act may be cited together as the Architects (Registration) Acts, 1931 to 1938.

5.—(1) This Act shall not extend to Northern Ireland unless and until provision to that effect is made by an Order of His Majesty in Council made in pursuance of a resolution passed by both Houses of the Parliament of Northern Ireland and any such Order may make such adaptations of this Act in this application to Northern Ireland as may appear to His Majesty in Council to be necessary.

(2) In the event of this Act being so extended to Northern Ireland then for the purposes of section six of the Government of Ireland Act,

1920, this Act shall be deemed to be an Act passed before the appointed day.

THE LATE E. P. WARREN

It is with deep regret we record the death, at the age of 83, of Mr. Edward Prioleau Warren, F.S.A., F.R.I.B.A. A native of the West of England, Mr. Warren was educated at Clifton College and was articled to Messrs. G. F. Bodley, R.A., and Thomas Garner. Mr. Basil Oliver, in an appreciation in *The Times*, wrote: "In Bodley and Garner's office one of his contemporaries was Sir Walter Tapper, R.A., and another was Professor F. M. Simpson, who was Bodley's first pupil. It was in the eighteen-nineties that Simpson, partly through his friend Warren's instrumentality, became Professor of Architecture at the first whole-time School of Architecture in this country—namely, University College, Liverpool, which was, at that time, one of the three colleges constituting the then Victoria University. Warren has told me that the appointment largely came about through his chance conversation with a member of the Holt family, of Liverpool, with whom he happened to be riding in Hyde Park, and who had asked him if he could recommend a suitable candidate for the new Professorship. Warren suggested Simpson, who was duly appointed. I have good reason to be grateful to both, first as a student under the latter, and then as one of Warren's pupils. That was characteristic of his many kindly actions."

Mr. Warren, who was elected an Associate of the Institute in 1883 and a Fellow in 1906, held the following appointments: Principal Architect for Mesopotamia Imperial War Graves Commission; British Representative on Jury of Architects in the competition for the International Labour Bureau, 1923; President, Berks, Bucks and Oxon Architectural Association, 1921-1925; Member, Committee of Honorary Consulting Architects to the Church Building Society; past member of the R.I.B.A., Council; Hon. Corresponding Member of the American Institute of Architects, and the Société Centrale de l'Architecture de Belgique.

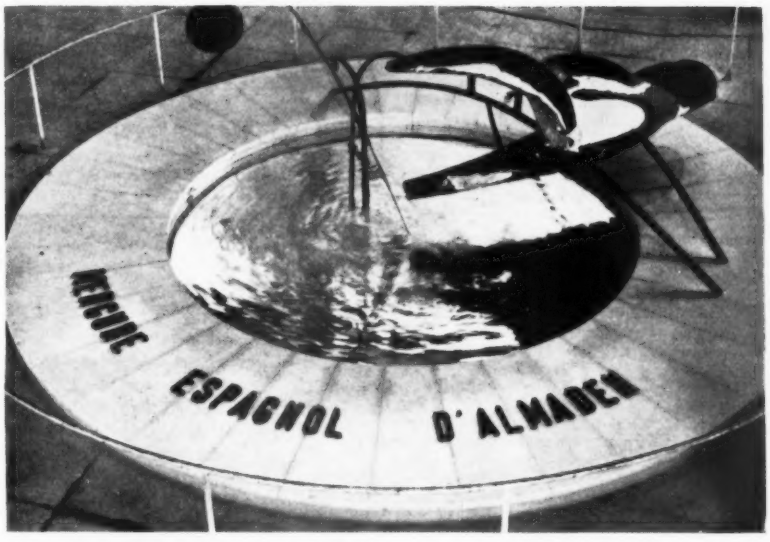
Mr. Warren was successful in the competition for the Hall of Caius College, Cambridge, in 1909, and his other work included: Hanover House, St. John's Wood; Shelly House, Chelsea Embankment; buildings for Balliol, Magdalen, Merton and St. John's Colleges, Oxford, and Trinity College, Cambridge; Radcliffe Infirmary, Oxford, and a large number of churches, schools and houses.

Mr. Warren's literary work included: "The Life and Work of George Frederic Bodley, R.A."

HOUSING PROGRESS IN SCOTLAND

During October Scottish local authorities completed 1,342 houses, the largest number in any month this year. Since the beginning of this year these authorities have completed 10,568 houses compared with 13,136 in the same period last year. On October 31 the number of houses under construction was 27,797, compared with 26,907 at the end of the previous month, while the number of houses contracted for but not begun fell from 11,367 at September 30 to 10,780 at October 31.

The total number of working-class houses completed by Scottish local authorities since 1919 is 186,404.



Mercury fountain in the Spanish Pavilion at the Paris Exhibition, designed and made by the American sculptor, Alexander Calder, who is now in England, holding his first show, which opened at the Mayor Gallery, yesterday.

R.I.B.A.

Informal General Meeting.—The first Informal General Meeting of the Session will take place on Wednesday, December 15, at 6.15 p.m., when the subject will be "Architecture and the Next Slump." The Junior Members' Committee, which is responsible for organizing these meetings, is hoping to get several speakers eminent in the Economic and Building Industry worlds. The meetings are open to all members.

Social Events.—The Concert on Monday next, December 6, will take place at 8.30 p.m. Members are invited to bring guests and there is no charge for admission. The next Dance will be on Friday, December 17. Single tickets are 6s. each, obtainable from Mr. R. W. A. Robertson, Clerk of the Dance Club, at the R.I.B.A.

Christmas Holiday Lectures.—There have already been more than 400 applications for the 500 seats available at the Christmas Holiday Lectures for Children. Members who wish their children to attend are therefore advised to apply for tickets within the next few days. The dates are December 29 and 31 and January 3. Mr. G. A. Jellicoe, F.R.I.B.A., is the lecturer and his subject "The English Countryside."

University Extension Lecture.—Mr. Basil Ward's ninth lecture at the R.I.B.A. on Tuesday, December 7, at 6.30 p.m., will be on "The Designer and his approach to Architecture."

R.I.B.A. Exhibitions.—"Modern Schools" is to return to London after being shown at the Public Library and Museum, Rugby, where it closes on December 11. In London it is to form a special section of the Schools Exhibition at Dorland Hall which is to open on December 20. London members interested in school design should not fail to visit this Exhibition.

"Airports and Airways" is at the Mortimer Galleries, Hull, until December 30.

"Civic Centres" is being opened at the Public Library and Art Gallery, Huddersfield, on Monday, December 6. It closes on January 8, 1938.

R.I.B.A. Library Catalogue.—When, at the Council Dinner, Sir Banister Fletcher was presented with the first volume of the New Catalogue, it was announced that he had made a second large donation towards the cost of Volume II, production of which will start at once.

General Meeting on December 20.—In this paper "The Case for a Learned Society," Mr. E. J. Carter, the Librarian-Editor, will ask whether architecture is just a practice to be protected by a strong professional "union" or whether it is, in fact, as it often claims to be, one of the essential progressive activities in modern life. If it is all that, what place can learning play and why is it so much neglected: what anyway is the kind of learning that we should foster; why is knowledge of antiquity considered scholarly and knowledge of technical matters merely unintelligible? And so by a depressing analysis of past and present to an estimate of what hope there is for the future.

QUEEN'S HOTEL, LEEDS

In the list of contractors for the Queen's Hotel, Leeds, published in last week's issue, the name of the Expanded Metal Co., Ltd., was inadvertently omitted. The firm were responsible for the B.B. expanded metal lathing and Rib-met.

CHANGE OF ADDRESS

Messrs. Andrew Farkas and George Farkas, architects, have moved to No. 57 Avenue Road, London, N.W.8. Telephone No. Primrose 4384.

LAW REPORT

Sir Brumwell Thomas v. Hammersmith B.C.

THE hearing was resumed during the past week in the King's Bench Division, High Court of Justice, of the action by Sir Brumwell Thomas against the Hammersmith Borough Council to recover damages or a sum due on a quantum meruit basis for work done in connection with plans and drawings for the defendants' new town hall.

The case has been reported in previous issues of the JOURNAL.

Mr. J. W. Morris, K.C., and Mr. Granville Sharp appeared for the plaintiff, and Mr. Pritt, K.C., and Mr. R. A. Willes for the defendants.

Mr. H. W. Langdon, of the firm of Horace W. Langdon and Every, quantity surveyor, gave evidence, and was asked whether the drawings and plans gave the quantity surveyor enough information about the wall surfaces of the building, and replied: "There is nothing in the drawings to indicate how the wall surfaces are to be treated, but I should not expect to find that information in the drawings except in some particular instance."

Questioned about a plan of the basement, witness said he would measure a 14-in. wall as

a brick wall, because there was nothing to indicate anything else.

He added that another drawing did not give details of the steel work of the public hall gallery, which was shown only in outline.

He gave his reasons why the plans were not complete, especially with regard to the foundations.

In his opinion a questionnaire on the drawings would run to some 600 or 700 questions. It would be many times longer than an ordinary questionnaire on drawings.

In a building of this kind, witness said, he should expect the fullest possible information as regarded the foundations. He should expect everything to be dimensioned. One could not have too much information as to the foundations. The tower in a building of that kind would not in his opinion come within the purview of a quantity surveyor.

The plans should have shown the heating arrangements.

Mr. Langdon, cross-examined, agreed that between 1931 and 1935 the scheme for the erection of a town hall went through a variety of stages.

Mr. Granville Sharp: Suppose that, as the result of changes in the cost of the building and the changes of requirements, the architect produced a set of plans in which there are some omissions, some mistakes as the result of reproducing and altering plans, and some lack of dimensions, it would be a simple matter—if the Council said: "Now go to a quantity surveyor"—for the architect to put the matter right and have the thing shipshape for the quantity surveyor?—If the drawings I inspected purported to be the whole work which the architect did, and if he took those drawings and out of them produced a set fit for the quantity surveyor, and which could be described as working drawings, it would be possible for the architect to do it. It would be no trouble to him, but I imagine that it would take him months to do it.

Mr. Langdon agreed that the plans indicated that Sir Brumwell had a clear conception of the building he wanted. There would be some twenty to twenty-five sub-contractors on a building like this, and the architect would send the sub-contractor the plans of that part of the building that affected him, and the sub-contractor would prepare his bill of quantities. He might give a lump sum price as well. He had gathered that the total cost of the building was £220,000. He had put the cost at £215,000. He was not told any details as to the steel work.

Replying to his lordship, Mr. Langdon said from the plans and drawings he could take out a proportion of the quantities desired, if he used his imagination and did what he thought it would be wise to do. That was his impression of the drawings. He thought the drawings and plans would raise unusual and never-heard-of questions to be dealt by an enquiry sheet.

Mr. Alfred Nunn, manager of the Adelphi Drawing Office, gave evidence as to the work the firm had done for Sir Brumwell.

Mr. Sydney Tatchell, F.R.I.B.A., senior acting partner of Tatchell and Wilson, was the next witness.

He said he heard nearly all the evidence of Mr. James. Speaking generally, he agreed with Mr. James, and speaking more particularly, with regard to his (Mr. James's) criticisms of the drawings for the quantity surveyor from the point of view of what an architect should send to a quantity surveyor, he agreed entirely.

In your view is it any good and any sense of an architect proceeding with drawings for the quantity surveyor before he got the definite approval of the authority for the whole layout of the building?—No. I do not think it is.

Mr. Tatchell considered it absolutely essential to have trial holes made in order to ascertain the extent and the depth of the foundations. He regarded that it was the starting point for any drawings. It was not the job of a quantity surveyor to discuss the question of trial holes.

At the time of going to press, the case is still proceeding.

LETTERS FROM READERS

GEORGE DRYSDALE
E. BERRY WEBBER

"Professor Reilly Speaking"

SIR,—I can forgive my old friend Professor Reilly much. He is usually battling on behalf of the younger men, and I have grateful memories of his help when I, too, could be numbered in the company of youth.

This time, however, in writing on architectural competitions, the Professor's zeal has more than outrun his discretion and has trapped him into downright errors. I know he has been a sick man for some time, so I propose to ignore the spitefulness of his attack upon the Competitions Committee. Personally I am rather more startled than hurt at being labelled "bucolic." (I certainly would never dare to claim the alternative of looking seraphic.)

With the greatest sympathy in the world, I cannot allow him to get away with mis-statements that may mislead the younger architects he is trying to help. Had the Professor taken the trouble to make a few enquiries, or examine first hand the work of the Competitions Committee, before bursting forth into print, he would have spared me this letter.

On the other hand, it is much more probable that having ascertained the facts, he would spare himself the effort of bursting forth—at any rate on competitions.

He begins by trying to "make our flesh creep" by exaggerating unduly an incident in a recent competition, and then shows a lamentable ignorance of the functions of the Committee by asserting, quite wrongly, that competitors who wrote to the press were "hauled up in front of the Competitions Committee."

It is apparent to me that he doesn't know the first thing about the work of the Competitions Committee, otherwise he would know that during the last few years scores of suggestions have been investigated, including his own ponderous and impracticable idea of running a competition.

That the regulations have altered so little speaks volumes, and while I am on the subject of regulations it appears necessary for me to remind Professor Reilly that they are in the hands of the Council of the Institute, which is the only body with the power to modify or alter them. In the same way, the Council, of which Professor Reilly is a member, appoint the Competitions Committee.

Then the Professor goes on to vilify the Competitions system by taking two examples which have no bearing on the case; entirely forgetting that Architectural taste has changed throughout the country since the War, whether in competitions or other work.

Why gibe at the late Henry T. Hare's building? I seem to remember designs by Professor Reilly of the same vintage, which also contained ossified ladies attached to the façade, and without any excuse of a Lord Mayor's Show!

Then he chooses two buildings of my own, designed some seven years apart, and because one appeals more, he pretends the reason is because the other was a competition. Where is his logic? Why, he himself has run the whole gamut of the architectural hysteria from "Neo-Grec" to "Neon-Grec"!

Now, if the Professor has the welfare of the architectural competition at heart, he should remember this. We cannot have competitions without promoters, and we will have very few, if any, competitions in the future unless we retain the confidence of promoters.

The article of Professor Reilly is calculated to do anything but retain this confidence.

Professor Reilly descends to the old poppy-cock about crossword puzzles, and is hoist with his own petard. So it doesn't matter to the promoter where the lavatories are placed? I should imagine that whatever the merit of the façade he would expect the internal arrangements to function efficiently.

Why not stop trying to give young architects the impression that they can design with a set of coloured pencils and an entire absence of practical knowledge?

E. BERRY WEBBER

P.S.—There is one remark of Professor Reilly's with which I am in entire agreement. He says it is astonishing that the faces of the Competitions Committee seem care-free. It is!

SIR,—As an unsuccessful competitor in numberless competitions and one who rarely finds himself in agreement with Professor Reilly, may I write to offer him my congratulations on his article under the above title in last week's JOURNAL? Again as one who has had charge of a certain number of successful young men I agree that protest is necessary. When these young men admit having to climb down in order to please some ancient individual assessor—will they ever climb up again? In at least two large and recent competitions, and these other than the one hinted at in the article, the result was appalling. I write as one very much interested but not a competitor. Most of us are willing to back the R.I.B.A. in its policy of advising authorities to hold competitions. If the judgments continue as in the past, however, then Heaven help us and architecture. Let the Professor write again and more fully for there surely is much to be written. If the Nabobs of Portland Place forbid us to criticize the individual result surely they can be made to do more than frown at general criticism of the sloppy judgments of certain nominated and well-paid assessors.

GEORGE DRYSDALE, Director,
School of Architecture, Birmingham.

The Architects' Journal Library of Planned Information

INFORMATION SHEET

SUPPLEMENT

SHEETS IN THIS ISSUE

578 Plumbing

579 Sanitary Equipment

580 Condensation in Industrial Buildings

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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
510 : Aluminium
511 : Elementary Schools—II
512 : School Lighting
513 : Approximate Estimating—XIV
514 : Air Conditioning
515 : Insulation of Buildings
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573 : Wallboard and Insulating Board
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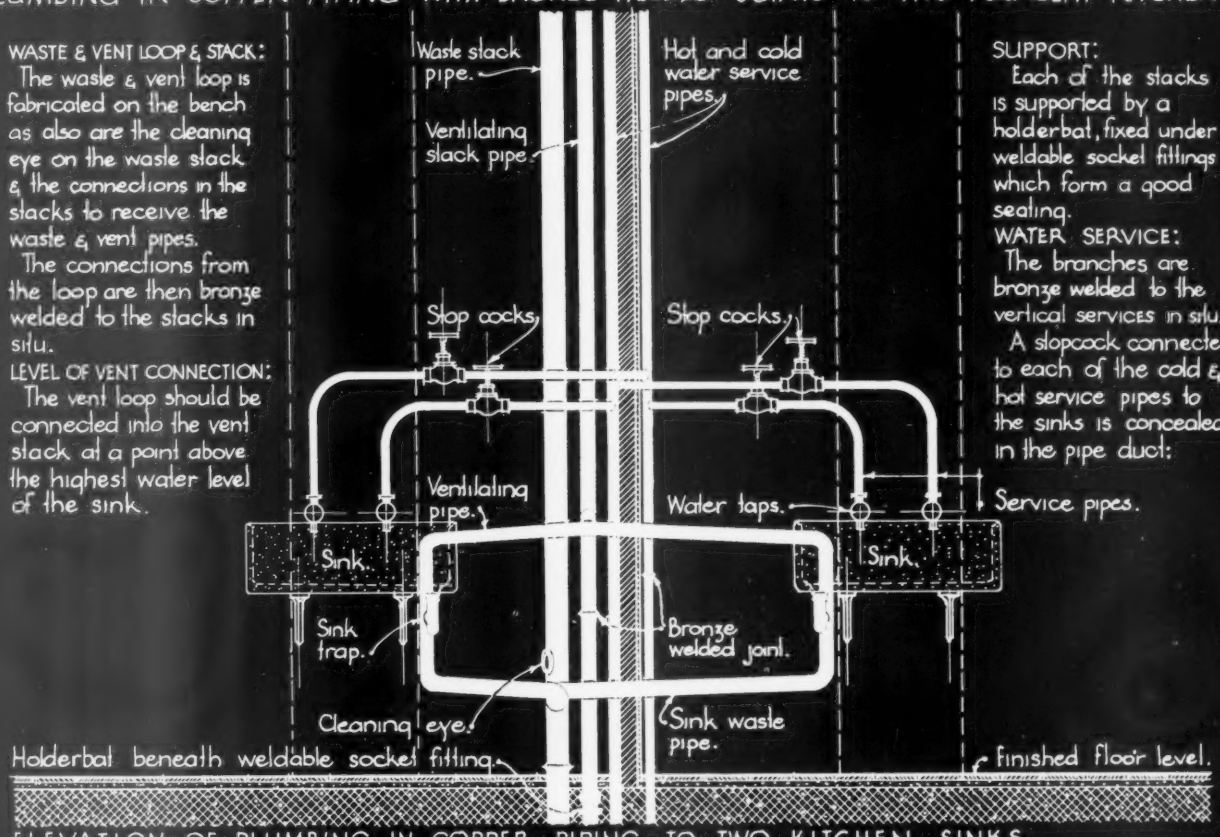
575 : Plywood—II
576 : Plumbing
577 : Leadwork

PLUMBING IN COPPER PIPING WITH BRONZE WELDED JOINTS TO TWO ADJACENT KITCHENS:

WASTE & VENT LOOP & STACK:
The waste & vent loop is fabricated on the bench as also are the cleaning eye on the waste stack & the connections in the stacks to receive the waste & vent pipes.
The connections from the loop are then bronze welded to the stacks in situ.

LEVEL OF VENT CONNECTION:
The vent loop should be connected into the vent stack at a point above the highest water level of the sink.



ELEVATION OF PLUMBING IN COPPER PIPING TO TWO KITCHEN SINKS.

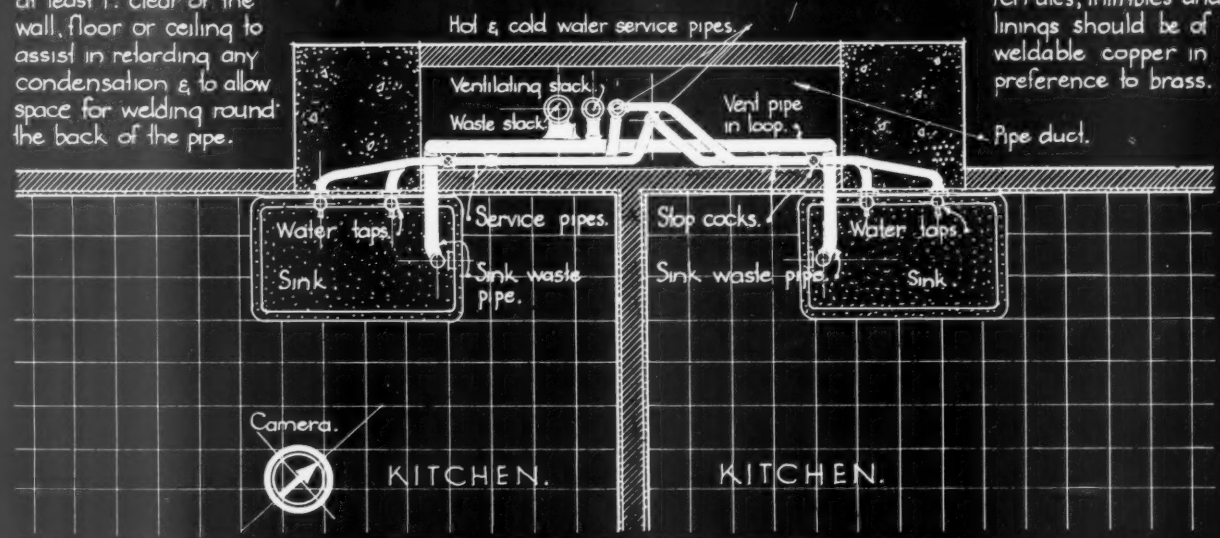
SUPPORT:
Each of the stacks is supported by a holderbat, fixed under weldable socket fittings which form a good sealing.

WATER SERVICE:
The branches are bronze welded to the vertical services in situ.
A stopcock connected to each of the cold & hot service pipes to the sinks is concealed in the pipe duct.

CLEARANCE:
All pipes should be held at least 1" clear of the wall, floor or ceiling to assist in retarding any condensation & to allow space for welding round the back of the pipe.

Scale of Plan and Section: ½" to 1'0"

FITTINGS:
Fittings such as ferrules, thimbles and linings should be of weldable copper in preference to brass.



PLAN OF PLUMBING IN COPPER PIPING TO TWO KITCHEN SINKS.

Information from W.L.Kilburn. R.P., M. Inst. W. *Issued by the British Oxygen Co., Ltd.*

INFORMATION SHEET: PLUMBING IN COPPER PIPING WITH BRONZE WELDED JOINTS: No.2.
SIR JOHN BURNET TAIT AND LORNE ARCHITECTS ONE MONTAGUE PLACE BEDFORD SQUARE LONDON WC1

THE ARCHITECTS' JOURNAL
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INFORMATION SHEET

• 578 •

PLUMBING

Subject : Bronze welded copper piping

This Sheet and the accompanying photographs show the plumbing to two sinks in adjacent kitchens, with the wastes discharging into a common waste stack. The hot and cold water pipes are also of copper.

The waste pipes and vents to both sinks are formed from one piece of piping in the form of a loop connected at its lowest point to the waste stack. A short length of straight pipe leads from the top of the loop into the vent stack.

The loop and the branch to the vent were welded in the workshop on the site, the connections to the two stacks being made *in situ*.

The cleaning eye in the waste stack was also welded in the workshop. The joints in the vertical stack pipes are welded *in situ*, as also are the connections from the traps of the two sinks.

Water Services :

The branches from the two vertical service pipes are bronze welded, and each branch is fitted with a stop cock concealed in the pipe duct.

Fixing :

The vent pipe is shown on the front of the Sheet as being fixed by a holderbat beneath a weldable socket fitting, a method which is considered the most satisfactory and economical. A description of methods of fixing stack pipes is given on the previous Sheet of this series.

Previous Sheets :

Previous Sheets dealing with welded copper piping are as follows :

1. 225.
2. 234.
3. 243.
4. 251.
5. 259.
6. 268.
7. 321.
8. 413.
9. 418.
10. 576.

Issued by : The British Oxygen Company, Ltd.

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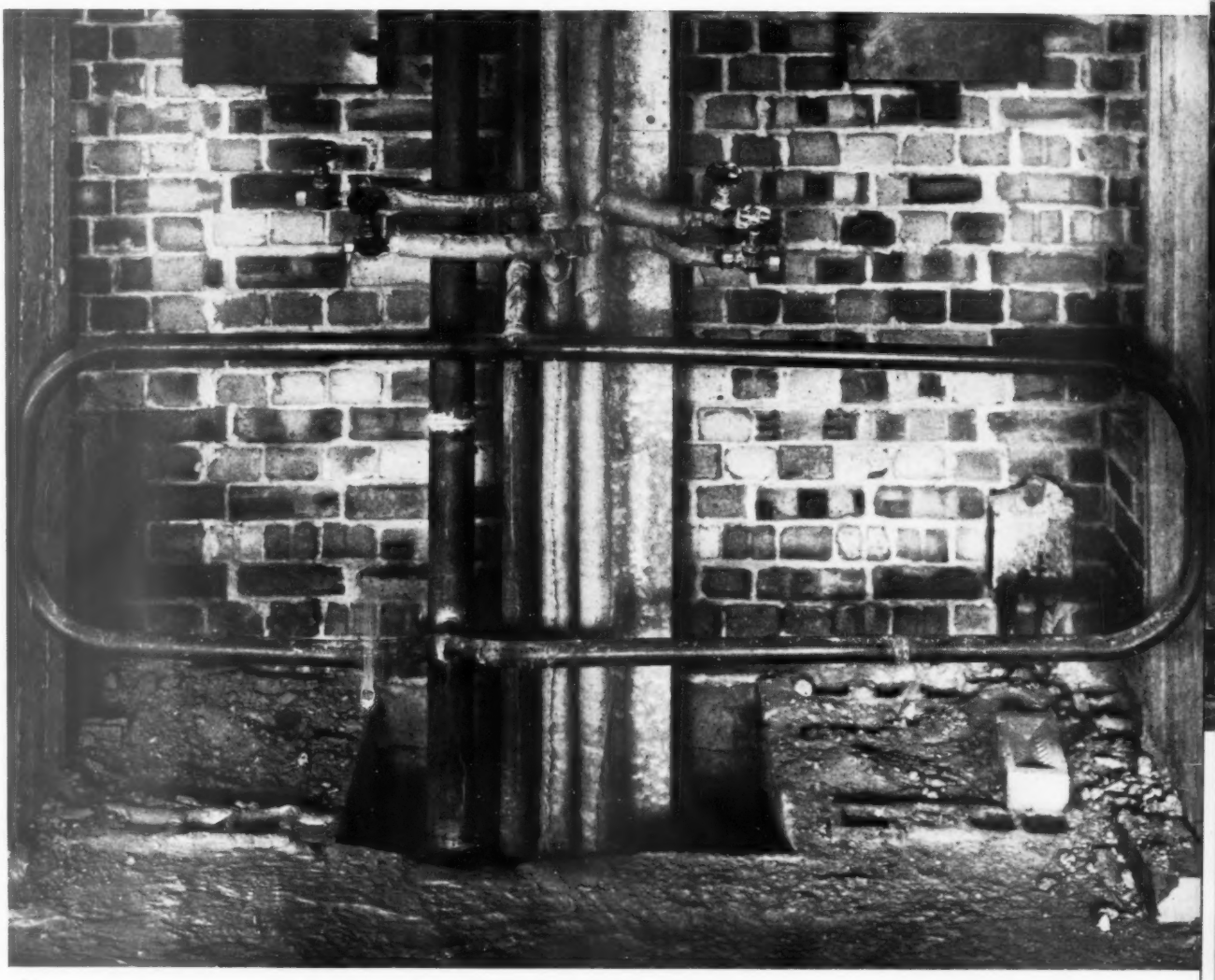

The photograph is taken from the kitchen side of the pipe duct, and shows the main waste and vent stacks of welded copper running up parallel with the lagged copper hot and cold water service piping.
The one-piece copper waste and vent loops for the sink trap connections can be seen in the foreground.

This close-up view of the installation was taken after the erection of the dividing wall between the kitchens, and shows the various bronze welded joints in the main stacks and branches. The welded cleaning eye on the waste stack can be seen behind the point of entry of the combined wastes from the sinks, while one of the holderbats beneath a weldable socket fitting is visible on the main vent shaft.
The bronze welded water service pipes are on the right-hand side.

84.

84.

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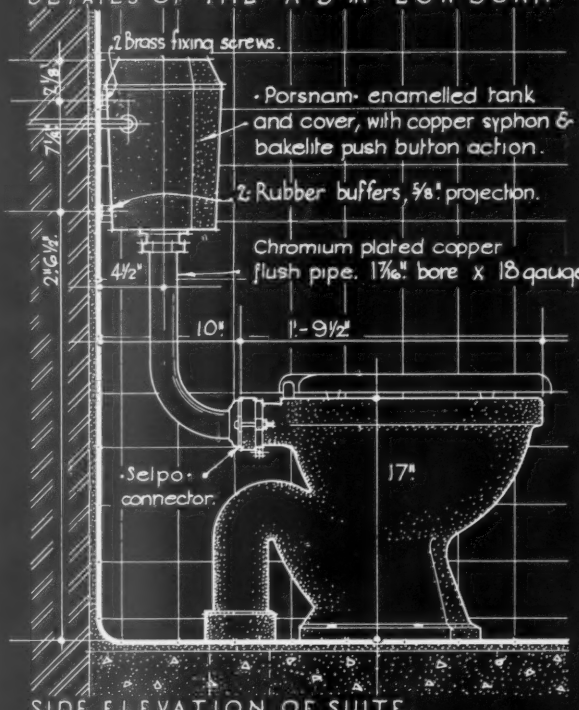
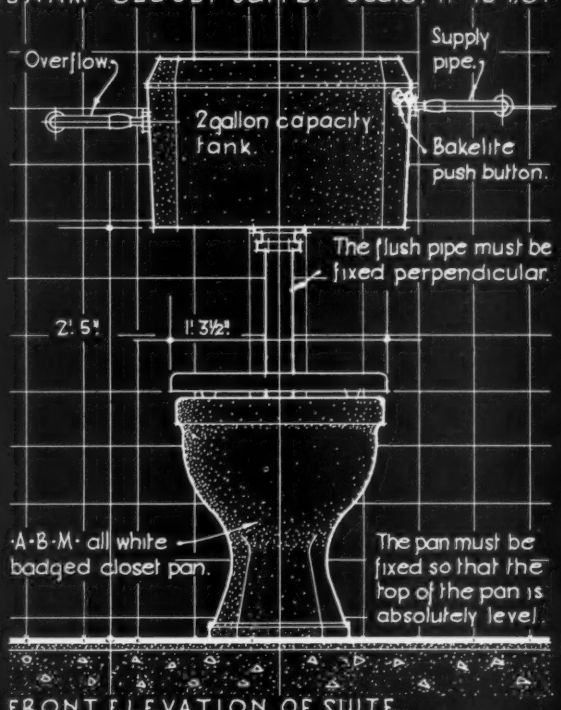
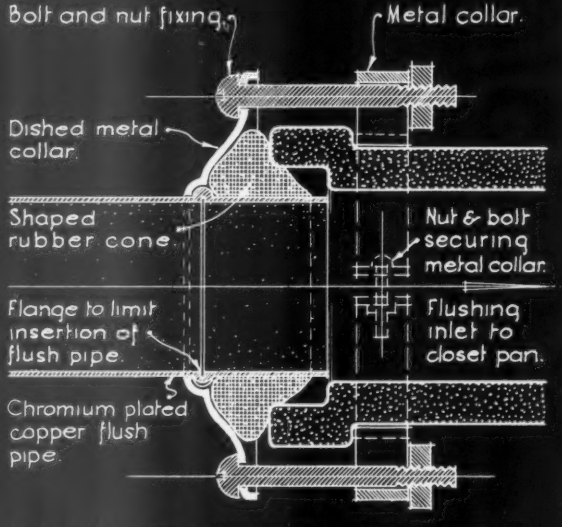
DETAILS OF THE ·A·B·M· LOW DOWN ·PORSNAM· CLOSET SUITE: Scale: 1" to 1'0"



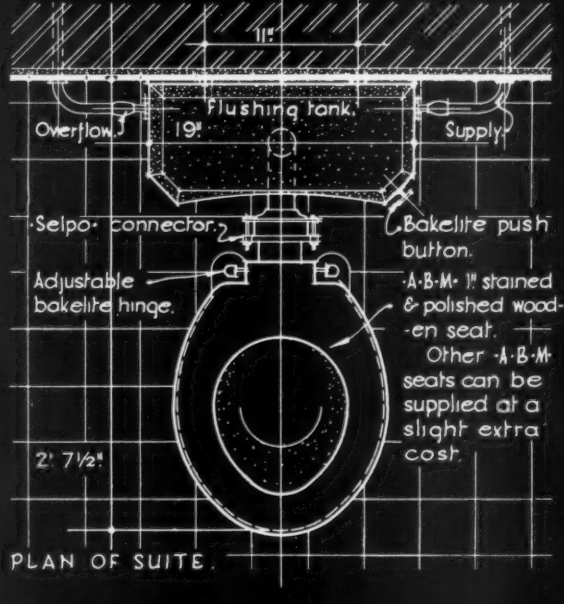
SIDE ELEVATION OF SUITE.



FRONT ELEVATION OF SUITE.



HALF FULL-SIZE SECTIONAL PLAN OF THE ·SELPO· FLUSH PIPE CONNECTOR.



PLAN OF SUITE.

THE CISTERN:

The flush is operated by an instant-aneous action push button operating a hydraulically pressed copper and brass action. A silent filling tube is pro-vided, and the interior fittings are non-corrodible and conform to Ministry of Health requirements.

THE CLOSET PAN:

This is an all white earthenware pedestal type pan, and can be fitted with any type of seat. The length of the flush pipe to the pan, and its dia-meter are designed to conform to Ministry of Health requirements, and a powerful flush is obtained.

Information from Associated Builders Merchants Limited.

INFORMATION SHEET: THE ·PORSNAM· LOW DOWN CLOSET SUITE.

SIR JOHN BURNET TAIT AND LORNE ARCHITECTS ONE MONTAGUE PLACE BEDFORD SQUARE LONDON WC1· Alan A. Bayne

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INFORMATION SHEET

• 579 •

SANITARY EQUIPMENT

Product : The A.B.M. Low Down Closet and Cistern

This Sheet deals with a w.c. suite comprising an all-white earthenware closet pan with a low-level flushing cistern and a chromium-plated flush pipe.

The Cistern :

This consists of either a pottery or a cast-iron Porsnam enamelled finish tank and cover, in 2-gallon capacity. The internal fittings include as standard a hydraulically pressed copper syphon, and brass fittings conforming to Ministry of Health specifications. Operation is by means of a bakelite push button, located on one corner of the cistern, giving instantaneous action. A silent filling tube is fitted and concealed fixing to the wall is provided. The cistern has been designed to avoid ledges and projections on which dust might lodge.

The Flush Pipe :

The flush pipe is of chromium-plated copper and is of the most suitable length and diameter to give an efficient flush.

The connection between the flush pipe and the pan is made by means of the Selpo connector, as shown in the details on the front of the Sheet. A watertight joint is made by the rubber cone which is forced into position by tightening the screws holding the fixing plate. A flange on the flush pipe prevents it being pushed too far into the socket—a frequent cause of faulty flushing.

The Closet Pan :

This is of white earthenware of the pedestal wash-down type made with "S" or "P" trap. Since low down cisterns can only function properly when fitted with an efficiently constructed pan, this suite has an A.B.M. earthenware closet pan, based upon tests covering practically every closet on the market.

Seat :

This type of seat, fitted as standard, is the A.B.M. single flat 1-in. stained and polished ring or back extension type, but the following seats can be supplied at a small extra cost :

A.B.M. bakelite, open or closed front.
A.B.M. 1¼-in. stained and polished or plain hardwood.
A.B.M. 1¼-in. solid mahogany closed front.
All the above may be double or single flap.

Fixing :

To obtain an efficient flush, it is essential that the closet pan should be fixed on the centre line of the cistern, and also the top must be perfectly level.

It is equally important that the flush pipe be fixed perpendicularly. The joint between the pan and flush pipe must be free from any impediment.

Colours :

The cistern and pan can be supplied in certain standard colours at small extra cost.

Previous Sheets :

Sheets already published dealing with A.B.M. products are Nos. 540, 555, 558, 562, 566, 570 and 574.

Standardised Designs :

The Associated Builders' Merchants is a non-trading organization devoted to the standardization of the design of building materials and equipment.

Materials and equipment made by a number of manufacturers are stamped with the following symbol 

indicating that they conform to the standard of design and quality laid down.

Information from : The Associated Builders' Merchants, Ltd.

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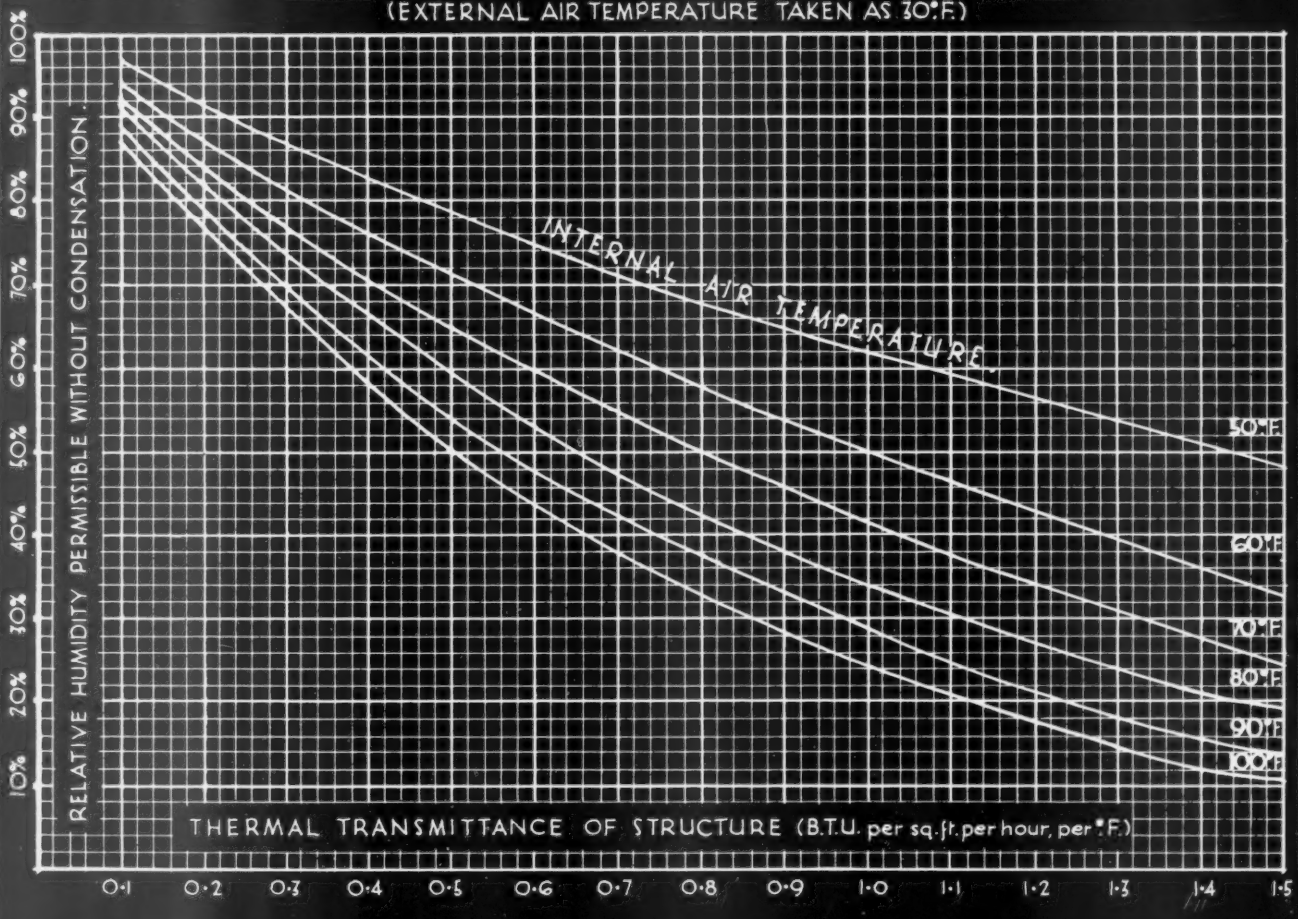
544. THE ARCHITECTS' JOURNAL LIBRARY OF PLANNED INFORMATION

GRAPH SHOWING RELATIVE HUMIDITIES PERMISSIBLE WITHOUT CONDENSATION FOR VARIOUS INTERNAL TEMPERATURES OF BUILDINGS AND VARIOUS THERMAL TRANSMITTANCES OF WALLS OR ROOFS.
(EXTERNAL AIR TEMPERATURE TAKEN AS 30°F.)



Previous Information Sheets (see Back) have set out the effect of insulation in reducing the costs of heating plant and fuel; this Sheet shows its effect on liability to condensation. The internal and external air temperatures used in preparing the table below are those given in previous Sheets for a typical factory building, namely 74°F. and 30°F.

INF. SHEET NUMBER.	TYPES OF CONSTRUCTION.	THERMAL TRANSMITTANCE.	% RELATIVE HUMIDITY PERMISSIBLE WITHOUT CONDENSATION.
220.	(1.) Corrugated asbestos cement.	1·40.	33%. ✳
	(2.) Do. but lined with 3/16" asbestos cement.	0·59.	58%.
	(3.) Do. Do. 5/8" TenTest.	0·306.	76%.
230.	(4.) Built up roofing on rough boarding.	0·485.	63%.
	(5.) Do. with 5/8" TenTest insulation.	0·27.	78%.
236.	(6.) Slates on rough boarding.	0·56.	59%.
	(7.) Do. with 5/8" TenTest lining.	0·23.	82%.
250.	(8.) Corrugated iron.	1·50.	29%. ✳
	(9.) Do. lined with 5/8" TenTest.	0·31.	76%.
256.	(10.) 5" concrete wall.	0·83.	47%.
	(11.) Do. lined with 5/8" TenTest.	0·352.	74%.
265.	(12.) 9" brick.	0·42.	69%.
	(13.) Do. lined with 5/8" TenTest on battens.	0·203.	84%.

✳ These figures have been adjusted to allow for corrugated unlined structure.

Information from The Tentest Fibre Board Co. Ltd.

INFORMATION SHEET: CONDENSATION IN INDUSTRIAL BUILDINGS.
SIR JOHN BURNET TAIT AND LORNE ARCHITECTS ONE MONTAGUE PLACE BEDFORD SQUARE LONDON WC1. Oscar A. Bayne.

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INFORMATION SHEET

• 580 •

CONDENSATION IN INDUSTRIAL BUILDINGS

General :

This Sheet sets out, by means of a graph and tables, the relation between the rate of heat-flow through the enclosing walls or roof of a building and the relative humidity permissible in the air within the building without formation of condensation.

The graph affords a simple means of determining whether condensation is likely to occur with any given set of conditions and the tables illustrate the effect of the incorporation of suitable insulation in the structure in permitting higher relative humidities to occur without resulting in condensation.

Dangers of Condensation :

Condensation on the interior surface of a building is often a serious matter, in that water dripping from a ceiling may cause damage to manufactured articles and machinery, short-circuiting of electrical equipment involving stoppages and repairs, besides rotting of timber and corrosion of metal structures generally.

Cause of Condensation :

Condensation is caused by the contact of the warm humid air in a building with surfaces having a temperature below the " dew-point " of the air. The higher the surface temperature, the higher the water content which the adjacent air can carry without precipitating its moisture on the surface.

Relative Humidity :

The amount of moisture air can carry is relative to its temperature. Air at a temperature of 100° F. has a maximum capacity for water of 19·7 grains per cubic foot, while the same amount of air at 30° F. is saturated with 1·94 grains of water.

The " relative humidity " of the atmosphere is the ratio expressed as a percentage of the quantity of moisture actually contained in the air at a given temperature, to the quantity which would saturate it at that temperature.

Dew-point :

The "dew-point" of the air is the temperature at which the air becomes saturated and commences to give up its moisture content. Cooling air to below its dew-point entails precipitation of moisture, or condensation.

Approximate Relative Humidites for different Buildings

For human comfort it is considered desirable that the humidity of air should not be less than 40 per cent. to 60 per cent. according to temperature. This is necessarily exceeded in many industrial buildings, approximate figures being given below :—

	Per cent.
Laundries	70 to 80
Paper mills	72 „ 88
Textile mills	65 „ 90
Stone and marble works	65 „ 85
Cleaning and dyeing plants	70 „ 85
Bakeries (dough making)	80 „ 85
Canning factories	68 „ 84
Tobacco curing	80 „ 90

Remedies for Condensation :

Condensation can be eliminated in one of two ways :—

1. Raising the temperature of the wall and ceiling surfaces above the dew-point of the air they enclose.
2. Lowering the humidity.

Dehumidification is not permissible where a high relative humidity is necessary for manufacturing processes and it entails operating costs.

The only alternative, raising the temperature of the surface, can be obtained either by increasing the velocity of the air passing over the surface (thus reducing surface resistance) or by increasing the overall thermal resistance of the wall or roof by installing a sufficient thickness of insulation. This method has the added advantage of reducing instead of increasing heat losses, and therefore heating costs, and is the method generally adopted.

The thickness of insulation required is determined by calculating the amount of thermal resistance necessary to keep the temperature of the surface above the dew-point temperature for the maximum conditions involved. This can be done for an existing or proposed building when the following information is available :—

(*a*) Construction of roof, walls, etc.
(*b*) Maximum internal temperature.
(*c*) Minimum external temperature.
(*d*) Actual or anticipated maximum relative humidity.

In existing buildings (*d*) can be determined when wet and dry bulb thermometer readings are available.

Treatment which merely *absorbs* condensation is a palliative and not a cure for the condition.

Explanation of Graph :

The graph affords a simple method of determining whether condensation will occur when external temperature is 30° F. for a range of internal temperatures from 50° F. to 100° F., and for thermal transmittance of roof and walls from ·01 to 1·5 B.T.U. per hour, per square foot, per ° F.

How to Use Graph :

From the point on the lower scale representing the thermal transmittance of the structure, draw a vertical line. Where this line intersects the curve corresponding to the internal air temperature draw a horizontal line to the left. Where this intersects the relative humidity scale, read the percentage relative humidity which can occur without condensation. If higher relative humidity is expected, add insulation.

(*Note.*—The highest temperature of the air adjacent to containing walls or roof must be used, which may be considerably higher than temperature at breathing line.)

Example :

It is proposed to use a 6-in. concrete roof on a building in which the internal temperature at roof level is calculated to be 70° F. and relative humidity anticipated is 70 per cent. Will condensation occur ?

Information Sheet 534 shows thermal transmittance of 6-in. concrete roof with plaster ceiling as 0·62. From this point on the lower scale, draw a vertical line to intersect the curve for 70° F. From the intersection, draw a horizontal line to the left scale of the graph and read 58 per cent. This is the relative humidity permissible without condensation and further insulation of the roof will therefore be necessary. Information Sheet 534 shows that a ceiling of $\frac{5}{8}$-in. TenTesT will reduce the thermal transmittance of the roof to 0·33. Use of the graph indicates that 75 per cent. relative humidity can now occur without condensation and as this exceeds the maximum relative humidity anticipated, condensation need not be feared.

Typical Figures :

In Information Sheets Nos. 220, 230, 236, 250, 256 and 265, were illustrated the effect of insulation in reducing the costs of heating plant and fuel within a typical factory building with different types of walls and roof.

The table on the front of this Sheet shows the effect of the same amount of insulation in the same buildings in reducing liability to condensation. The air temperatures used are those given in the previous Sheets, namely, internal air temperature 74° F. and external temperature 30° F.

Corrugated Surfaces :

It should be noted that the graph does not apply accurately for structures of corrugated material unless lined with a material providing a flat surface.

Previous Sheets :

Figures showing thermal transmittance of many different types of construction which may be used in conjunction with this Sheet have been published in Sheets 59, 63, 146 (back), 220, 230, 236, 250, 265, 515 and 534.

Information from : The TenTesT Fibre Board Co., Ltd.

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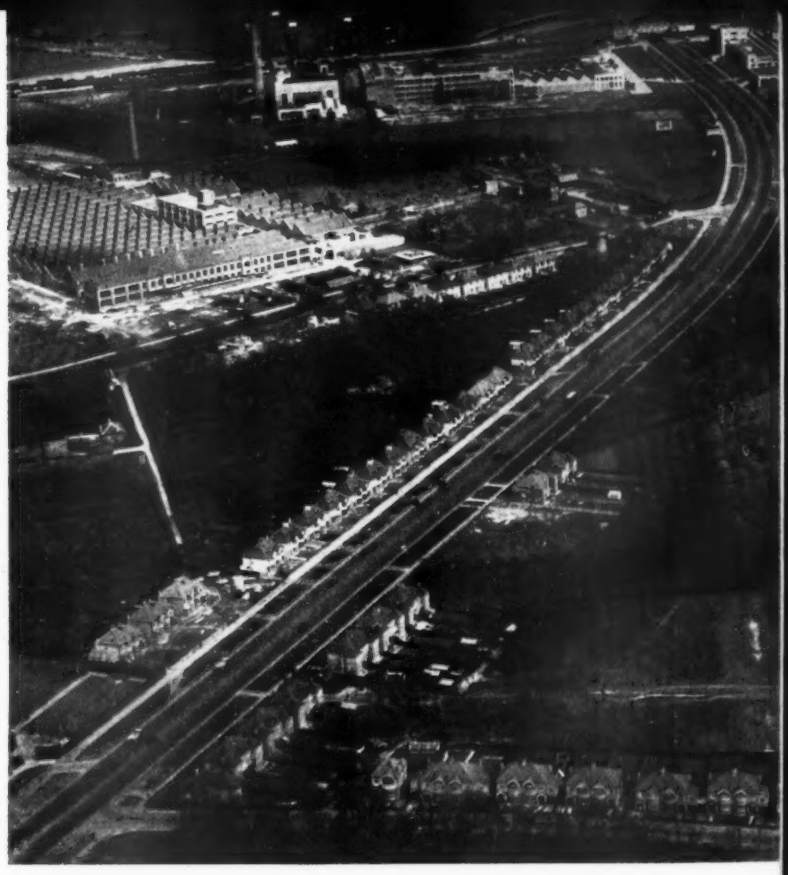


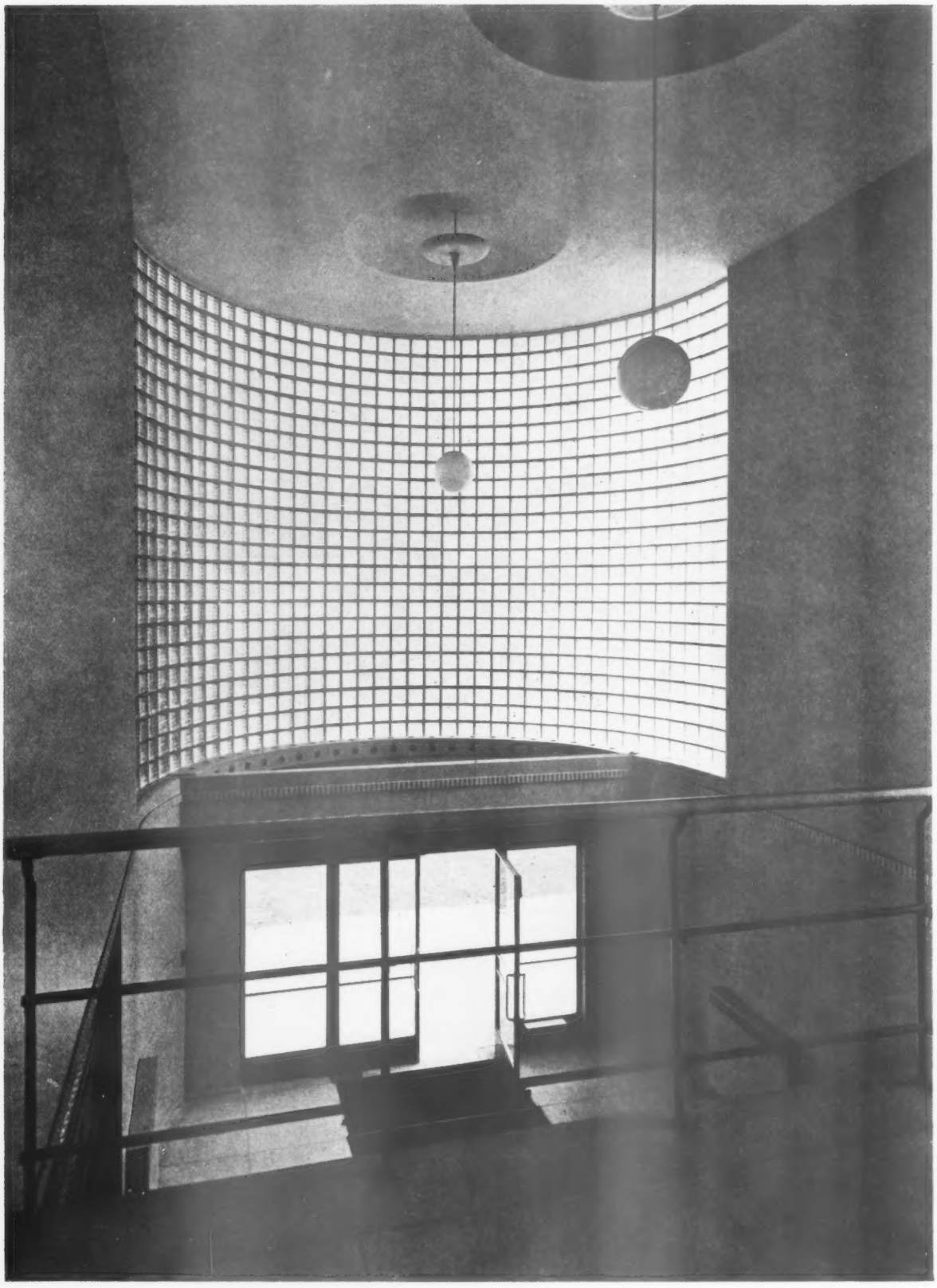
FACTORIES

FOREWORD

BY THE EDITOR

THE building of large numbers of factories on the outskirts of London has been a most important industrial development in the past ten years. Nearly all of them light industries, the new factories have been attracted to the London area by the doorstep market offered, by the adaptable labour available, the higher spending power on semi-luxuries in the Home Counties and, to some degree, by the advertisement value of a building on an arterial road. Partly on account of this publicity value and partly owing to growing realization of the necessity of well planned factories, the employment of architects for light industrial buildings has now become a matter of course ; and whether or not the Home Counties is the best place for new industrial development, it is likely to remain so.

On the following pages the JOURNAL attempts to summarize present methods of factory design. The issue contains special studies of factory planning, the Factory Act, regulations, and equipment. Its main purpose, however, is to provide a record of the various types of scheme completed in the last five years, and thirty such schemes are illustrated.



The modern factory : the main entrance to the Berlei Factory at Slough. By Sir John Brown and Henson in association with W. D. Hartley.

Roof steelwork and vertical northlights at the Jantzen knitting mills.

DESIGN

NOTES ON SITES, PLANNING AND CONSTRUCTION

BY H. COURTENAY CONSTANTINE

Siting

IN very few instances is the architect consulted before a factory site has been selected. Manufacturers ought to realize that siting factors are of paramount importance, and many difficult problems could be solved if the architect were approached at the outset. There are many factors involved—Town Planning requirements of the neighbourhood, local bye-laws, availability of essential supply services, adequate depth of sewers for proper drainage of premises and back land, existence of water on site and character of sub-soil for foundations, and, just as important, nuisances which may arise from existing neighbouring factories, such as excessive smoke, discharge of fine dust, excessive noise and vibration.

The now almost universal use of road transport renders the question of railway sidings or canal lay-bys of lesser importance unless the particular goods manufactured demand excessive fuel consumption or the carrying of heavy materials better conveyed by rail or water.

The new Road Traffic Development Order demands provision within the site for loading goods, necessitating a dock and turning spaces for vehicles. A considerable portion of the site will therefore be required for this purpose.

The parking of owners' and employees' cars and motor cycles has now become a necessity, and provision should be made within the site, including storage for pedal cycles. This question particularly applies to factories outside cities and towns where usual transport is not available.

Other factors to be considered in selecting a site are the accessibility of local fire brigades, disposal of trade refuse, size of available water mains for sprinkler installations or fire hydrants and the necessity of finding space for a transformer chamber where electrical supply companies require such provision to be included within the site.

The question of obtaining sufficient of the right kind of labour arises only in certain trades as it can usually be found that a short intensive training on modern machines enables a person of average ability to become proficient in a very short time.

It is seldom possible to acquire land at an economical figure to allow for recreation spaces or playing fields. Objections are to be found in providing such amenities as they have invariably to be given up to allow for extension of buildings or storage of surplus plant or other purposes, or for garages to house transport wagons as the business increases.

To summarize the question of selecting sites the main thought should

be to plan for future requirements. The possibility of disposing of surplus land or sub-letting sections of the buildings if occasion demands should not be overlooked.

The architect is more than ever before in touch with firms whose parent factories are abroad and who contemplate building in this country. He should therefore realize at the outset the desirability of furnishing his client with aerial photographs, maps of the locality and such data as will enable him to have all the available facts before purchasing the land.

Factory Regulations

The Factories Act, 1937, clearly demonstrates that working conditions in factories and the general welfare of the workers shall be considerably improved, and, what is more important, maintained at a higher standard. The powers of inspecting such buildings have been increased under this Act, and the imposing of new conditions will be an important factor in the future design of factories. As an example, the cubical space for each worker is increased from 250 feet to 400 feet, and although certain trades requiring considerable working space may not be unduly affected, those with machines and benches where the workers are only a few feet apart may require considerable modification.

Greater consideration must be given to the treatment of wall surfaces and floors to give added cleanliness. This provision calls for careful thought, and it would seem that glazed tiled surfaces and materials of this nature will again come into vogue, for, although an expensive item at the outset, these may be found to be an expense well worth while.

Added responsibilities will be the provision of sufficient natural lighting and its maintenance by constant cleaning of windows and skylights. Facilities should therefore be provided to give access to top lighting and windows in multi-storied buildings for cleaning purposes, These new regulations should have a direct influence upon efficient production.

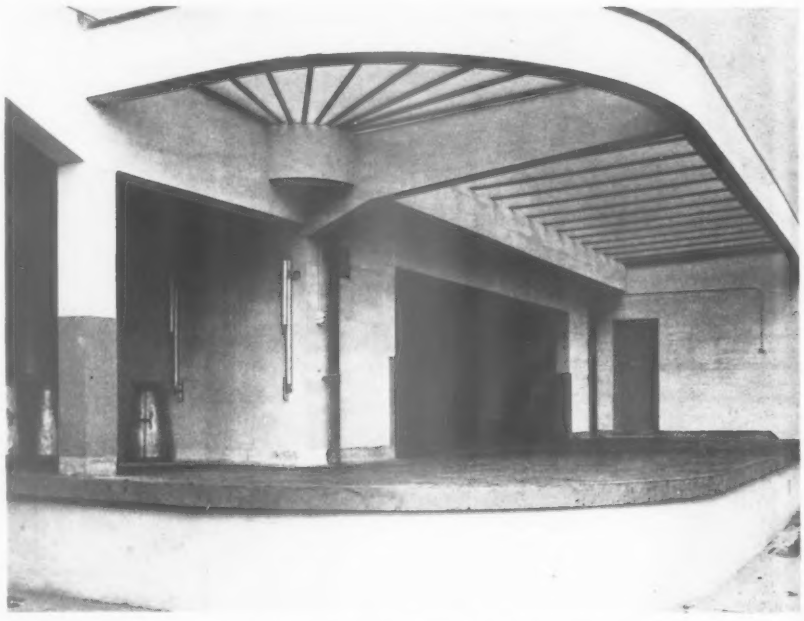
An article devoted to Factory Regulations and Equipment is elsewhere in this issue.

Finance

The fallacy that factories must be confined to back land or placed on railway sidings has definitely passed, and although buildings are usually designed to satisfy specific conditions, it has become apparent that design and construction are essentially within the province of the architect.

The tendency is to give an atmosphere of solidity to buildings on the principal road frontages and to develop the rest of the site as a purely utilitarian structure, single or multi-storied, according to the demands of the particular trade.

Many urban authorities have been helpful in modifying their bye-laws to allow for steel-framed buildings and reinforced concrete structures.



Road transport has increased the importance of well designed loading bays. The bay above is at a C.W.S. dairy.

The question of cost of the site and building is largely dependent upon the nature of the product to be manufactured. Certain businesses gain publicity if situated upon main thoroughfares or arterial roads, and the tendency is to select sites where the particular business can be expressed in the character of the building. Certain factories gain publicity solely by their position in a recognized area or trading estate. The important thoroughfares must be considered as a means of giving a factory whatever publicity is possible without unduly affecting the design.

Planning

For machine shops or any constructive works dealing with larger articles or materials it is necessary to have large clear spans. The span is again dependent on the proper flow of work to be done. This is usually arranged by using lattice girders in the depth of the roof, which in turn carry the roof trusses and are themselves supported by stanchions at infrequent intervals. In some cases, such as aeroplane assembly shops or similar works, it is necessary to have these clear spans as great as 150 to 250 ft. and this can readily be arranged, but, of course, at an increased cost. It is often a great error, moreover, to adopt small spans if there is any possibility of a re-arrangement of the layout of the factory or if the machinery in a machine-shop is liable to variation. In such cases numbers of intermediate stanchions are a great hindrance to proper planning.

If the use of the factory permits the materials being lifted to upper floors

It has been found that a front to an arterial road has great advertisement value. The Sperry Gyro building on the Great West Road. Designed by H. Courtenay Constantine.

and the site value is great it may be advantageous to adopt a multi-storey type of building. Here an essential thing is to have a frame which will allow of alteration or variation in future times. All manufacturing processes are constantly being improved, and such improvement often calls for re-arrangement of space and machinery to suit revised methods. Floors, if arranged to carry machinery, should be calculated for such a load as will permit movement and variation in the layout and be of such a type that fastenings for securing the machines can be made anywhere. A little extra cost in the original factory in making such provision can often be of great advantage at a later date. In factories where a large number of machines are used it may be necessary to provide strength to carry overhead shafting. On the whole, however, there appears to be a tendency to run machines or small groups of machines from separate electric motors. In this way economy of electrical power is achieved as all machines may not be required to work simultaneously.

Planning for different industries presents many problems and a general purpose building should as far as possible be envisaged. There may arise a change in conditions whereby the growth of the business warrants larger premises or a change of neighbourhood, and it is then that a prospective purchaser should be satisfied that he can adapt the buildings to his own particular trade without structural difficulties.

This point brings in the question of floor loading, and forethought should control the design of floor construction so that within limits the building should be capable of housing any normal trade.

In factory design, therefore, economy can best be attained when the building adapts itself easily to the requirements of a new industry or is capable of being readily extended or altered.

The layout of machinery and the chain of operations present difficulties on a limited site area or when it is imperative to build in many storeys.

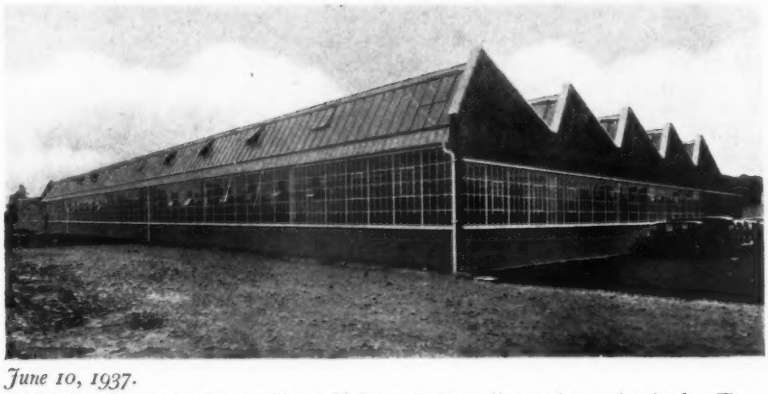
In the past it was generally left to the works manager and the engineer to prepare a layout of the building and to hand over the scheme to the architect to fit in to the best of his ability administration offices, lavatories, boiler-houses and any special plant in connection with the manufacture.

These conditions have changed and where mass production is the rule rather than the exception, machinery experts are consulted and a chain of operations and the layout of the machinery carefully planned, and the elimination of waste space in corridors taken into consideration.

It can be found that by the careful planning of essential gangways leading to fire exits, staircases, etc., much can be done to assist the owner and engineer in his layout. A good plan when the factory is completed is to paint strong lines upon the floor demarking these gangways and also where material or appliances are permanently stored.

November 29, 1936.

February 11, 1937.



June 10, 1937.

Light framed construction enables a high speed of erection to be maintained. Top, steel frame and trusses in position ; centre, glazing nearing completion before brick infilling ; bottom, the finished factory for Champion Sparking Plugs by Wallis, Gilbert and Partners.

Lavatories

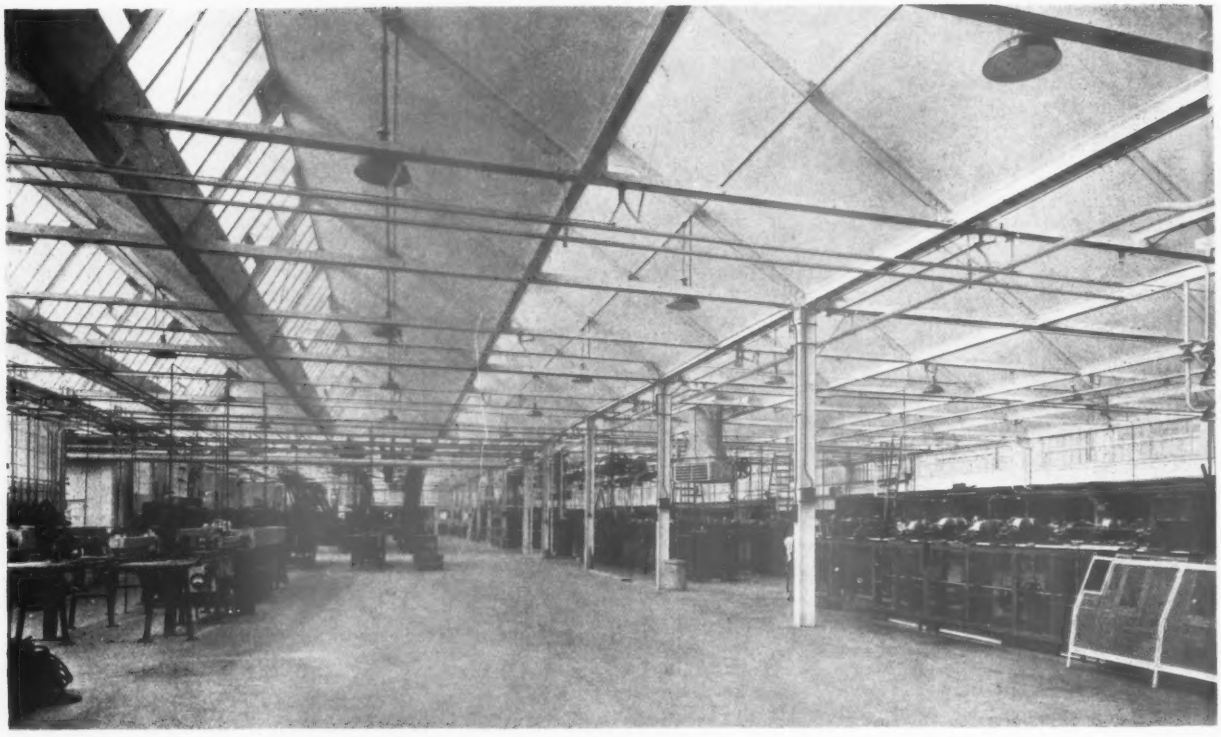
The disposition of lavatories and cloakrooms requires careful consideration. The essential feature in this part of the design is to have control over the workers. The door attendant to the works, who should be provided with an office of adequate size, should be in a position to see all persons entering or leaving the premises, and cloakrooms and lavatories should be under his supervision and control.

Cloakrooms should be formed on a corridor "in and out" principle and enclosed only with a wire fencing. Adequate heating and ventilation are essential, and numbered hooks as well as metal coat-hangers are desirable.

The internal finishings of works lavatories should provide for hard asphalt flooring with floor channels for drainage. Wall surfaces and partitions up to a height of 6 ft. should be covered with terrazzo or similar material, preferably in a grey-green tint, and w.c. doors should be faced with metal sheathing with strong gunmetal hinges and fitted with springs so that the doors always remain open after use.

Continuous flushing tanks are more desirable than individual tanks and require less maintenance.

Metal continuous troughs with spray nozzles operated by a wheel-headed



Saw-toothed trusses with window gear, lighting and power services and warmed air trunking hung on the steelwork. Note fully caged belting in the foreground. The Gillette factory by Sir Banister Fletcher.

valve are generally found sufficient for most purposes, and a mixing-box provided at the head of the services, set to a desired temperature. On these services pipes may be affixed soap containers and mirrors.

Generally all fittings should be in heavy fireclay and of good quality. Drinking fountains are essential and should be in conspicuous positions.

In certain cases it may be desirable to plan the whole of the sanitary equipment within the building, and this can be done providing adequate natural top light and mechanical ventilation is provided.

Inlet ventilation in this case is by floor gratings placed just above the skirtings, with ducts under the floor leading to the open air.

Canteens and Welfare

The provision of canteens, rest-rooms and first-aid has become an essential part of factory design, and it will be found that a considerable amount of floor space is required for this purpose. It is advisable to place the canteen either on an upper floor or in a special building outside the factory. Many workers are content to bring their own food and to be provided with heating facilities, the canteen providing tea and coffee only.

The success of a canteen is largely dependent upon the position of the factory relative to outside facilities or the proximity of the workers' homes. In some instances the canteen is used as a club, and is controlled by a committee of workers who arrange for dances and sports meetings.

Generally speaking, the cafeteria system of service is the most practical and requires the minimum staff where the number of persons to be served is comparatively small.

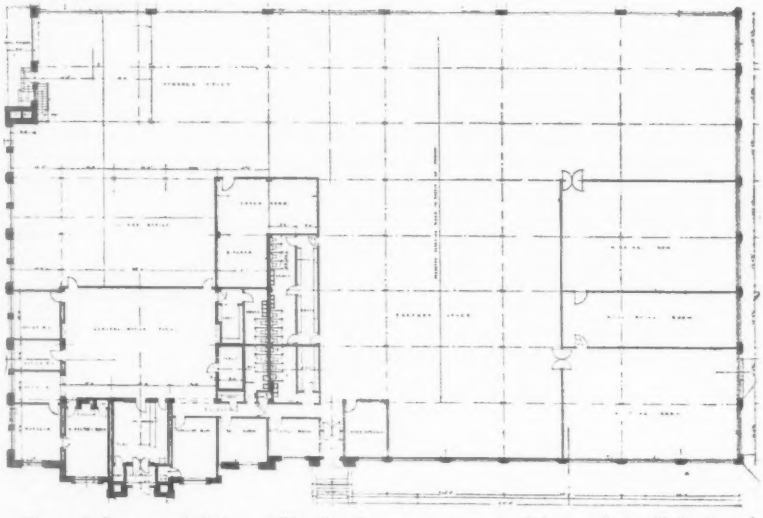
It is desirable, if possible, to provide heat, light and hot water from the factory services and cooking by gas is an economical and practical method.

The provision of refrigeration is essential and a washing-up machine and an adequate number of sinks are also desirable.

Heating and Ventilation

An essential factor in the general planning should be the position of the heating plant in relation to the design under consideration and provision made for future extensions. Sufficient space should be allocated for the plant and for fuel storage. The size, design and disposition of the smoke stack is important. In many instances where it is undesirable to construct a chimney for future requirements space can be left and provision made in the stack to instal a mechanical draught-inducing plant.

It is more economical to plan for the whole of the heating and hot-water plant, fuel storage, etc., in one section of the building, and if possible, to plan this in a central position in relation to the whole scheme.



Plan of Jantzen knitting mill, showing arrangement of internal top-lighted and ventilated lavatories.

The heating and ventilating arrangements require careful consideration, and before any of the many different systems now available can be decided upon it is necessary to determine just how important this section is to be in relation to the building and its purpose; for instance, factories engaged in textiles, confectionery, tobacco, printing, cellophane, etc., will require the temperature and relative humidity of the air to be constant and controlled within very close limits. This would call for an air-conditioning plant with complete automatic control and possibly refrigeration also, if dehumidification is necessary. A scheme of this description would involve considerable expenditure compared with the systems to which one is more accustomed, such as low pressure hot water with accelerated or gravity circulation and direct radiation, which is comparatively cheap to instal and is quite suitable for the usual factory not requiring conditioned air.

Under normal conditions a temperature of between 60° F. and 65° F. should be provided, depending upon whether the work is manual or not. This would necessitate a considerable amount of heat, particularly if there is north light construction, and it is not always possible to allocate sufficient wall space for radiators. In this case it may be desirable to instal heating panels in the sloping roof in addition to radiators at low level; this arrangement is good, inasmuch as it gives an even distribution of heat and the combination of convective and radiant heat is beneficial.

A less costly method is to instal unit heaters. These are usually fixed overhead, thus leaving the floor space clear. Each unit has its own heater and fan, and can be served with hot water or steam, the warm air being deflected by adjustable louvres in any desired direction. With this arrangement it is quite usual to have fresh air inlets for the heaters with dampers, thus making it possible to recirculate the warm air when quick heating up is required. During the summer months a certain amount of ventilation can be obtained by running the fans, the air being drawn in through the fresh air inlets. This system is quite satisfactory providing an adequate number of unit heaters are installed and the air velocity is not too high.

There are many other systems which may be employed with advantage and generally speaking, hot water or low pressure steam is applicable to them all. When hot water is the medium, pump circulation is preferable; it allows more latitude in piping arrangements, is very flexible in operation and the maintenance costs are low. Low pressure steam, with or without vacuum return, has much in its favour, particularly when used in conjunction with unit heaters, the initial heating-up is quicker and the various heating surfaces, such as radiators, heaters, coils, etc., can be smaller than with hot water, due to the higher temperature of the steam.

Boilers may be hand-fired, using solid fuel, and with this arrangement it is possible to dispose of a certain amount of the refuse usually occurring. The tendency now is for some form of automatic firing, such as mechanical stokers, or oil fuel, both of which are very efficient, clean and help to abate the smoke nuisance; then the refuse, if any, can be consumed in an incinerator, so arranged to provide the hot water for domestic or trade purposes.

Structure

There is little doubt that the factory built on " warehouse " lines has passed —no longer will heavy walls and limited window area be tolerated. What is definitely required of the architect today is a well-lighted practical building of sound construction, properly planned and modern in every sense.

Framing of either steel or concrete should be employed to give strength without sacrificing space.

The question as to which is the better form of construction depends largely upon the article to be manufactured, and whether the building is to be one-storied or multi-storied.

In districts where the encasement of steel is not demanded by the authorities, the steel-framed building has much to recommend it, both as to the question of cost and speed of erection, and it would also appear to be the best form of construction for one-storied buildings where top lighting is essential.

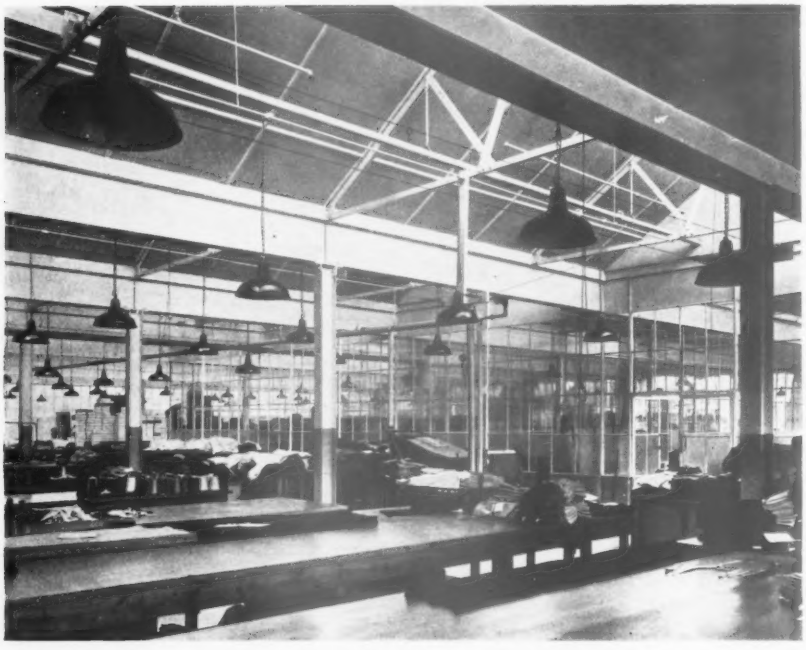
Buildings over one storey in height can be advantageously erected in reinforced concrete, and at no greater expense. On the question of comparative times, possibly the steel-framed structure is quicker, and it enables floor construction to be proceeded with at a more rapid pace.

The design of North lighting in roofs can take several forms. The most usual form is the saw-tooth with the glass at an angle of 60°. Another type which commends itself is the vertical light consisting of metal frames with opening lights for ventilation and glazed with ordinary sheet glass. The lay-light type between main girders and beams, as a substitute for the ordinary saw-tooth type roof is satisfactory from a lighting point of view, but does not exclude sunlight to the same extent as the ordinary North light roof.

In such roofs the position of the main lattice girders in large north-light spaces is important. The usual form is to place these girders vertically under the ridge of the saw-tooth roof and to support the roof generally by intermediate light trusses at right angles to the lattice girders at frequent intervals.

Another form is to place the lattice girders against the north-light glazing and to keep these in place by substantial steel rafters and beams and a system of

Mushroom columns in a reinforced concrete multi-floor building. J. L. Couves and Partners, architects. Note radiant heaters slung from the ceiling.



Uncased stanchions and steel and glass partitioning. Where casing is not obligatory, the speed of erection in a steel-framed factory offsets the higher heat insulation of reinforced concrete.

tie rods introduced at the apex of the roof.

A third form is to place the lattice girders at right angles to the north-light glazing. This involves the lattice girders being partly exposed above the roof and is more costly to instal and maintain.

The steel-framed building can proceed in all weathers, which is an advantage and facilitates progress generally.

Where the fire risk is a factor to be considered and the building contains inflammable goods, steelwork should be encased in concrete.

Reinforced concrete has the advantage that the relatively small amount of steelwork is not unduly affected by fire, and it has been found that the shell is affected but the core remains intact.

There is little doubt that reinforced concrete has become a serious rival to the steel frame, and this may be attributed largely to the advance of scientific design in reinforced concrete, which shows a considerable saving in weight of steel, mainly due to the fact that all the material in this form of construction is being used to support the load, instead of acting as added dead weight, as in the casing to steelwork in steel-frame construction. Another factor is that reinforcing steel is available at short notice in sufficient quantities to allow progress to be made almost immediately the site has been prepared, and no time is wasted in the transport of heavily built up beams and stanchions.

Long spans can be constructed in reinforced concrete in sections which do not exceed those of a cased steel girder, and the reinforced concrete beam can take into account the effect of continuity at the supports. This is important from an economic point of view, and results in a saving of steel as compared with steel-frame construction.

In most reinforced concrete beams, the floor slab acts as the compression member of the beam, thus using material which is wasted in steel construction.

With regard to the construction of long span beams, supporting north-light roof trusses, the usual steel construction provides for wrought iron or pressed steel valley gutters, which are rendered watertight with red lead joints. In reinforced concrete construction it is possible to form these gutters in reinforced concrete as part of the beam, when they act as horizontal stiffeners and so add to the economy of the structure as a whole. The gutters being asphalted results in permanent construction without heavy maintenance costs.

Prejudice against bulky structures of the past has disappeared, and under existing regulations it is now possible to design within limits of size which compare favourably with steel construction.

Considerable foresight is desirable on the question of service pipes. Small collars should be placed at intervals in the shuttering of the beams at the floor soffit level. Through the openings thus formed service pipes can pass without either bends or cutting the beam casing. This affects a saving in the services cost. The holes can also form a convenient method of fixing shafting or machinery.

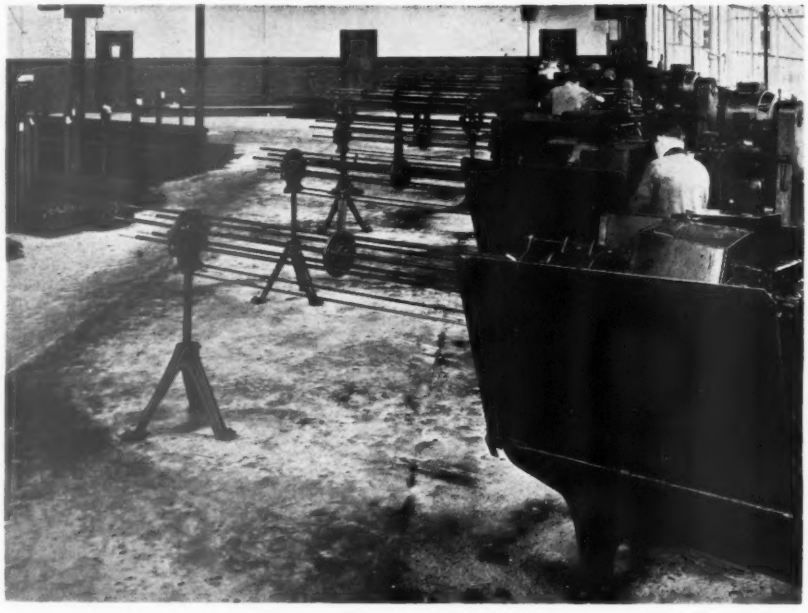
Concrete being a bad conductor of heat, this increases its value as a building material. Movements in concrete arise from either the expansion or contraction of the concrete due to setting and hardening, or to variations in the temperature of the concrete. The action of the first usually results in a shrinkage of the concrete, and as this is restrained from movement by the walls, etc., of the building, cracks occur at intervals, which depend upon the amount of steel in the slab, and the amount of movement taking place. Several methods of dealing with this trouble exist, the chief being (*a*) Expansion Joints, (*b*) Steel to distribute the cracks over such a space that each crack will be too small to be visible, (*c*) Anti-crack measures in laying the concrete. This last is to reduce the total movement which takes place in the concrete after it has hardened. The bulk of the contraction in a newly cast slab takes place within say 48 hours of being laid. If it is therefore laid in 10 ft. bays (parallel with the main bars), with a 2 in. grouting space between bays, it is possible to allow most of the movement to exhaust itself before grouting takes place 48 hours later. The use of this device should greatly reduce the amount of cracking due to contraction. Concrete should be as dry as is possible for working purposes, as the use of a wet mix results in increased contraction subsequently. The use of, say, 1 per cent. of distribution steel as against ·08 per cent. is recommended as the result of experiments with long corridors where this trouble is most apparent. It will be noted that the divisions are parallel with the main slab bars, as it has been found that the main steel generally distributes the cracks sufficiently to render them invisible.

In practice it is found that temperature changes generally occur either on asphalted roofs, or under boilers, and expansion is generally the trouble. Provision should be made to insulate the concrete from the source of heat, and in the case of roofs this can be achieved by a cork insulation, or hollow-tile coverings.

A feature common to both steel and concrete construction is the difficulty of making structural alterations necessitated by additional lifts, staircases or vent shafts after the building has been completed.

In the case of a steel-framed building the operation is simpler, in so far as it is seldom necessary to call in the structural expert.

With regard to reinforced concrete, this is performed by cutting out and exposing the steel reinforcement. New members can be connected to the original members without much difficulty, the cut away portion being reconcreted after the added portion is in place. It is essential that the existing concrete be well wetted during this operation, otherwise the old concrete will absorb water from the new, and cause weakness at the joint.



The importance of finishings: above, stairway at a factory at Wolverhampton by Lavender and Twentyman; below, illustrating the importance of a floor finish from which oily dirt can be easily cleaned.

Finishings

The right kind of floor finishings again is dependent largely upon their relation to the building and its purposes.

Processes demanding the use of oil require a special hard oil-resisting asphalt.

Engineering and its allied trades where heavy machinery is used, demands a hard-wearing and easily scoured material with a granolithic surface.

Certain trades where damage by breakage is possible, or where the operations are confined to tables, render wood floors desirable. If initial expense is not important, maple is the most desirable floor finishing for this purpose, or alternatively, if low cost is essential, a good grooved and tongued pine floor is a fair substitute.

The treatment of granolithic floors in machine shops to avoid accumulation or rising of dust is to apply a liberal coating of linseed oil.

Wood block floors, although excellent in administrative sections of the building, are not desirable in factory sections.

Where it is desirable to separate different processes or departments, partitions become necessary and wherever possible these should be in metal. Clear vision and lightness should be essential, and this is generally possible where metal partitions are provided. In many cases these partitions can be sectional and easily removable, each section being clipped to a tubular vertical support. The question of double-glazing should not be overlooked to exclude noise or to separate different atmospheres or temperatures.

For walling and external treatment, brick has merits beyond most other facing materials. Such a variety of coloured facing bricks are now available that the cost is little more than for ordinary common bricks rendered in cement.

Should it become necessary to expose concrete as a window framing or a projecting part of the structure, it is better to treat the concrete with waterproof paint rather than render in cement, which usually results in crazing or cracking.

Services

With regard to electrical services and equipment, as electricity will be needed for lighting and in many cases for motive power, industrial heating and other purposes, it is essential that full information is forthcoming at an early stage as to the nature, sufficiency and price of the available supply. Special accommodation may be necessary for the supply company's apparatus, such as high tension transformers and switchgear and a charge for the service main cable may have to be included. Adequate space or an enclosured room is also required for the consumer's own main controlling switchgear, meters, etc., and provision should be made, if at all possible, for future extension of the apparatus.

Assuming electric lighting is to be used, careful planning can ensure adequate illumination to suit each particular process and experience is now available of the foot candles necessary for good illumination, but unnecessarily high illumination will obviously increase the running costs of current and lamps.

General overhead lighting with correct spacing and height of fittings from floor is the most satisfactory and can be supplemented by small drop fittings over particular machines which require local lighting. Wall brackets or plugs for bench lighting are very useful.

As regards lighting fixtures the opaque enamelled reflectors of correct size and shape are generally the most suitable. They are efficient and unbreakable and can be easily cleaned. The only drawback is that they give a somewhat gloomy appearance to ceilings and walls and as an alternative in the case of factories for light and clean processes, an opal enclosed lighting unit might often be substituted to give a more cheerful aspect without much loss of efficiency. A compromise may be

The cafeteria method of service is the most satisfactory for factory canteens. The canteen bar at the Rizla factory.

effected by the introduction of the prismatic bell type of fitting which gives good lighting and reflection from the ceiling.

The vapour discharge lamp as used for roadway lighting, is now in the field for interior use, and where large units of light are required, and the colour of the light is acceptable, provide the same illumination at about one-third of the cost for current compared with the gas-filled filament lamp. At present the relatively high cost of the new lamp and its accessories are against its general adoption, but greater use will no doubt have the effect of reducing the price and with colour correction, which is being experimented with, this type of lamp will no doubt come into more general use in the near future.

It is desirable that the architect should bring these points before his client so that provision may be made in his electrical specification, and in the structure.

For wiring, the screwed conduit system with vulcanized rubber insulated cables seems to be the only one available to withstand factory conditions on account of its mechanical strength and freedom from fire risk, and it also provides a good " earth " connection for fittings, etc. It has the drawback of inflexibility for extensions and alterations, but this could be obviated in some measure by interposing additional conduit boxes with spare outlets in the runs of conduit from which new conduits could be run without disturbing existing work and adding very little to the original cost of the work.

It is permitted by the Regulations in suitable cases to dispense with conduit altogether, and use open wiring with vulcanized rubber insulated wires fixed on insulators, so long as they can be placed high up out of harm's way, at a greatly reduced cost.

The more general use of pull ceiling switches, which are now quite reliable, is advocated to give local control of individual lighting units as the wall switches in a large factory may be quite a long way off, and in any case usually control groups of two to four fittings, all of which are not necessarily required at the same time.

The architect should be instructed in the early stages of the work to provide for intercommunication telephones, Post Office telephones, electric clocks and dicta call and watchmen's clocks, as the installations of these systems are better prepared for in the structure where holes and chases may be left as the work proceeds.

It is very rarely that the exact location of each piece of machinery can be determined at an early stage of the design of the building, but where it can a system of trenches with chequer plate covers in the floor makes for economy in wiring as a number of cables can be laid in a metal trough in the trench or, alternatively, lead covered cables laid direct in the trench on bitumenized sheeting. From the floor trenches short lengths of conduit can be laid in the floor fill to the bases of the machines and the switches and starters fixed either on the machine or an iron frame fixed to the floor nearby. The drawback to this underfloor system is the difficulty of altering the positions of machines once they are fixed, and for this reason the overhead system is more usually adopted, with conduit wiring on the ceiling or roof steelwork, the conduits dropping to the machine motors. Where the power current required is relatively heavy and distributed over a large area, a metal trough system fitted with bare or lightly insulated conductors on insulators can be used with advantage, connections being taken from the trough to the motors through ironclad fuses fixed on a convenient stanchion or wall to the steelwork of the roof. Whatever system is used the prospective growth of the demand for power should be envisaged and provision made accordingly.

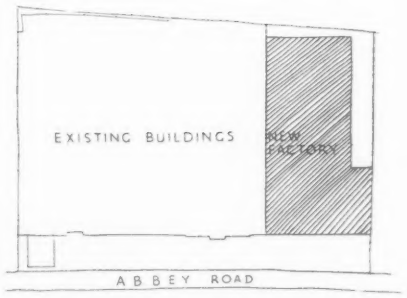
The importance of having all electrical apparatus readily accessible is stressed, particularly such things as switch- and fuse-boards, to minimize delay when troubles occur ; positions where they may later on be screened by stock or fixtures being avoided.

Sky signs, floodlighting and neon lighting is unfortunately a subject which does not receive sufficient consideration by the owner at the outset, and it seems that it is a matter which is very often determined without reference to the architect. Certain buildings gain considerably by floodlighting, but the indiscriminate use of neon lighting, by outlining sections of a building, is not satisfactory. Neon lighting is a medium with attractive possibilities if it can be used to better advantage, and not merely as a means of emphasizing architectural features.

A revival of the old trade signs, some of which are still to be seen in the City of London, could well be represented in neon lighting, and perhaps here is a possibility of providing an advertising medium which could be incorporated in the design of the factory.

FACTORIES ILLUSTRATED

METERS • PARK ROYAL, MIDDLESEX • BY ADIE, BUTTON AND PARTNERS



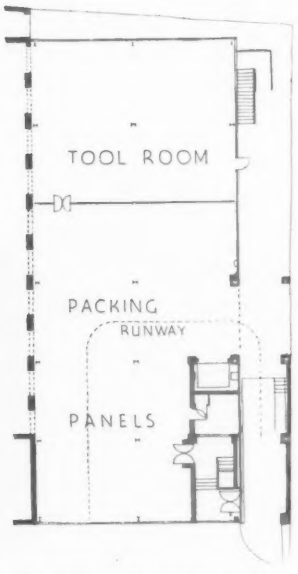
SITE PLAN

PROBLEM—Rebuilding portion of factory for manufacture of all types of meters for the Electroflo Meters Co., Ltd. Large unbroken floor areas and uninterrupted window space.

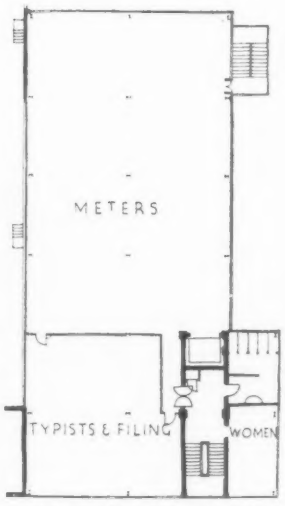
CONSTRUCTION—Steel framed, with stanchions set back from wall face to allow uninterrupted window areas ; external walls, floors and roof, reinforced concrete ; brick partitions to staircase and lift ; moveable steel glazed partitions to offices ; plinth of building and surround wall to loading dock, black bricks with white flush joints ; external paving, concrete cast in situ, approximately 4 ft. squares, with permanent shuttering of blue bricks. On the upper floors the stanchions have been kept back sufficiently to allow the windows and concrete balustrade walls up to cill level to be continuous round building, giving horizontal band effect.

INTERNAL FINISHES—Floors generally, wood block ; those to staircase and landings, cloakrooms and lavatories, granolithic ; doors, oak. Wall surfaces painted stone colour ; stanchions, bright red ; beams and window frames, white.

HEATING AND VENTILATION—Combined system by convector fans on ceilings.

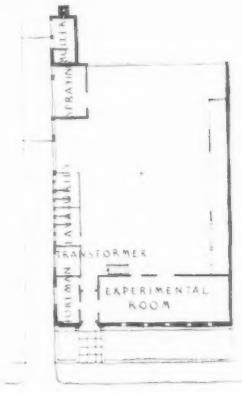


GROUND FLOOR PLAN



FIRST FLOOR PLAN

METERS • PARK ROYAL, MIDDLESEX • BY ADIE, BUTTON AND PARTNERS



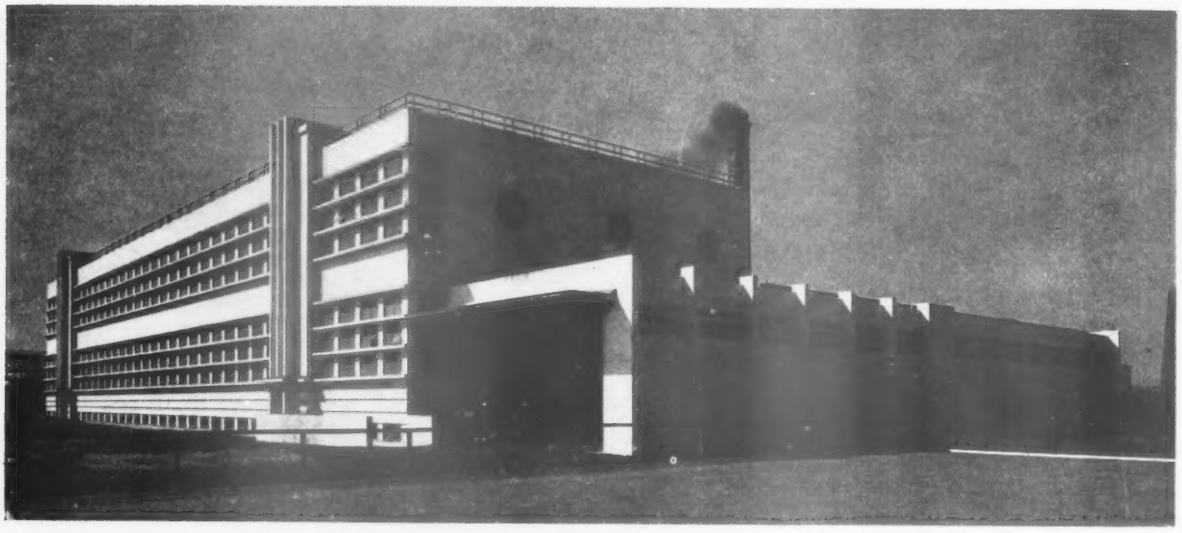
GROUND FLOOR PLAN

PROBLEM—Factory at Morden Road, Morden, Surrey, including an experimental room, lit by long, narrow windows, which are obscured by black roller-blinds during experiments ; and a room to demonstrate coloured floodlighting.

CONSTRUCTION—Brick walls, finished externally with cement ; base brownish-purple bricks ; dressings, artificial stone ; roof, steel trusses with north slope glazed, remainder covered with asbestos slates outside and fire-resisting sheeting on inside.

INTERNAL FINISHES—Walls, coloured green; floors specially treated to eliminate dust.

LIGHTING • MORDEN • BY STANLEY HALL AND EASTON AND ROBERTSON



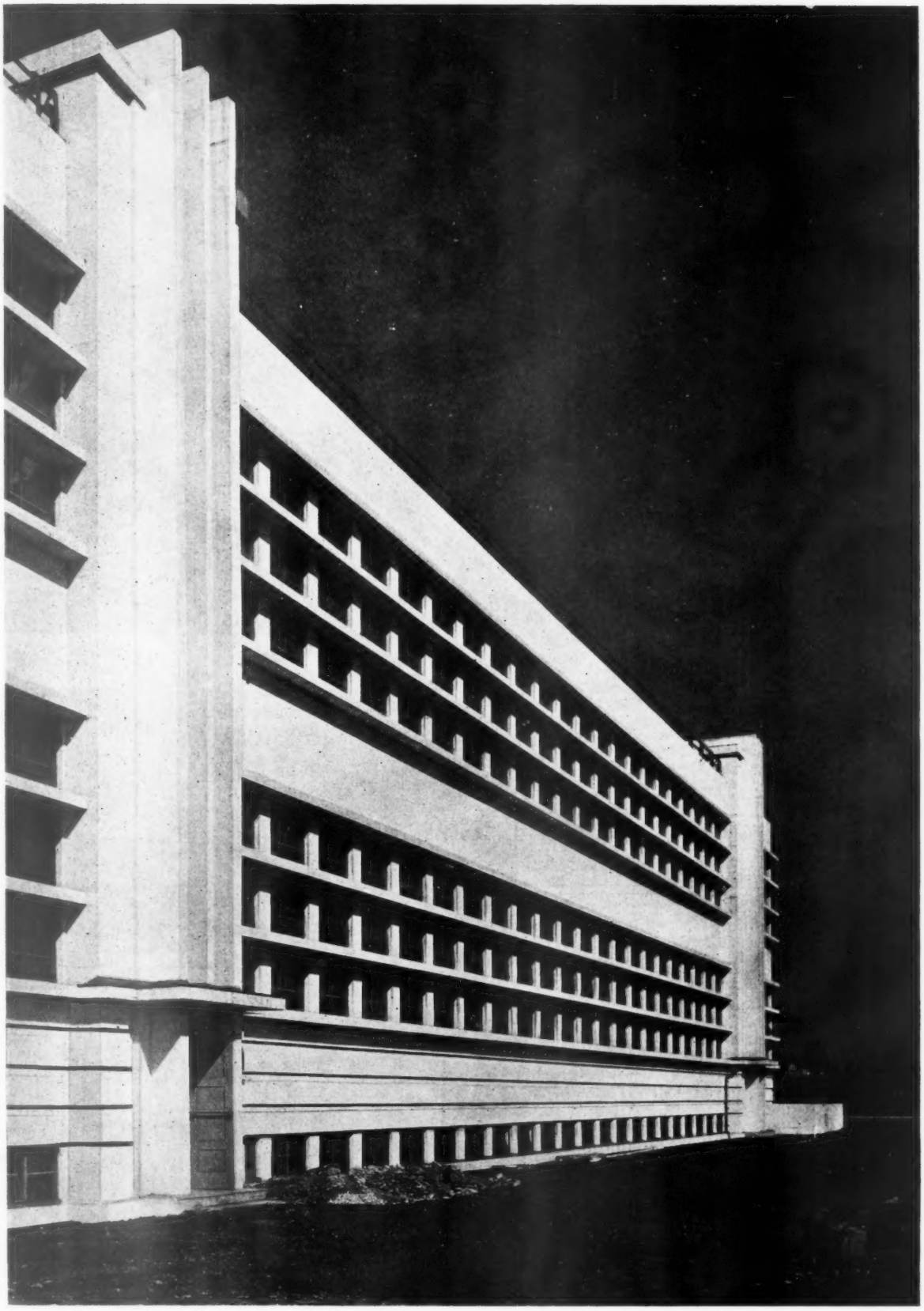
GROUND FLOOR PLAN

PROBLEM—Extension of an existing factory at Irlam for the manufacture of various grades of toilet soap ; for the Co-operative Wholesale Society, Ltd. Architect, W. A. Johnson, Chief Architect of the Society, assisted by C. L. Paice.

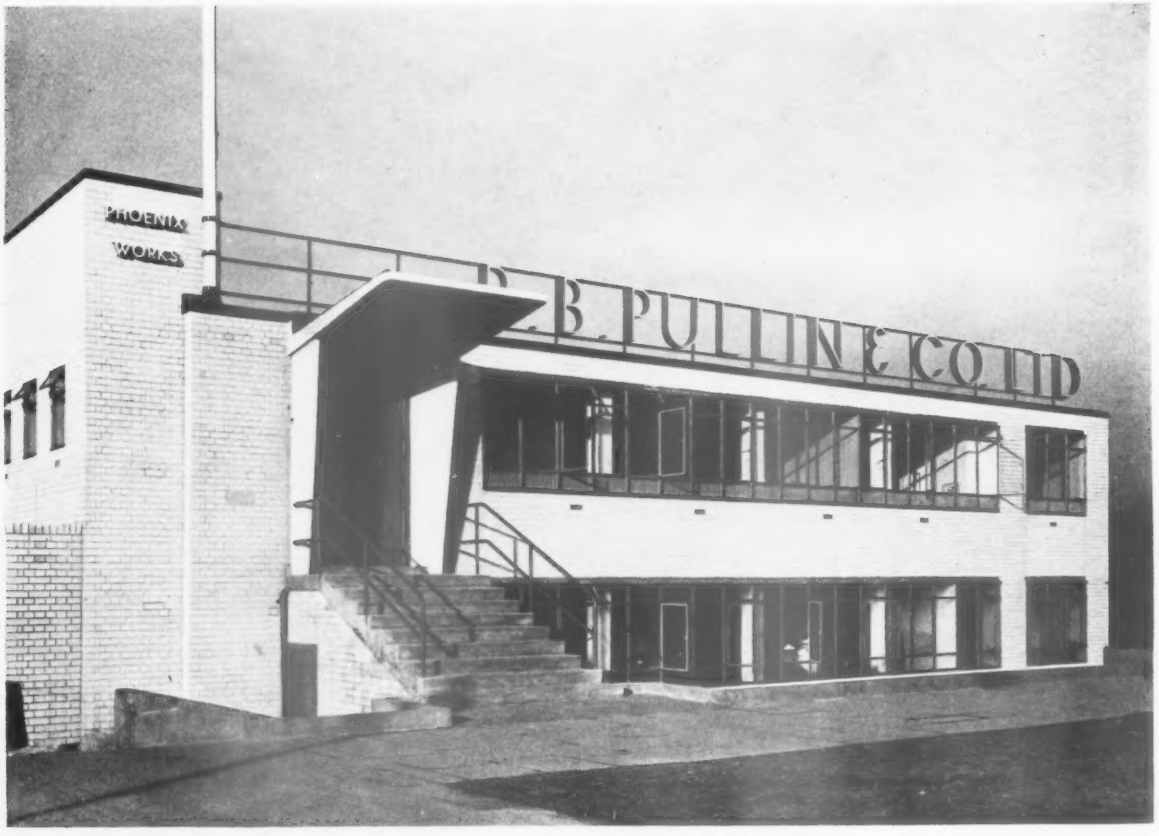
CONSTRUCTION—The low-bearing capacity of the soil made it inadvisable to make any structural connection between the old and the new buildings. A cantilever form of construction was therefore adopted for the extension, with the outer line of columns set back 6 ft., the walls acting merely as screens. The building is carried on 560 pre-cast reinforced concrete piles driven to a depth of 40 ft. and constructed of reinforced concrete, with the faces left as they came from the form work, except for a small amount of surface grinding. External walls finished with oil-bound water paint, cream in colour. The nature of the manufacturing processes to be carried on in the new works made it essential to provide the maximum of window area, with even distribution, but without too great a glass exposure either to the cold winds on the north side or the sunshine on the south.

Top, a general view ; centre, the timekeeper's lodge ; left, one of the subsidiary entrances.

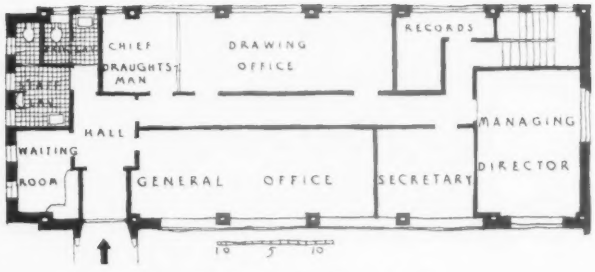
SOAP • IRLAM, LANCASHIRE • BY W. A. JOHNSON



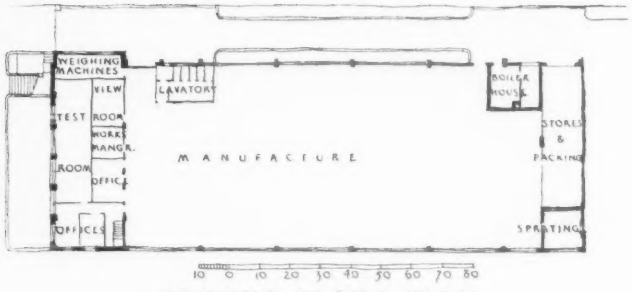
SOAP • IRLAM, LANCASHIRE • BY W. A. JOHNSON



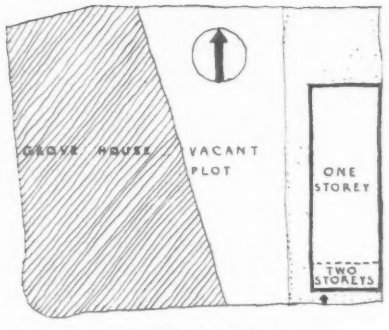
PROBLEM. — Engineering works for the manufacture of gyro-compasses and similar apparatus, for R. B. Pullin & Co., Great West Road, Chiswick.



FIRST FLOOR PLAN



GROUND FLOOR PLAN



SITE PLAN

GYRO-COMPASSES • CHISWICK, MIDDLESEX • BY PERCY TUBBS,

CONSTRUCTION—Steel frame, with infilling of sand lime bricks ; elevations faced with white bricks ; windows, steel, painted red and projected forward externally on steel bearings. Hood over entrance, reinforced concrete, with soffit painted light buff ; door, plywood, painted red ; steps, reinforced concrete, with a granolithic finish ; railings, steel, painted black. Name sign at roof level : letters, steel, painted red and cream and fixed to a steel balustrade, painted black.

SON AND DUNCAN IN ASSOCIATION WITH W. J. A. OSBURN

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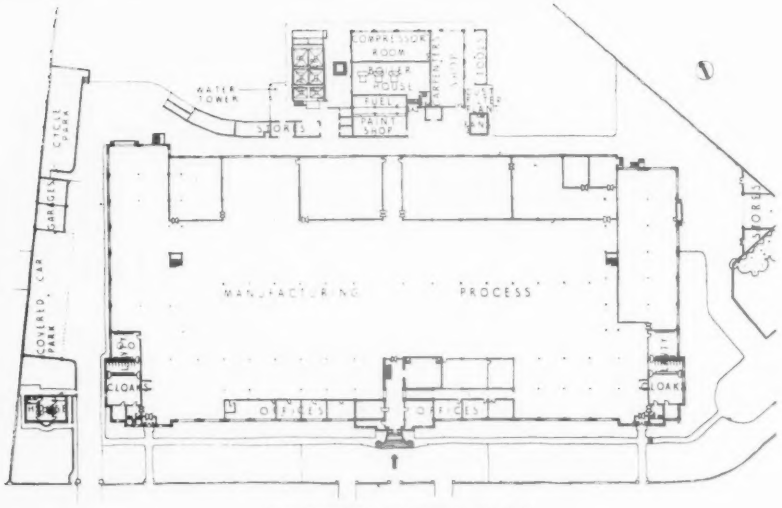
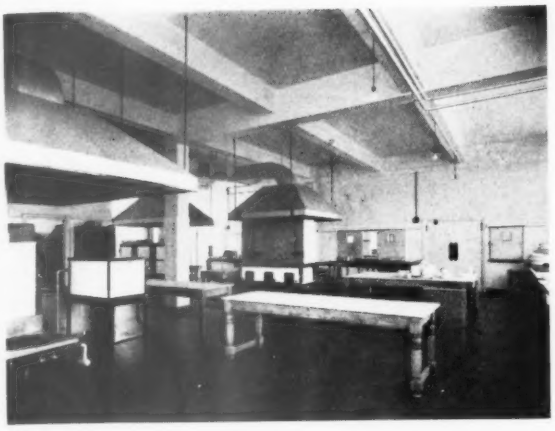


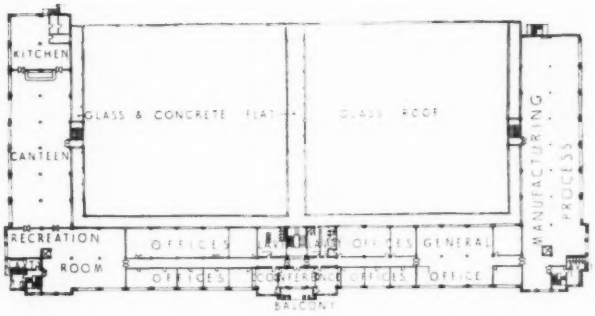
GROUND FLOOR PLAN

PROBLEM—Cutlery factory for Gillette Industries, Ltd., at the junction of the Great West Road and Syon Lane, Osterley, Middlesex. It covers an area of about 2½ acres, and has a frontage of nearly 500 ft.

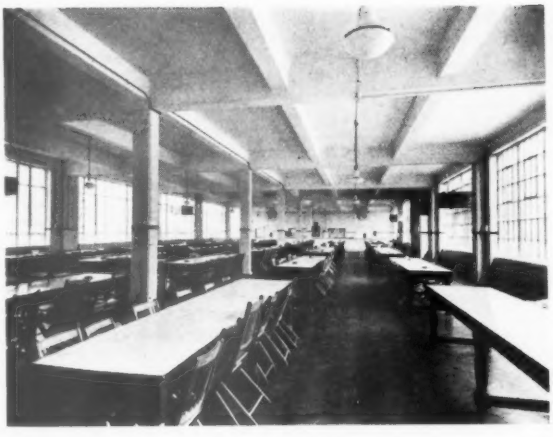
CONSTRUCTION—The principal elevations are in 2-in. Bedford grey facing bricks, laid five courses to the foot, with a base of 2⅝-in. dark Bedford facings, laid four courses to the foot. Clipsham stone has been used for the main entrance; the tower, 150 ft. high, contains a clock, 10 ft. in diameter, and set in a copper surround. The metal windows in the principal façades have cast iron panels between the storeys contained within frames of 1-in. bricks. The serrated metal panels immediately below the windows are cellulosed dull green; entrance doors are bronze. Above and left: two general views; one taken by day, the other by night.

CUTLERY • OSTERLEY, MIDDLESEX • BY SIR BANISTER FLETCHER





SECOND FLOOR PLAN



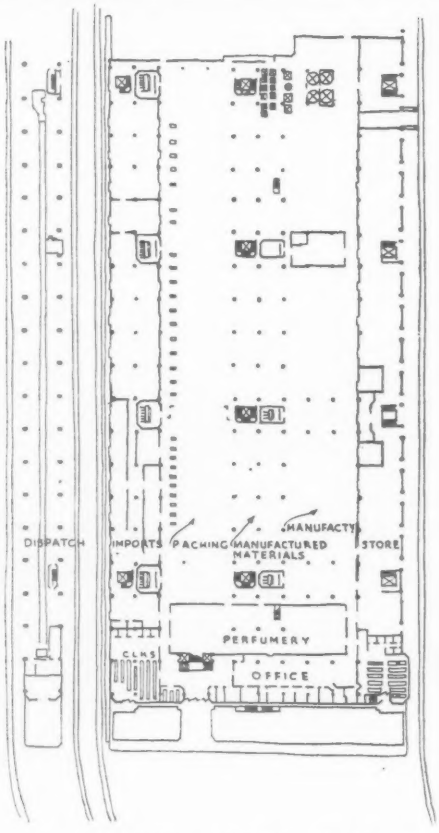
INTERNAL FINISHES—The entrance hall is paved with travertine Biancola tiles. The conference room is panelled in mahogany, Honduras being employed for the stiles and rails, and cherry mahogany from Nigeria for the veneered panels. Cherry mahogany is also used for the shop front in the entrance hall and for the show-case counters. Floors are: manufacturing sections on upper floors, maple wood blocks; offices, canteen and recreation rooms, Rhodesian mahogany.

SERVICE PIPES—The main service pipes are carried in a large duct, 7 ft. high, under the main building from the principal entrance to the boiler house.

Right, the clock tower; above, the kitchen; and the canteen.

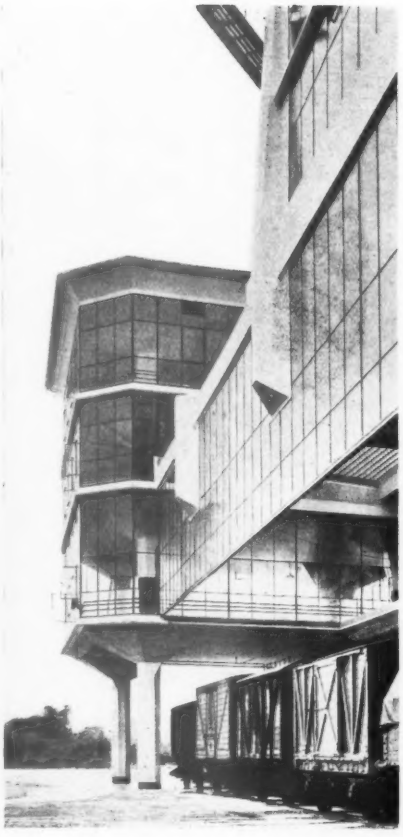
CUTLERY • OSTERLEY, MIDDLESEX • BY SIR BANISTER FLETCHER

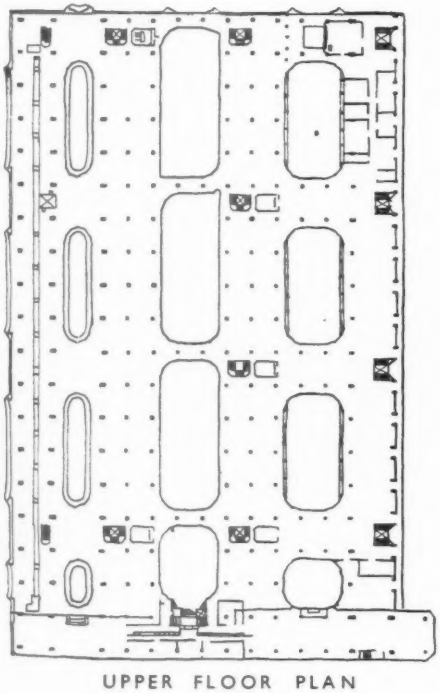
Above, the entrance front ; the centre entrance leads to the offices, and those on either side to the works ; and a view looking down into the dispatch dock and roadway.



GROUND FLOOR PLAN

MANUFACTURING CHEMISTS • BEESTON, NOTTS • BY SIR E. OWEN WILLIAMS





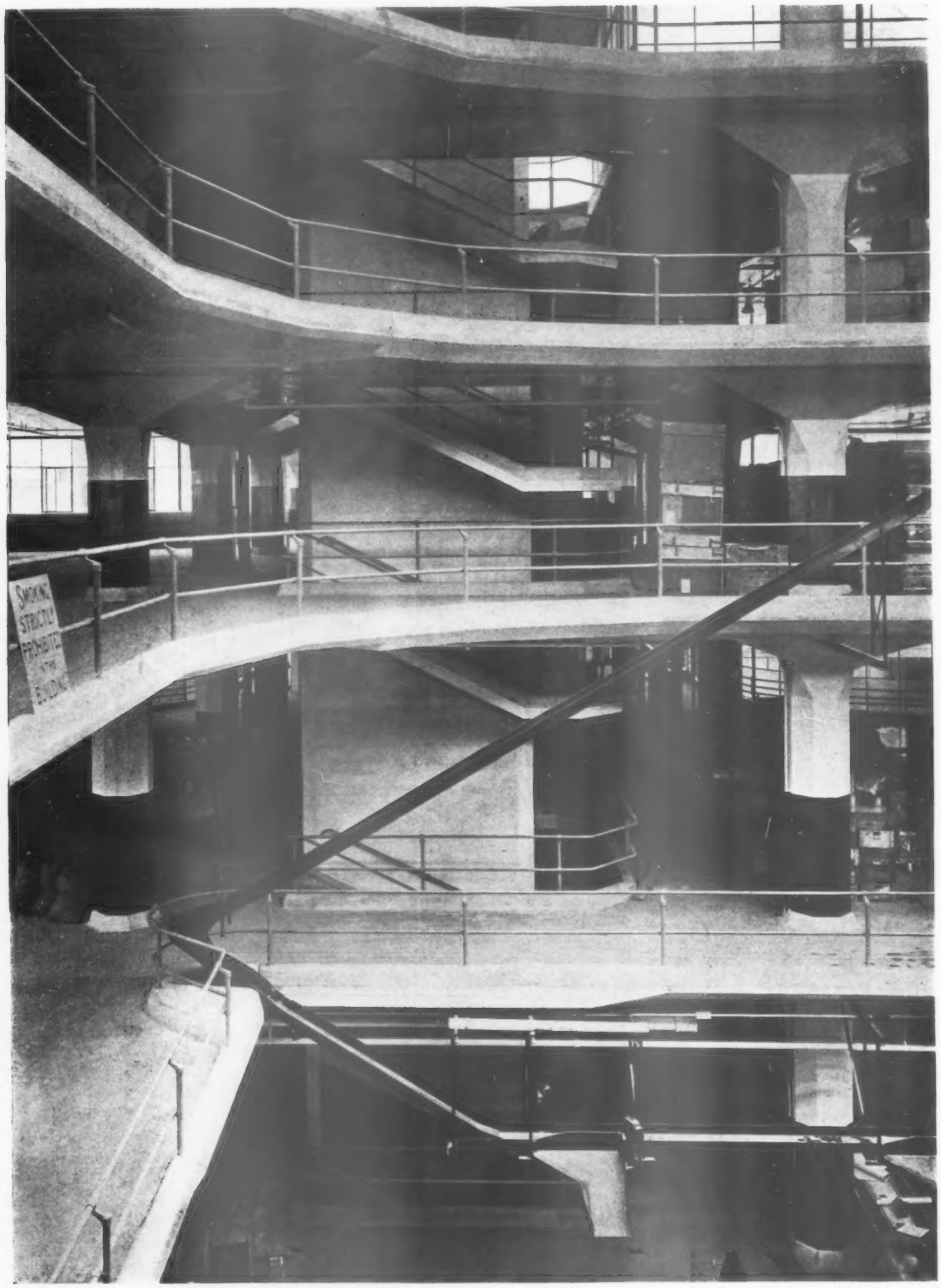
UPPER FLOOR PLAN

PROBLEM—Factory at Beeston, Nottinghamshire, for Boots, the Chemists. Only one-third of the scheme has been finished ; the second portion is now under construction. The first section is about fourteen million cubic feet. When completed, it will be the largest reinforced concrete building in the country.

CONSTRUCTION—The two principal materials used in the construction are glass for the walls and roofs, and reinforced concrete for floors and stairs. The panes of glass in the walls are of uniform width, but varying heights. A basic unit measurement of 7 ft. 8 ins. was adopted, and the whole building, including the floors, staircases and doors, have been designed as factors of this dimension. The glass panes are fixed in frames of steel and secured with strips of aluminium. On each floor the wall is divided horizontally into three parts, of which the upper and lower are fitted with roughcast glass ; the centre part is glazed with polished plate. The cantilevered roof over the unloading dock runs the whole length of the south front, a distance of 550 ft., and projects 30 ft. without supporting columns or stanchions. The travelling cranes beneath the roof can pick up a load from a railway truck or lorry and drop it at any point of the dock at ground- or first-floor levels.

Above, two views of the south front.

MANUFACTURING CHEMISTS • BEESTON, NOTTS • BY SIR E. OWEN WILLIAMS



THE INTERIOR—The big, ground floor, packing hall is linked both longitudinally and vertically with all floors. Goods are lifted to upper floors by continuously-operating elevators, and descend on inclined chutes. The reinforced concrete staircases are supported on the walls surrounding the lifts. The walls of the lavatory towers, which extend from ground to top floors, are of double obscure glass, fitted in metal frames and with metal plates to the doors below push-bar level. These lavatory towers are planned as individual shafts and are constructed, like the staircases, independently of the main work.
Above, one of the staircase towers. There are ten of this type, but four are of larger size.

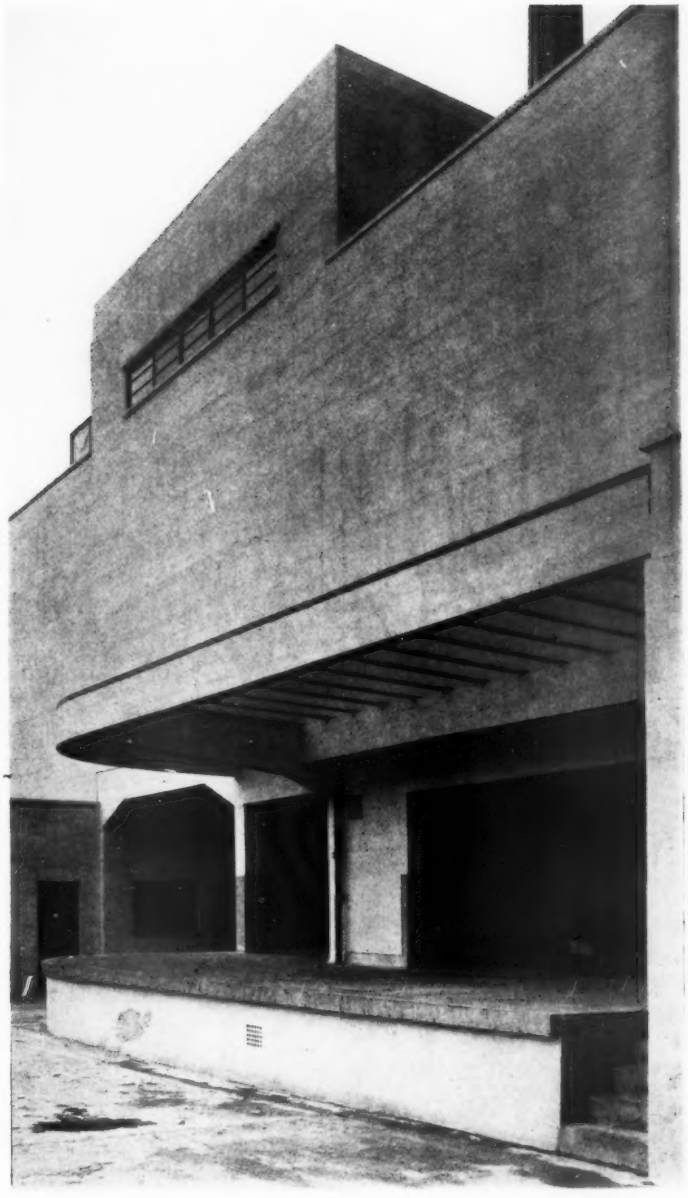
MANUFACTURING CHEMISTS • BEESTON, NOTTS • BY SIR E. OWEN WILLIAMS

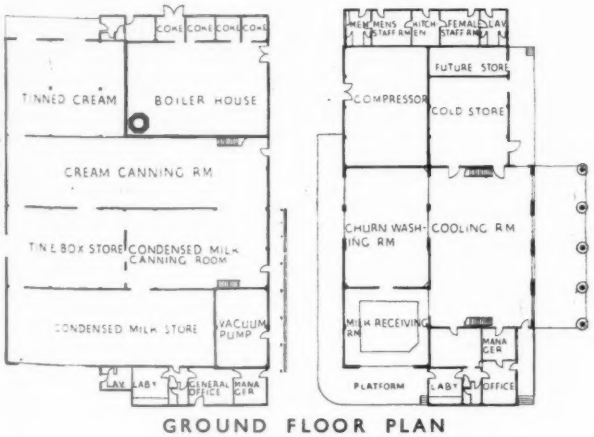
PROBLEM—Wholesale milk depot, dried milk factory and cream cannery on the Latton Estate, Cricklade, Wiltshire, for the Co-operative Wholesale Society, Ltd.

CONSTRUCTION—Reinforced concrete frame with concrete panel infilling; walls 5 ins. thick, faced internally with 2-in. insulation blocks ; floors, loading platform level, pre-cast concrete units ; first floor, concrete cast *in situ* ; roofs, flat, asphalt on felt, boarding and wood joists ; pitched, corrugated asbestos sheeting. On the elevations the concrete is as struck from wood shuttering, rubbed down and finished with stone paint.

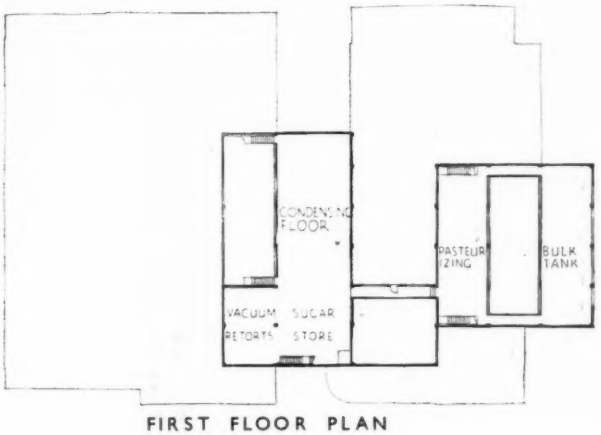
INTERNAL FINISHES—Walls, generally, tiled dado, 8 ft. high, with plaster skin on insulation blocks over, finished enamel paint ; floors, milk depot, 2-in. granolithic with chequer steel plates inserted ; cannery, part tiled floor, part granolithic ; ceilings, fibre board sheets finished flat white paint. In the office and mess room blocks the floors are tile on cement screed, and the walls and ceilings are plastered and distempered.

Above, a general view ; right, the platform to the milk receiving room.



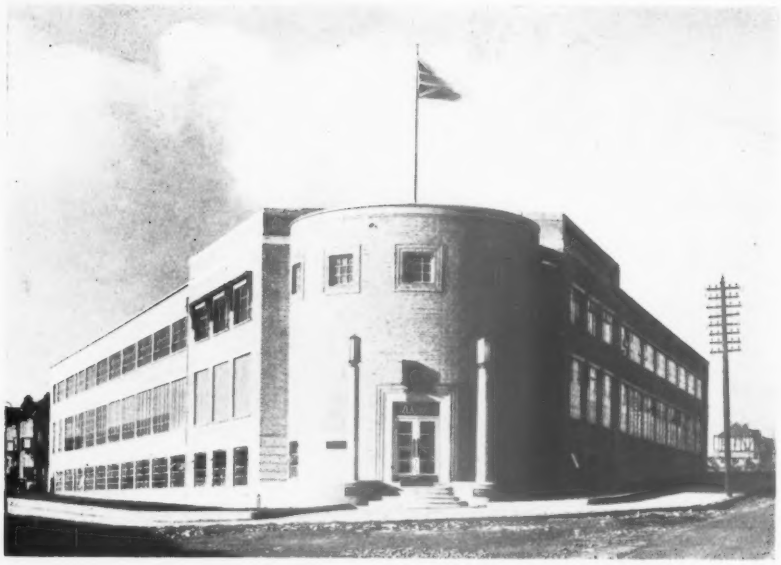


GROUND FLOOR PLAN



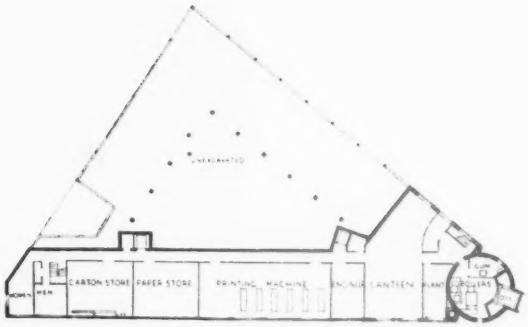
FIRST FLOOR PLAN

MILK AND CANNING • CRICKLADE, WILTSHIRE • BY L. G. EKINS

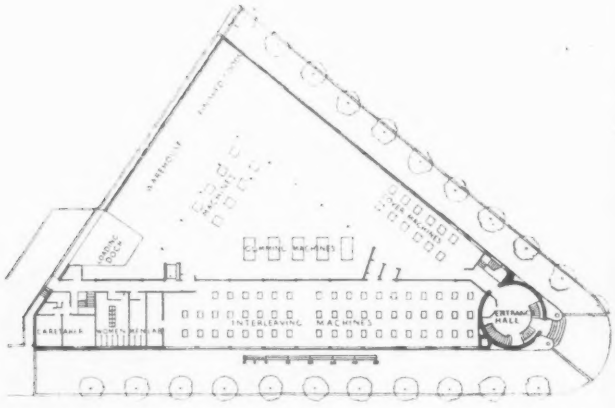


PROBLEM—Factory for L. Lacroix Fils (London), Ltd., in Beresford Avenue, Wembley, Middlesex, for printing, interleaving and packeting cigarette papers. The interleaving required a large floor space, with conditioned air of a humidity of 80 deg. Special temperatures were required for the storage of paper and adequate ventilation for machines giving off considerable heat. Departments are also included for gum making and for printing in colour the outer covers to the cigarette packets.

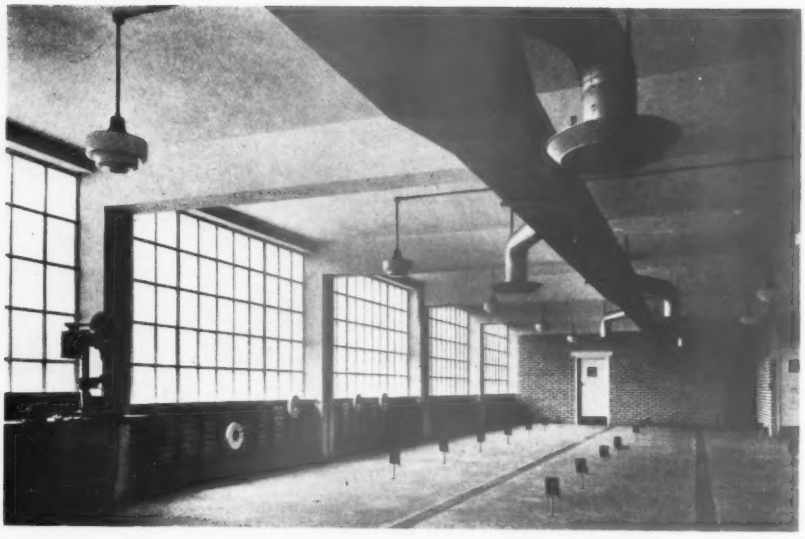
CONSTRUCTION—Reinforced concrete frame, floor slabs, roofs and staircases, heavy slabs being provided for machinery. The whole of the interior is faced with white bricks, including the partitions, the upper parts of which are glazed with clear sheet glass. To preserve the humidified atmosphere all windows and partitions are double glazed, and there are double-check lobbies to all doorways and lifts.



BASEMENT PLAN



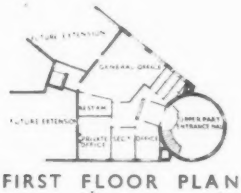
GROUND FLOOR PLAN



Floors are: factory, granite surface ; offices, oak blocks ; entrance hall and principal staircase, terrazzo.

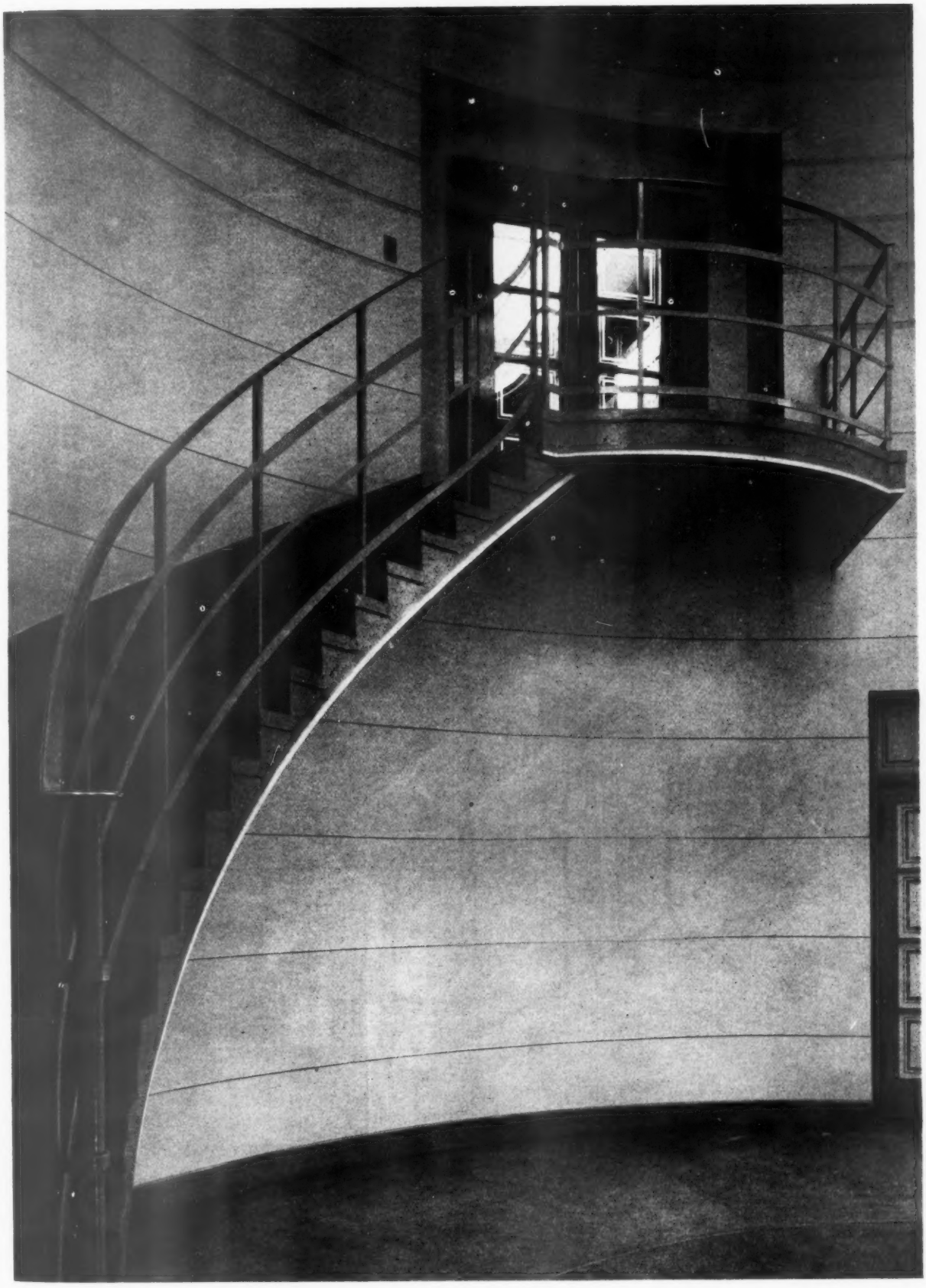
WIRING FOR MACHINERY—The wiring for the machines is lead-covered and is laid in metal-covered troughs in ducts in the concrete floors, and covered with iron-chequered plate.

The interior photograph shows the conditioned air system to retain a humidity of 80 deg. On the facing page is a photograph of the main staircase.



FIRST FLOOR PLAN

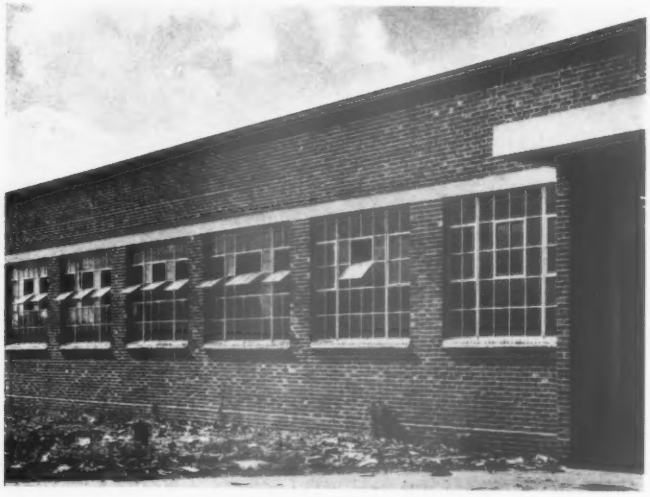
CIGARETTE PAPERS • WEMBLEY, MIDDLESEX • BY H. COURTENAY CONSTANTINE



CIGARETTE PAPERS • WEMBLEY, MIDDLESEX • BY H. COURTENAY CONSTANTINE

PROBLEM—Factory for the Great Eastern Cabinet Co., Ltd., on the Eleys Estate, Angel Road, Edmonton, N., for the manufacture of cabinet work and furniture.

Above, the office block ; left, centre, the loading dock ; bottom, part of elevation of factory ; below, staff entrance.

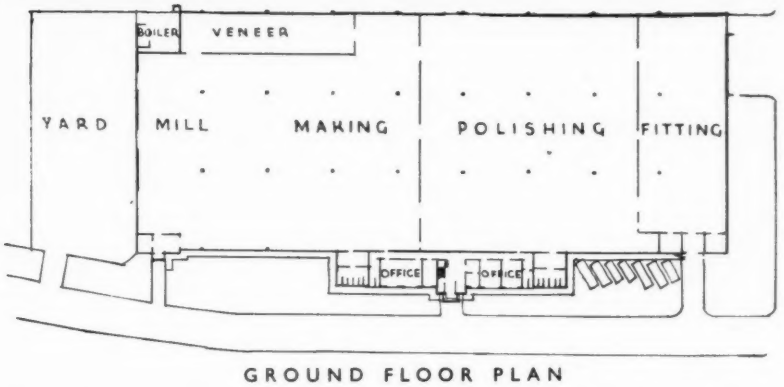


FURNITURE • EDMONTON, N. • BY NICHOLAS AND DIXON-SPAIN

CONSTRUCTION—Steel framed, with infilling of brick, supported on wall beams. Offices are brick, with reinforced concrete wall beams and concrete piers. Offices have hollow concrete floors and flats, and the factory has asbestos roofing sheets and troughing, and north light glazing. The steelwork is designed with large spaces between the stanchions to give maximum freedom to floor area. Roof trusses are supported by lattice girders. Elevations are rustic fletton facings, with artificial stone dressings.

PLANT—The factory is provided with electrically-driven plant, and steam presses and heaters. Exhaust ducts convey the wood chips and sawdust from the workshops into the fan over the boiler-house for discharge to the boilers and incinerator.

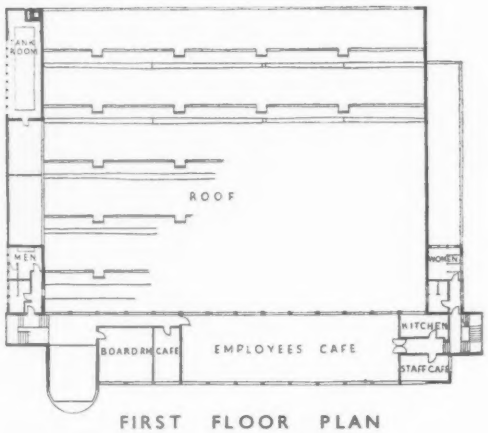
Right, the principal staircase ; below, a detail of the handles on the entrance doors of the office block.



GROUND FLOOR PLAN

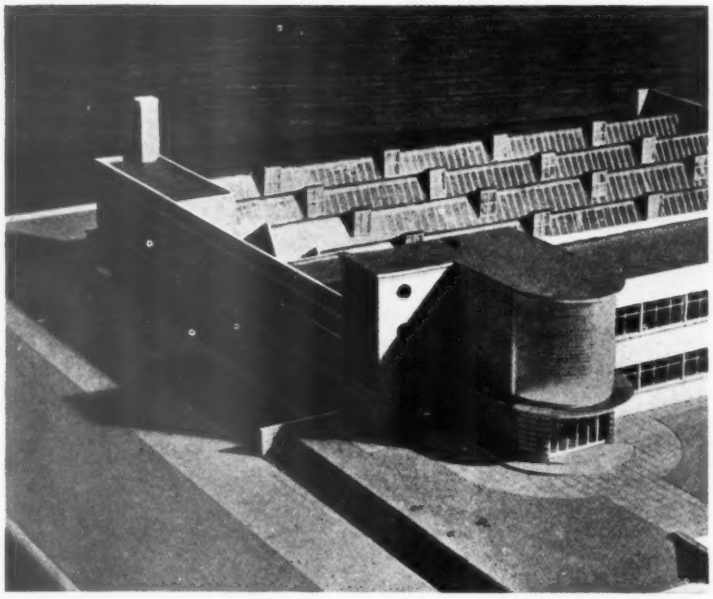
FURNITURE • EDMONTON, N. • BY NICHOLAS AND DIXON-SPAIN

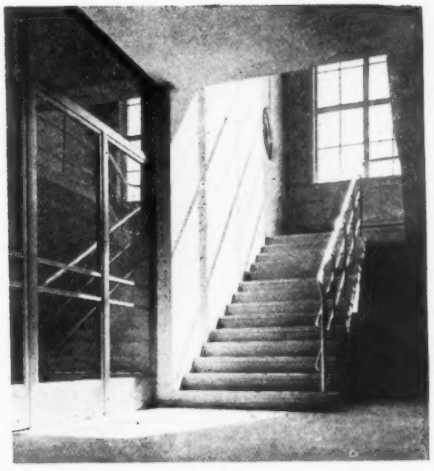
The photographs show : Left, a detail of the main front; below, the main entrance.

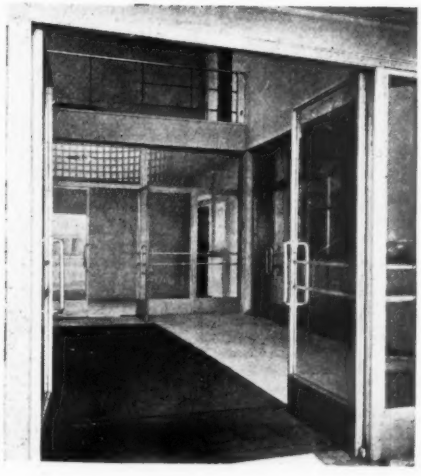


FIRST FLOOR PLAN

CORSETS • SLOUGH, BUCKS • BY SIR JOHN BROWN AND



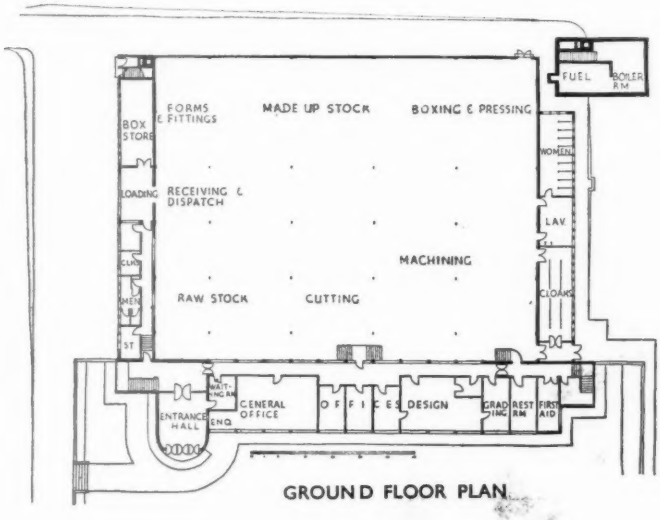




PROBLEM—A factory at Slough—on the Gt. West Road—for Berlei, Ltd., for the manufacture of corsets and other similar products. The scheme consists of an administration block facing the road with the factory behind. The former is raised 4 ft. above general site level in order to simplify supervision and to present a more monumental elevation to the road. The owners required a factory to accommodate roughly 300 employees, or approximately 15,000 ft. super., with the following requirements. (1) North lighting. (2) Conditioned ventilation and heating. (3) Social rooms for employees. (4) Possibility of future extensions. (5) Flexibility of internal factory layout. (6) Best conditions for installation of power machinery and benching.

CONSTRUCTION—Steel framed ; asphalte flat roofs ; reinforced concrete floors. Office block: faced externally with primrose faience in 2 ft. by 1 ft. slabs ; metal windows, painted dark green. The window over the main entrance is constructed of glass bricks. Factory block : Buff facing bricks, and, internally, the walls are distempered primrose.

INTERNAL FINISHES—Office block : walls plastered and colour-washed primrose. Entrance hall floor, buff terrazzo with aluminium expansion joints ; entrance doors and staircase balustrade, anodized aluminium ; other doors, standard flush, painted dark green. Standard spherical lighting fittings are installed throughout. Factory : floors finished with special linoleum.



GROUND FLOOR PLAN

Top, left, a model of the scheme ; above, top, the staircase ; centre, the canteen ; bottom, the entrance hall.

A. E. HENSON IN ASSOCIATION WITH W. DAVID HARTLEY

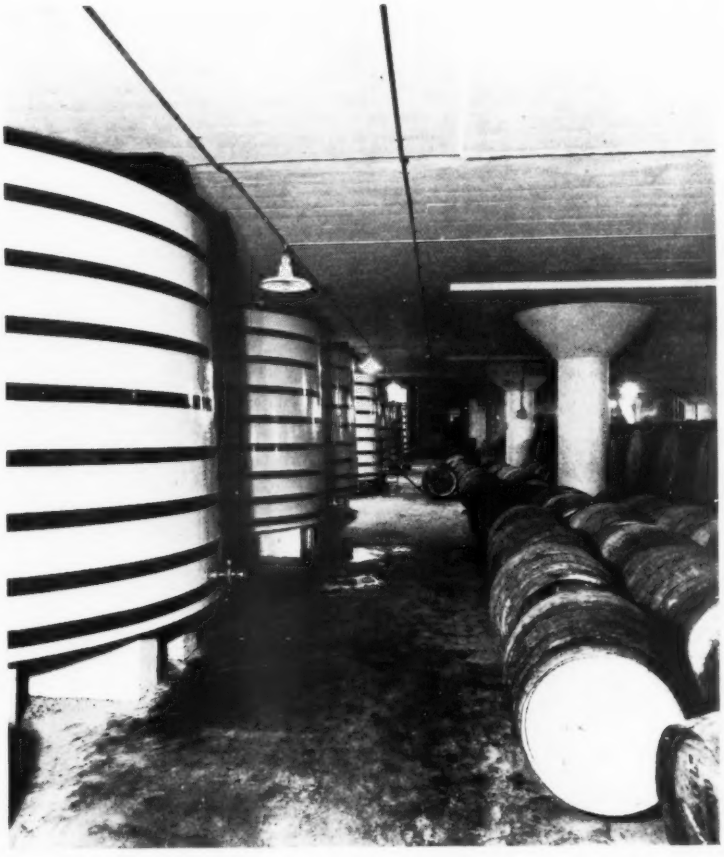
PROBLEM — Factory for Charles Kinloch and Co., Ltd., for the storage, blending and bottling of wines and spirits. The storage of the wine necessitated making provision for control of the temperature and the humidity of the air.

CONSTRUCTION—Wine store, reinforced concrete tanked basement, outer walls in two thicknesses of concrete, separated by a layer of asphalte ; circular mushroom columns support the ground floor slab over. The building is steel framed, with brick panel walls and external facings ; north light trusses supported by lattice girders ; roof covered with corrugated asbestos sheeting on tongued and grooved V-jointed boarding with patent glazing on north slopes.

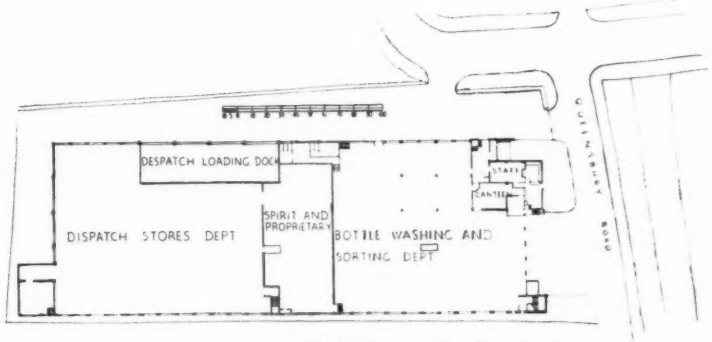
INTERNAL FINISHES—Entrance and lobby doors, teak ; hall floor, terrazzo divided into tiles with ebonite strips ; staircase to first floor finished in terrazzo with wrought iron balustrade and bronze handrail ; floors to main offices, polished oak blocks ; doors, oak flush panel ; boardroom panelled in straight grained oak, with ebonite dividing strips.

Above, a general view ; left, the main entrance by night.

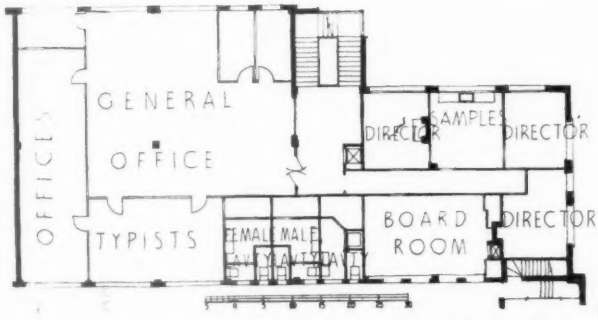
WINE AND SPIRIT BLENDING • WEMBLEY, MIDDX.



Top, left, the staircase, taken from the first floor landing ; right, the wine store in the basement ; above, the sampling room.



GROUND FLOOR PLAN



FIRST FLOOR PLAN OF OFFICE SECTION

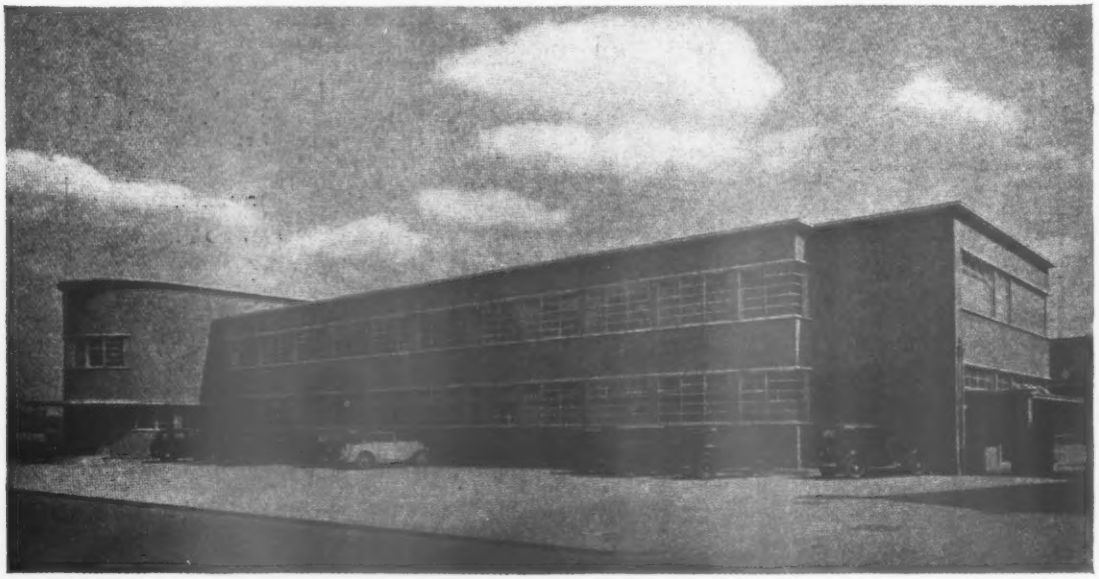
BASEMENT PLAN

BY E. E. WILLIAMS. CONSULTANT ARCHITECT, G. G. WINBOURNE

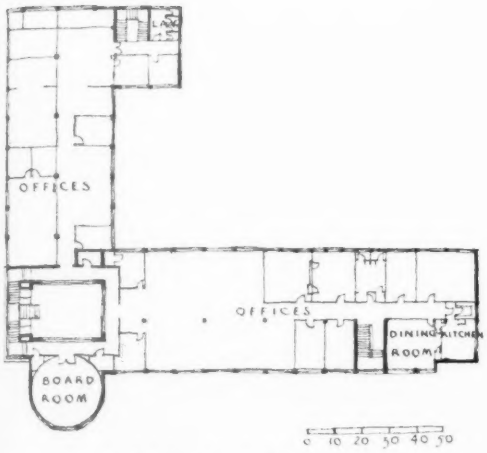
PROBLEM—Administrative offices for an extensive steel-tube factory at Birmingham. The clients' requirements included that the plan lay-out should be capable of future rearrangement, that provision should be made for future extension either on plan or by the addition of a floor, and also for a considerable area of filing space for past correspondence. The upper photograph shows the position of the building adjoining the main road passing the works, with each department of which it is connected by telephones and by pneumatic tube conveyors. The present building was planned in L form to allow of its easy extension by the completion of the square.

CONSTRUCTION—Basement ; of reinforced concrete with walls and floors on piles. Piles were also driven for the foundations of the other wing, and walls are carried on reinforced concrete beams owing to ground being made up. Construction of steel frame save for entrance circle, which is of brick-faced reinforced concrete. Calculations for framing made allowance for the load of an additional floor. Walls : 11-in. cavity brick; flat roofs, 3-ply felting on boarding and joists ; internal walls, cavity blocks of diatomaceous earth ; office partitions, plywood-faced studding packed with slag wool, the top half of the partitions being glazed. Local facing bricks with pre-cast and in situ local reconstructed stone dressings. Windows, metal casement throughout, cavity subframes being used in the basement.

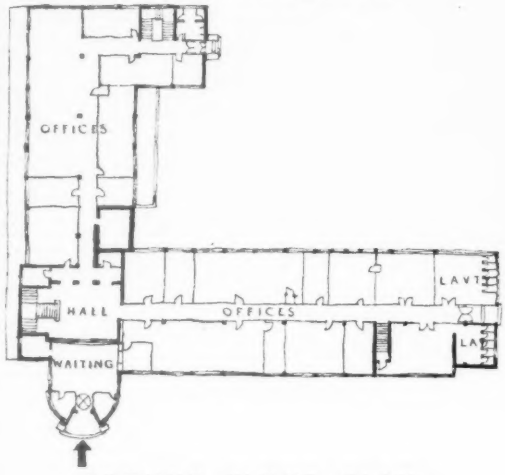
Below, the main front.



STEEL TUBES : ADMINISTRATION BLOCK • BIRMINGHAM • BY ALBERT



FIRST FLOOR PLAN

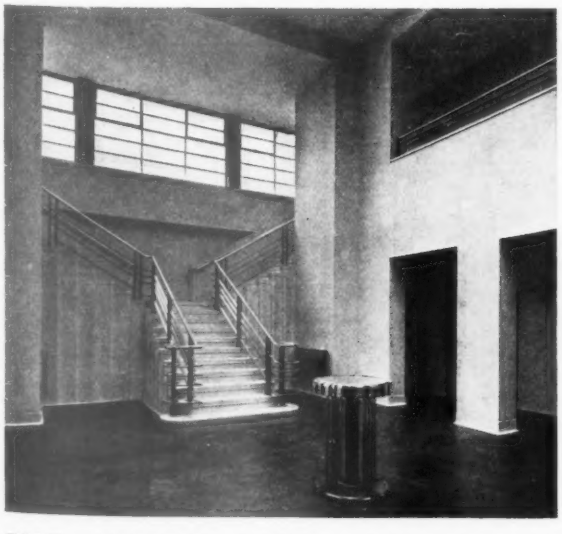


GROUND FLOOR PLAN

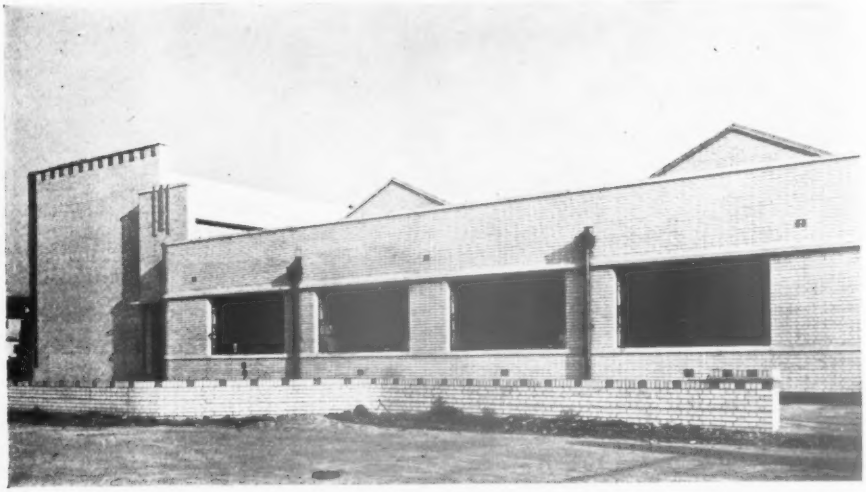
INTERNAL FINISHES—Walls generally are spray-painted grey, the flush doors to each department having a distinctive colour, lavatories and cloakrooms black. Ceilings are distempered white. Floors are of 12 in. square cork tiles.

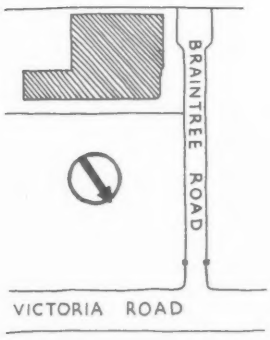
SERVICE WIRING—A continuous duct runs around the building on both floors carrying heating cables and electric wiring generally.

Above, the main entrance. Below, the entrance hall and the sales office.



BYE, SIMMS AND GIFFORD IN ASSOCIATION WITH S. T. WALKER

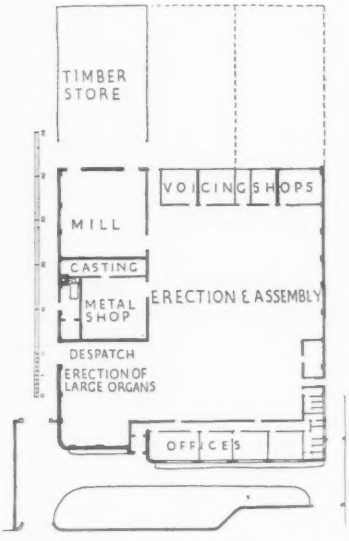




SITE PLAN

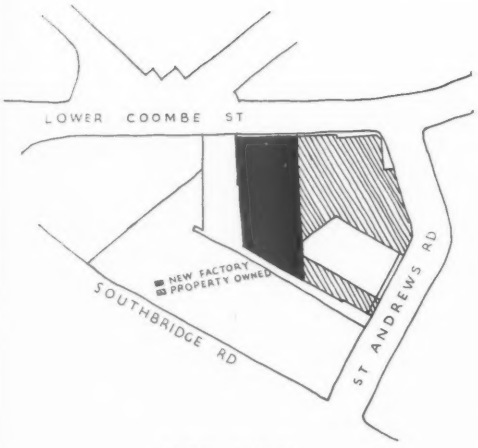
PROBLEM—Factory at Ruislip, Middlesex, for J. W. Walker and Sons, Ltd., organ builders. Incoming timber is stored and seasoned in the timber shed at the extreme end of the factory, and other raw materials are taken direct into the works. The timber passes through the sawmill into the main erecting shop for assembly. Metal is alloyed in the casting shop and fashioned into organ pipes in the metal shop. The finished pipes are tuned in the voicing shops. A portion of the factory is loftier than the remainder to facilitate the erection of cathedral organs and to permit direct loading on to vehicles within the factory.

CONSTRUCTION — 40 ft. span steel framed roofs, covered with corrugated asbestos sheeting and lined internally with flat asbestos sheeting. The voicing shops are built in partition blocks, lined with insulation board, painted on the exposed surfaces to give required reverberation. A hollow wall, with a blanket of insulation wool in the cavity, is built between adjacent voicing shops.

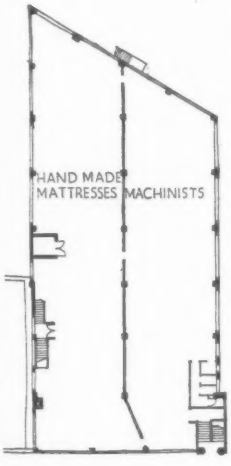


GROUND FLOOR PLAN

ORGANS • RUISLIP, MIDDLESEX • BY S. CLIFFORD TEE AND GALE



SITE PLAN

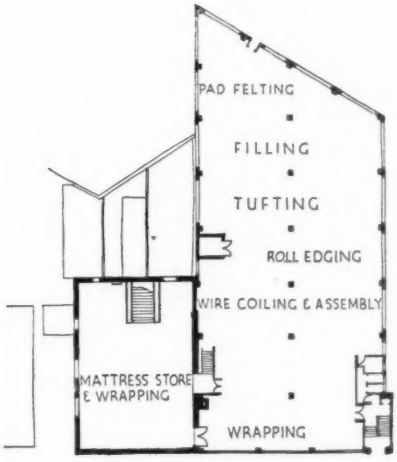


SECOND FLOOR PLAN

PROBLEM—Factory for W. Howard Price Ltd. in Lower Coombe Street, Croydon, for the manufacture of bedding. Raw material is carded into flock, blown up through ducts to the flock stores on the roof, and distributed by chutes to the floors below for filling. The finished products, on first floor, are taken through the adjoining building to the loading dock.

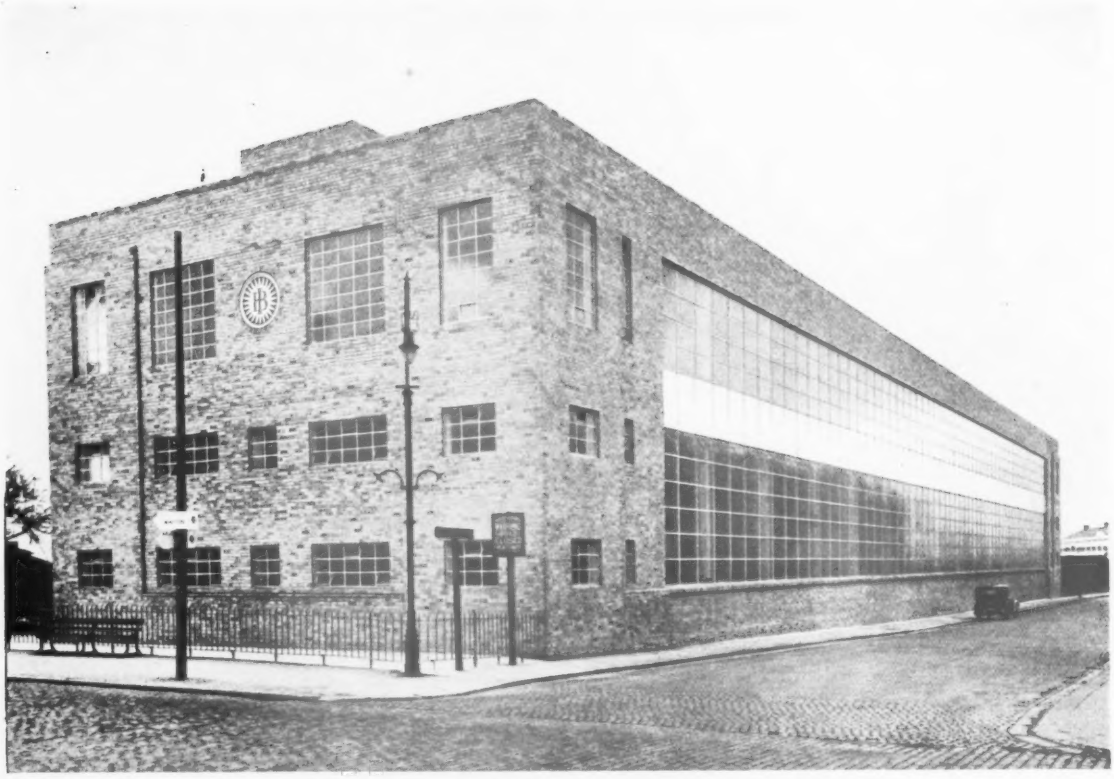
CONSTRUCTION—Reinforced concrete frame ; brick panels, with beams exposed and columns encased ; front elevation and return side elevation, reinforced concrete, rendered white ; roof, concrete and sheet asphalte ; floors, granolithic on concrete ; internal walls, plain faced partition blocks, distempered ; plinth, black tile ; lettering, gilt ; staircase, granolithic with carborundum treads.

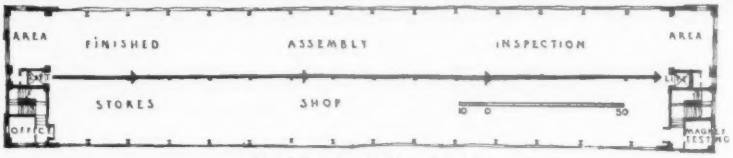
GROUND FLOOR PLAN



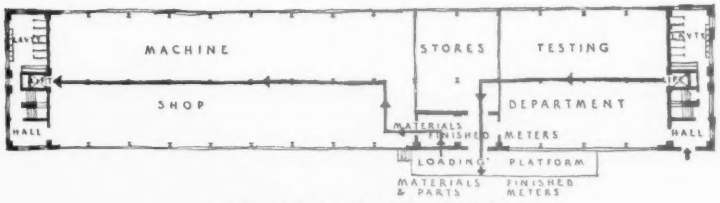
FIRST FLOOR PLAN

BEDDING • CROYDON, SURREY • BY HUGH AND L. A. MACINTOSH





FIRST FLOOR PLAN



GROUND FLOOR PLAN

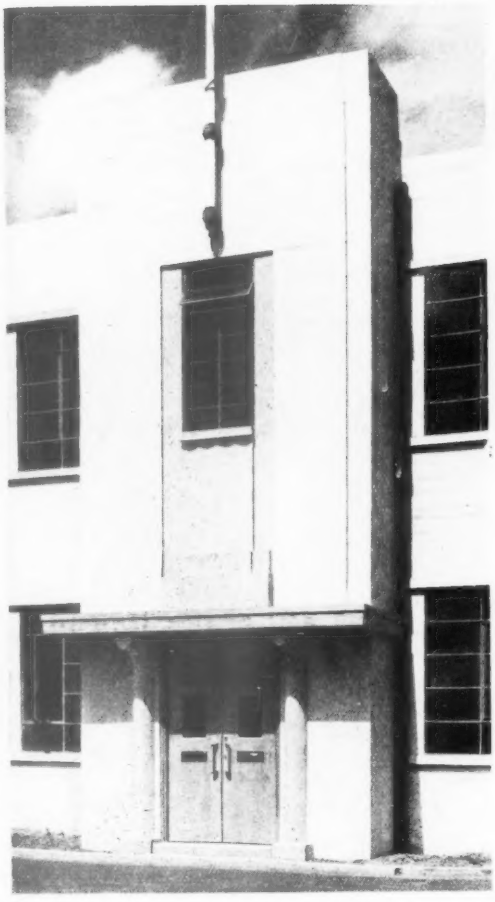
PROBLEM—Factory for the mass-production of electric meters.

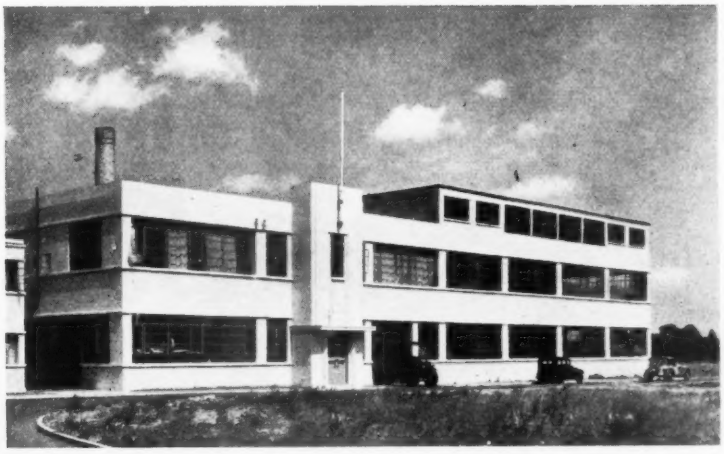
CONSTRUCTION—Steel framed, with brick infilling and faced with smooth surfaced brown bricks; floors and roofs, precast reinforced concrete beams, with filler joists; roof insulated with fibre board and finished with two layers of rubber sheeting; walls of main shop, glazed from ground floor cill to eaves with standard steel fixed casements, in 4 ft. widths, $\frac{3}{8}$-in. plates being inserted as stiffeners at intervals.

INTERNAL FINISHES—Walls and ceilings colour washed; heating panel coils plastered to form raised panels; workshop floors, beech blocks; lavatory floors and walls, tiled; ceilings, plastered.

Above, a general view; below, the assembly shop and the machine shop.

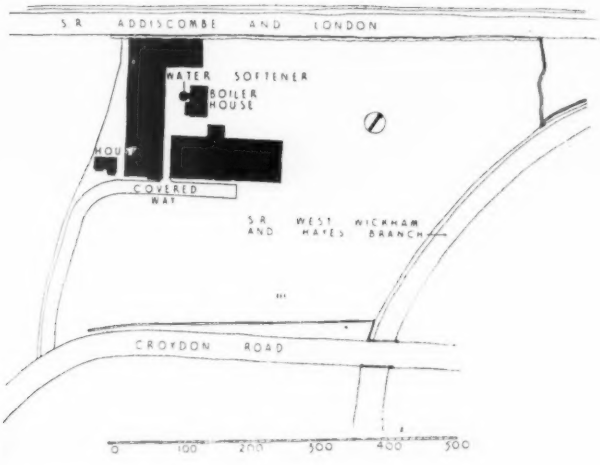
ELECTRIC METERS • PRESCOT, LANCS • BY DUDLEY NISBETT



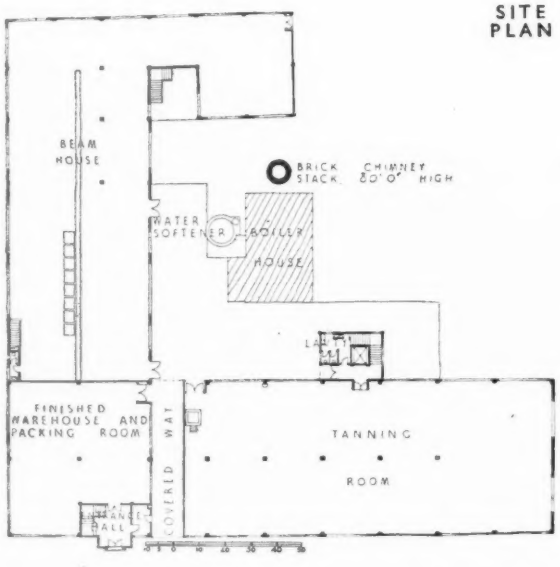


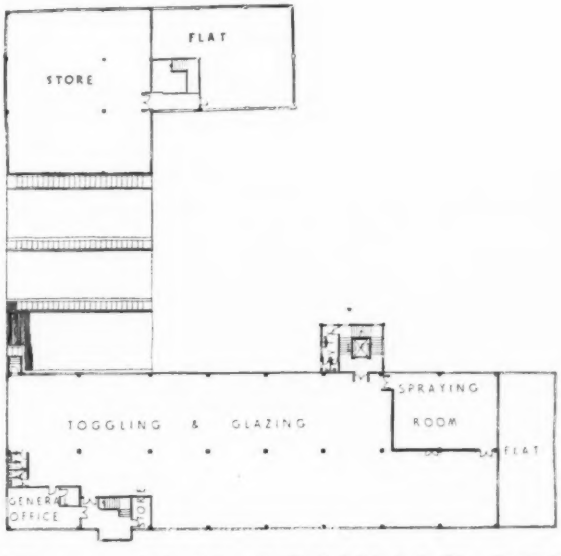
PROBLEM—Tannery for Kohnstamm, Elmers End, Kent. Three-storey building consisting of tanning, dressing, drying and glazing rooms and a finished goods warehouse, together with an existing building in rear called beam house. Production flow is from tanks in beam house to tannery—finishing—despatch.

CONSTRUCTION—Reinforced concrete with 6-in. panel infillings, elevations colour-washed or rendered with crushed spar and glass. Floor finishes are granolithic, and walls distempered. Office floors, wood block.



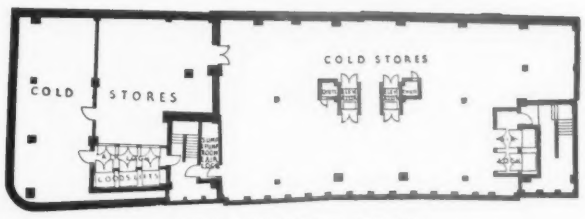
SITE PLAN



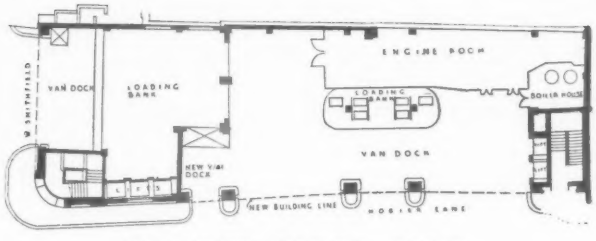


GROUND AND FIRST FLOOR PLANS

TANNERY • ELMERS END, KENT • BY H. REGINALD ROSS



BASEMENT PLAN



GROUND FLOOR PLAN

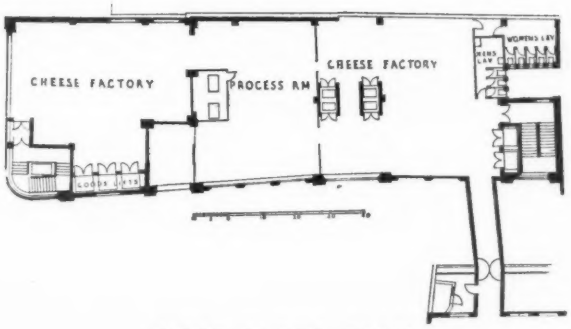
CHEESE • WEST SMITHFIELD, E.C. • BY JOSEPH HILL

PROBLEM—Cold store, butter-blending and cheese factory for Messrs. Lovell and Christmas, West Smithfield, E.C.

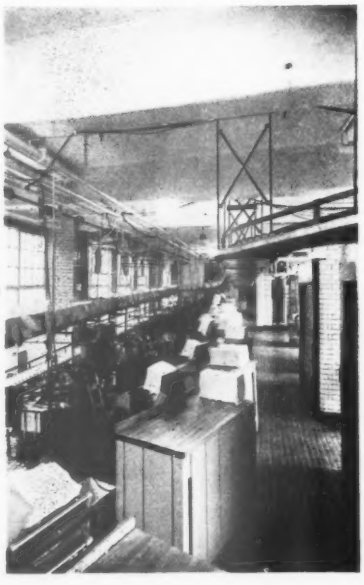
LAYOUT—Cold store in basement, engine-room and van docks on ground, and cheese and butter-making above. Goods circulation entirely by chutes, conveyors and lifts.

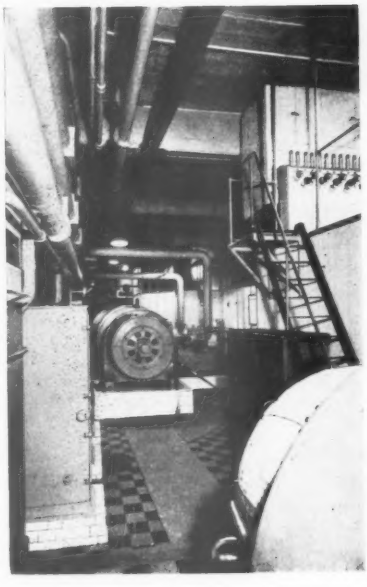
CONSTRUCTION—Steel frame with 14-in. brick walls, faience facing and reinforced concrete floors and roof. Internal finish, white tile walls, painted ceilings.

Below, a factory floor and the engine-room. Right, a detail of the independent main staircase.

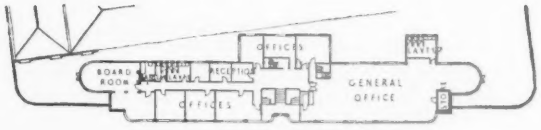


FIRST FLOOR PLAN



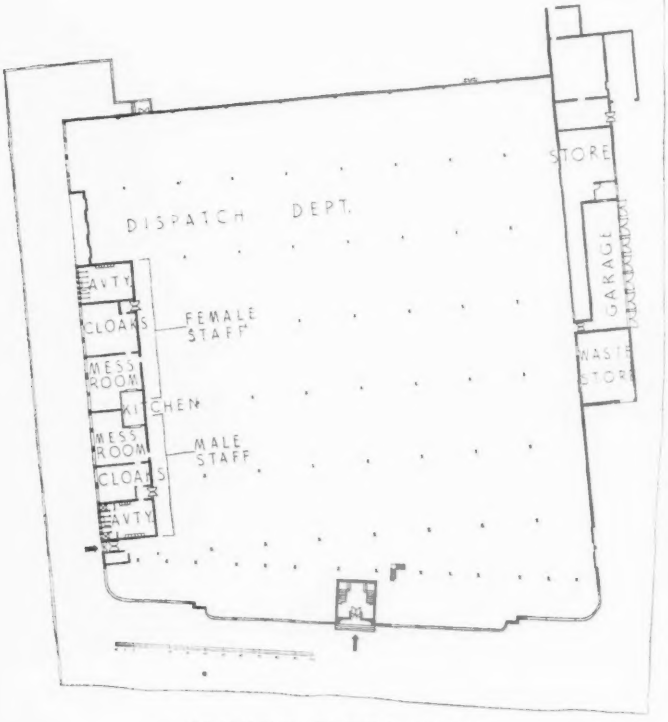


CHEESE • WEST SMITHFIELD, E.C. • BY JOSEPH HILL

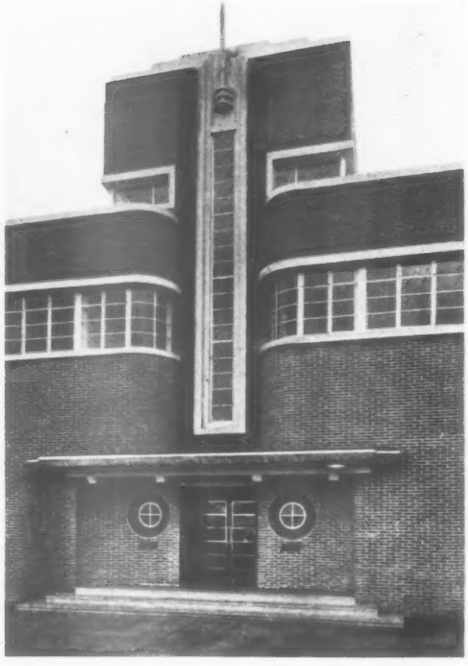


FIRST FLOOR PLAN

Above, the main front of the office block ; below, the main entrance and staircase window.



GROUND FLOOR PLAN

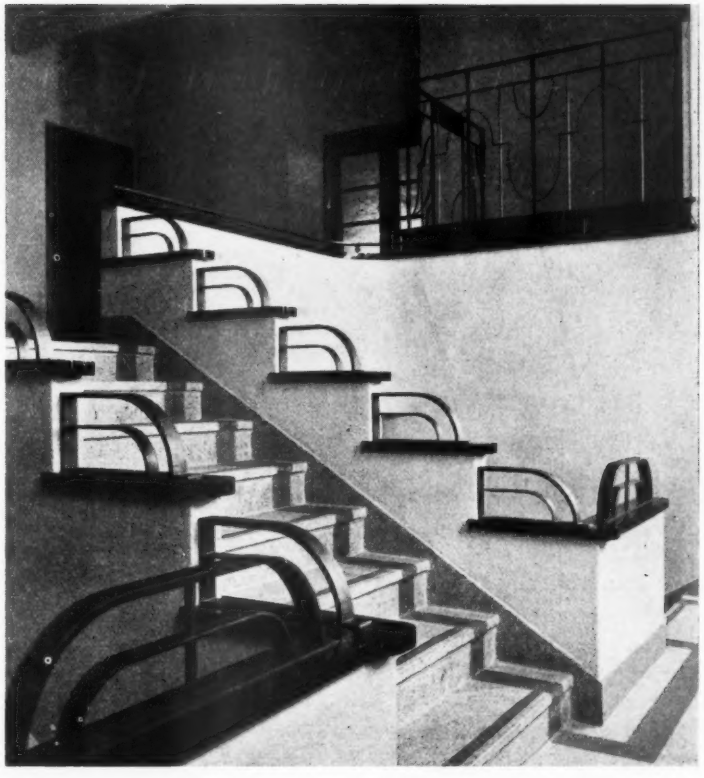


CORRUGATED BOXES • HAYES, MIDDLESEX • BY ROBERT SHARP

PROBLEM — Single-storey factory, with two-storey office block, for the manufacture of corrugated boxes for Thompson and Norris, Ltd., in Uxbridge Road, Hayes. The office block is built entirely separate from the factory, with the exception of one communicating stair which leads direct from the general office to the factory. Site, approximately six acres. The entire ground floor of the factory has been left free of partitions with the exception of one block on the east and one block on the west, housing respectively the services and the stores, garage, etc. Direct communication between the departments is maintained by pneumatic tubes and internal telephones.

CONSTRUCTION — Steel framed, with 11 in. cavity walls; roofs, asbestos; internal walls, 4½ in. and 9 in. brick; floors, concrete; partitions, steel sheeting and 4½ in. brick. Elevations, 2 in. hand-made multi-facing bricks, with copings, cills, canopy, etc., in artificial stone; windows, rustproof.

Above, looking from the roof towards the general office; right, the main staircase. The stairs are of terrazzo with dark green bands and the balustrading is iron.

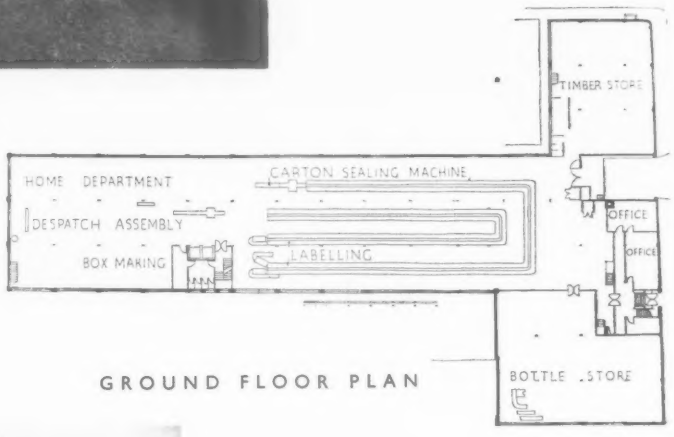


CORRUGATED BOXES • HAYES, MIDDLESEX • BY ROBERT SHARP

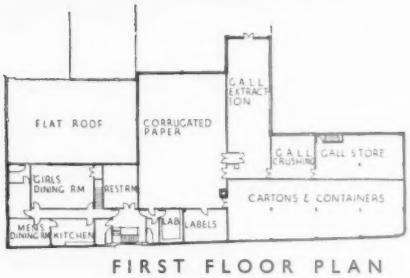
PROBLEM—Factory for Mabie Todd & Co., Ltd., for the manufacture, packing and distribution of Swan ink to the home and overseas markets. Advantage was taken of the fall of the site to arrange loading docks onto two floors.

CONSTRUCTION—Steel framed, with brick walls ; large water tank on roof in reinforced concrete ; fifteen ink vats in reinforced concrete, lined with acid-resisting asphalte ; partitions, metal and glass ; floors, precast concrete.

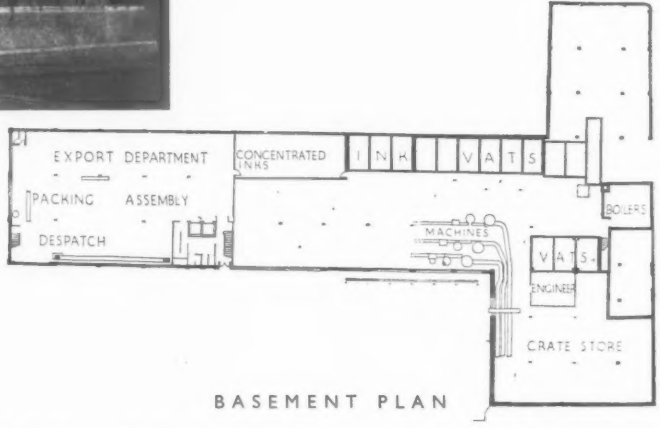
Above, the carton sealing machine department ; below, general view.



GROUND FLOOR PLAN

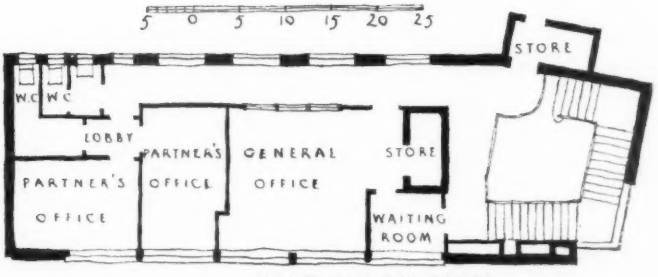


FIRST FLOOR PLAN



BASEMENT PLAN

INK • LIVERPOOL • BY LEY, COLBECK AND PARTNERS



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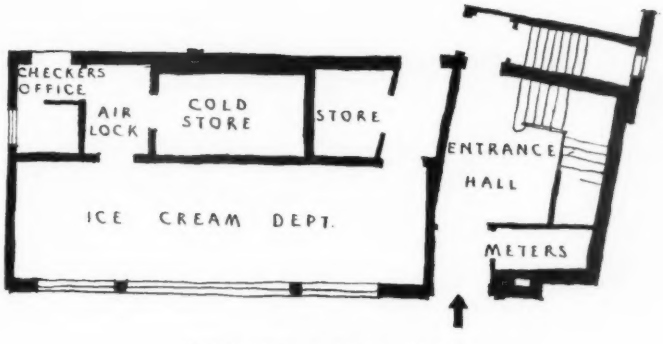


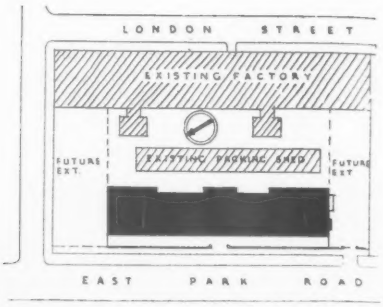
GROUND FLOOR PLAN

PROBLEM—Factory for the manufacture of ice cream. Special requirements were a refrigerating plant, a manufacturing department and administrative offices, together with storage and services. The refrigerating plant is accommodated in the basement ; and the ice cream department is at the front of the building on the ground floor, both to ensure good lighting and to allow the public to see the conditions of production.

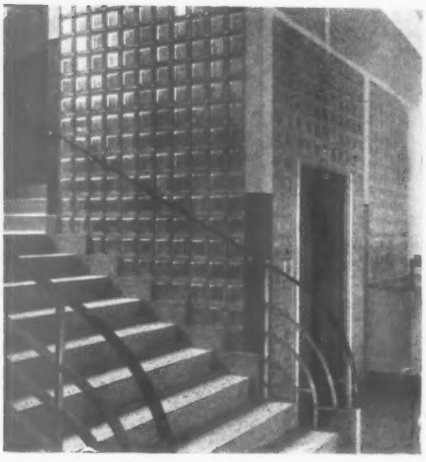
CONSTRUCTION—Walls, 9-in. brick ; floors, roofs and staircase, reinforced concrete ; cold stores, brick insulated with cork, with final internal finish in cement rendering ; elevations faced with ivory matt-glazed faience ; plinth and copings, pale green faience ; windows, aluminium alloy, with stanchion casings of stainless steel.

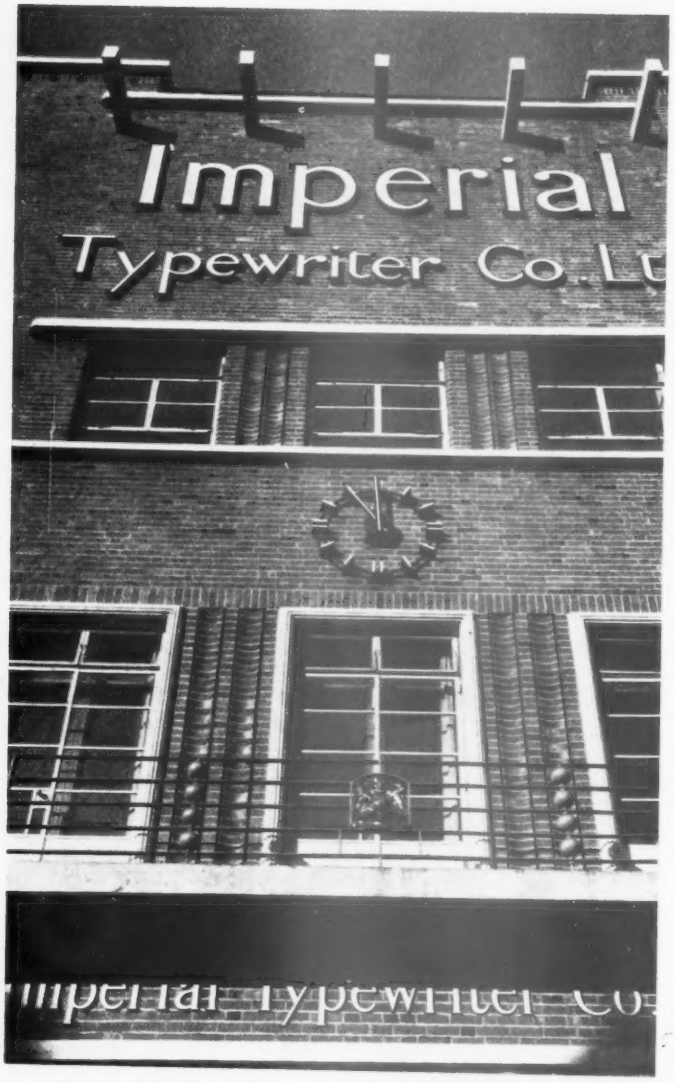
INTERNAL FINISHES—Walls and floors of hall are finished in pale green and buff terrazzo ; ice cream department tiled with a non-slip cement floor.

ICE CREAM • WOLVERHAMPTON • BY LAVENDER AND TWENTYMAN



SITE PLAN



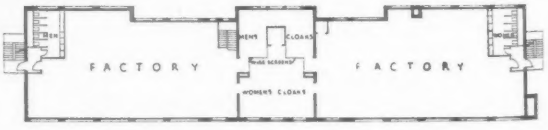


PROBLEM—Office and factory, East Park Road, Leicester, for Imperial Typewriter Co., Ltd., for light typewriter assembly.

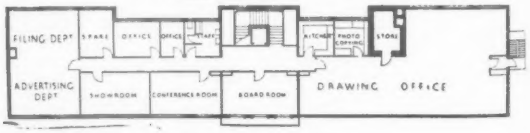
CONSTRUCTION—Steel framed, faced with mixed brindle bricks, and reconstructed stone dressings; entrance doors, stainless steel and bronze; sign, bronze and enamel.

INTERNAL FINISHES—Floors, ground and first, compressed cork tile squares; second and third, teak blocks; office partitions, glazed steel; boardroom, panelled; entrance hall, Hopton wood stone floor and dado with Swedish green marble banding; walls, generally, finished plaster, painted matt ivory with glossy grey dados.

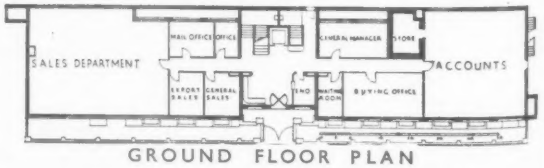
Left, two views of the main front; above, the staircase and lift.



SECOND FLOOR PLAN



FIRST FLOOR PLAN



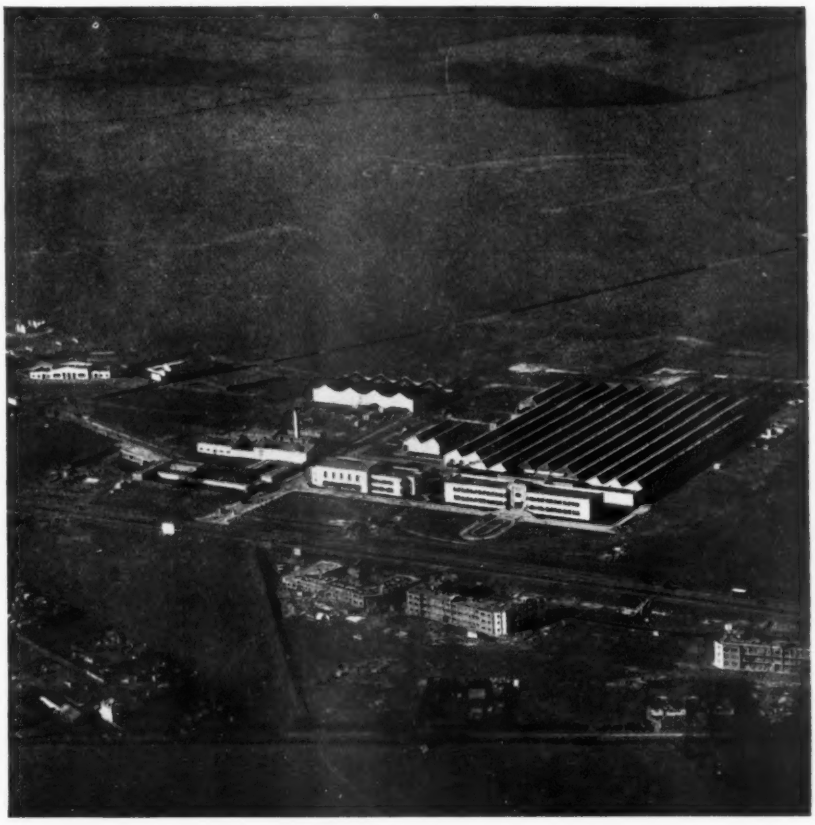
GROUND FLOOR PLAN

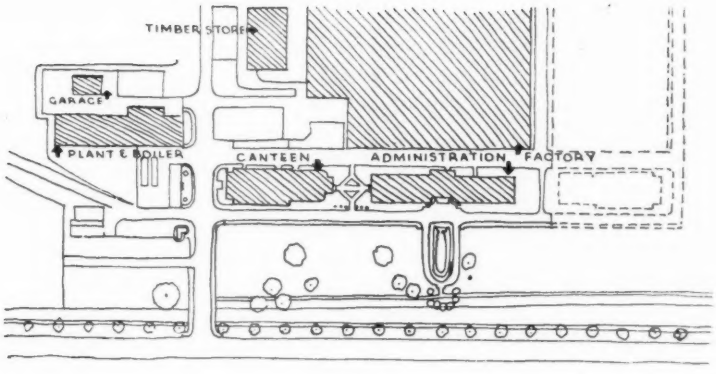
TYPEWRITER ASSEMBLY • LEICESTER • BY PICK, EVERARD, KEAY AND GIMSON

PROBLEM—This factory is situated to the west of the Barnet By-pass, immediately adjoining Hatfield aerodrome. The factory is capable of extension in two directions and there is space for a further components factory to the north. The aerial photograph is taken from the east, and shows how the buildings are set back from the road behind a broad garden ; a technical school is to be added to the north, completing the administration group and screening the factory buildings from the road.

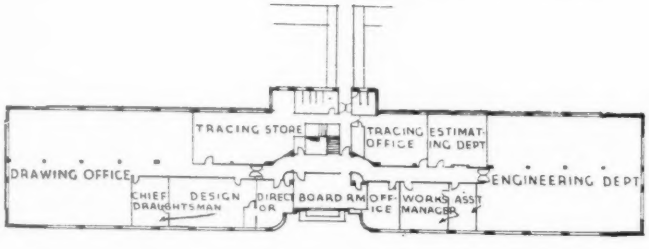
CONSTRUCTION — Factory : Steel construction, with girders contained in the depth of the north-light roof, spanning up to 150 ft. Floors generally, panelled R.C. with a specially hardened surface, with the exception of certain large areas of maple block. External walls, yellow facing brick. Roof has grey-green slate chips rolled into the outer covering, and is finished in aluminium throughout the inside, including the steelwork. Sectional steel partitions are used generally, except where brick is required for insulation. Administration Building : Monolithic R.C. with flush suspended ceilings to permit flexibility of partitioning. External finish, slurry of white cement and sand-rubbed on immediately after striking shuttering. Dressings to windows and piers in two shades of green glazed terra-cotta ; base, grey-green bricks.

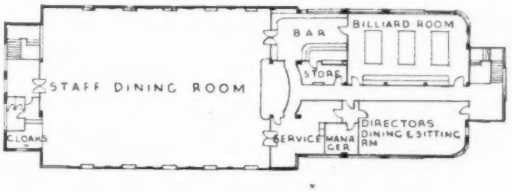
SERVICES — Heating by automatic stoked Lancashire boilers supplying steam to unit heaters in the factory and radiators in the offices. Beneath the concrete roads, large ducts, branching from the boiler house and turbo-generator switch-board, serve to distribute all services.

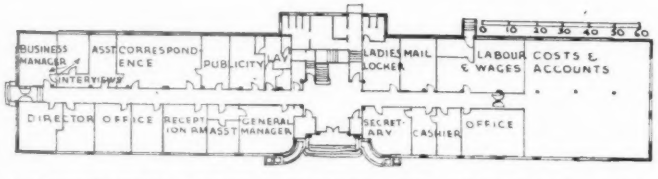




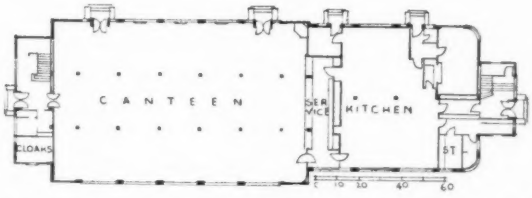
SITE PLAN





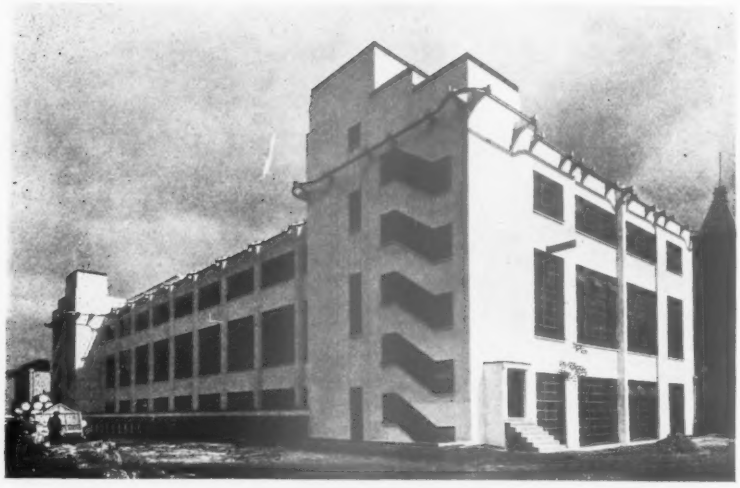


ADMINISTRATION BLOCK : GROUND AND FIRST FLOOR PLANS



CANTEEN : GROUND AND FIRST FLOOR PLANS

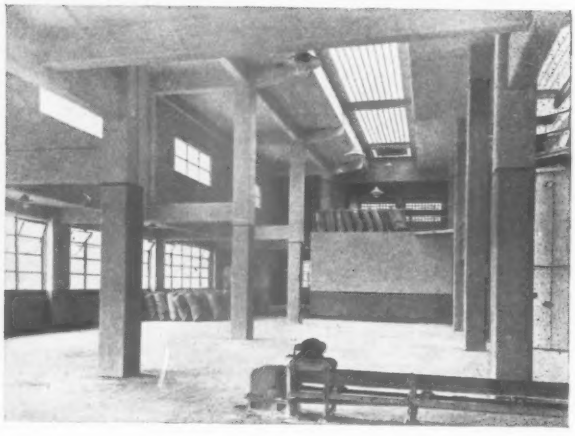
AIRCRAFT • HATFIELD • BY JAMES MONRO AND SON

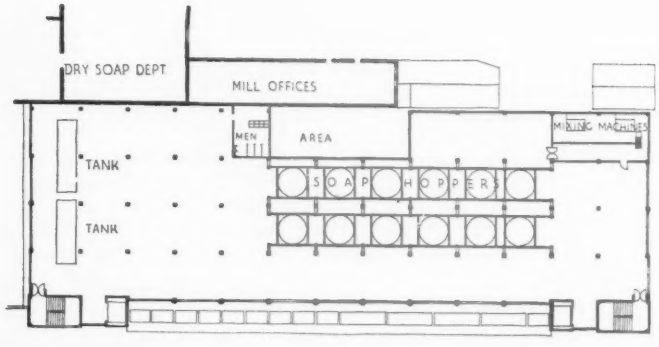


PROBLEM—Extension to the dry soap works of the Co-operative Wholesale Society, Ltd., at Silvertown, London, E., to accommodate the following processes : soap boiling, atomizing, drying and packing. It is in direct communication with the adjoining soap works.

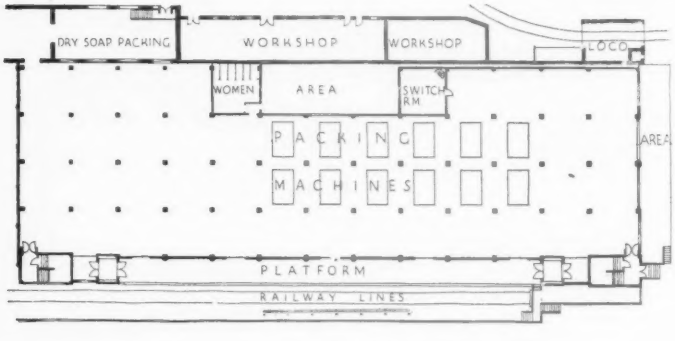
CONSTRUCTION—The factory stands on about 300 pre-cast reinforced-concrete piles, 14 in. square, driven to depths of 25 ft. to 40 ft., and is built in reinforced concrete, the walls varying in thickness from 5 in. to 8 in., finished externally with white stone paint. Floors are reinforced concrete.

Top, left, general view ; below, two of the workshop floors.





FIRST FLOOR PLAN



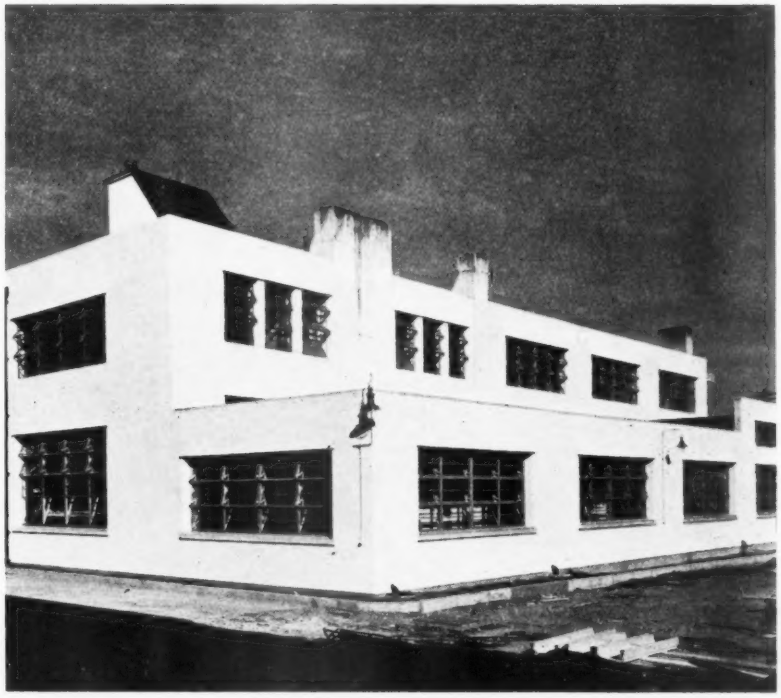
GROUND FLOOR PLAN

SOAP • SILVERTOWN, E. • L. G. EKINS

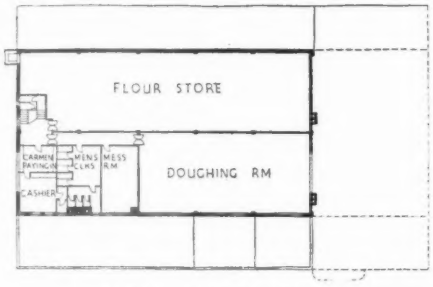
PROBLEM—Bakery, at Mitcham, for the Royal Arsenal Co-operative Society, Ltd. The complete scheme provides, in addition to the bakery, a dairy and a laundry, each in separate buildings.

CONSTRUCTION—Reinforced concrete frame and special reinforced concrete beam foundations to walls ; 13½ in. external panel walls, finished in 1 in. white cement ; reinforced concrete slab roof, asphalte covered ; metal casements, sherardized.

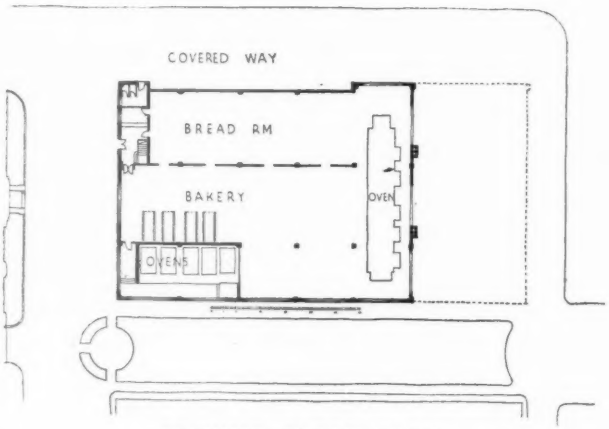
INTERNAL FINISHES—Entrance lobby, terrazzo tiled : bakery floors, quarry tiles; walls tiled, with dunning rail 2 ft. 6 ins. from floor to save tiling from knocks ; ceilings painted to avoid damp percolating through ; flour store, fair-faced brick walls, limewhited ; manager and cashier's offices, wood block floors, plastered walls : bathrooms and cloaks, floors, terrazzo, walls, tiled.



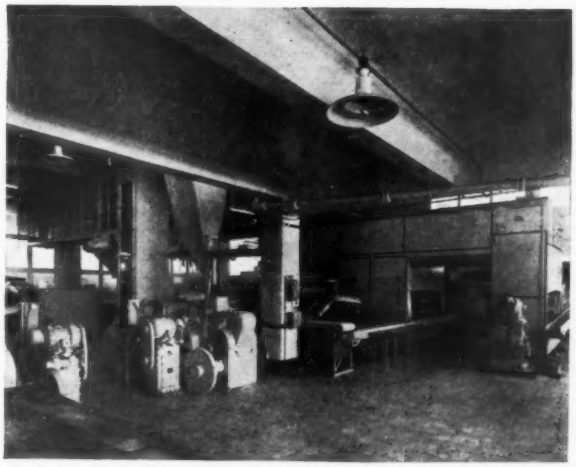
Right, top, general view ; centre, the dough room ; bottom, the dividers (on the left) and the final prover.



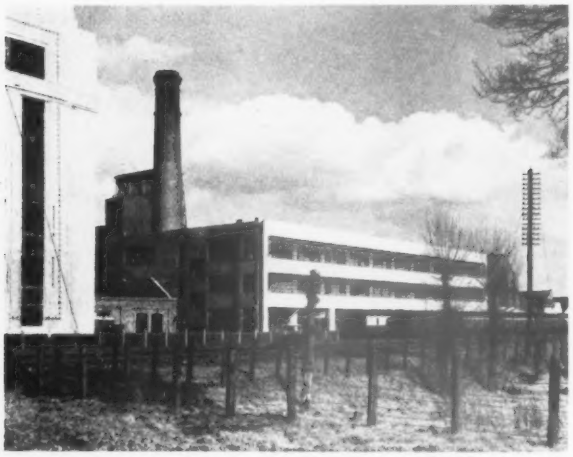
FIRST FLOOR PLAN

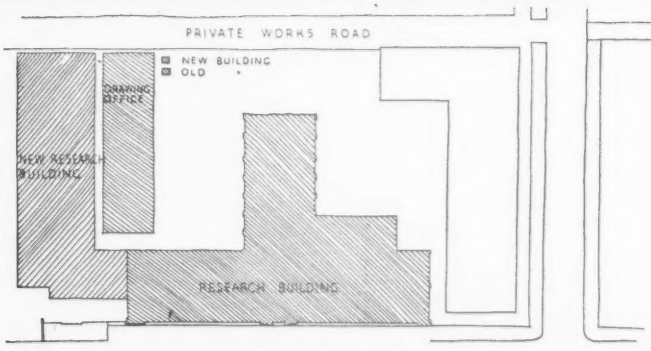


GROUND FLOOR PLAN

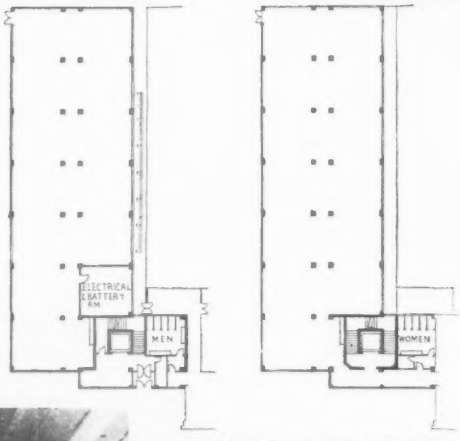


BAKERY • MITCHAM, SURREY • BY S. W. ACKROYD





SITE PLAN



GROUND AND FIRST FLOOR PLANS: NEW RESEARCH BUILDING

PROBLEM—Extension to the existing research building of the Gramophone Co., Ltd., to provide additional accommodation for research in television, etc.; and a machine store building for the completed units of any of the company's products.

RESEARCH BUILDING—Floor heights correspond to those of the adjacent building and determined the main features of the new scheme. To maintain an even temperature in the upper storeys the roof is covered with insulation roofing slabs. External walls are of reinforced concrete 5 ins. thick, with, on the inside, a 2 in. insulation slab lining, and with the lining used as shuttering. Windows are steel.

The photographs show: Top, left, and bottom, left, the machine store; top, right, the research building.

RESEARCH BUILDING AND MACHINE STORES • HAYES, MIDDX. • BY A. P. BODEN

Another view of the machine store. The building is designed so that two additional floors can be added to the height. The roof can be used as the floor of an elevated reservoir, with 4 ft. depth of water.

RESEARCH BUILDING AND MACHINE STORES • HAYES, MIDDX. • BY A. P. BODEN

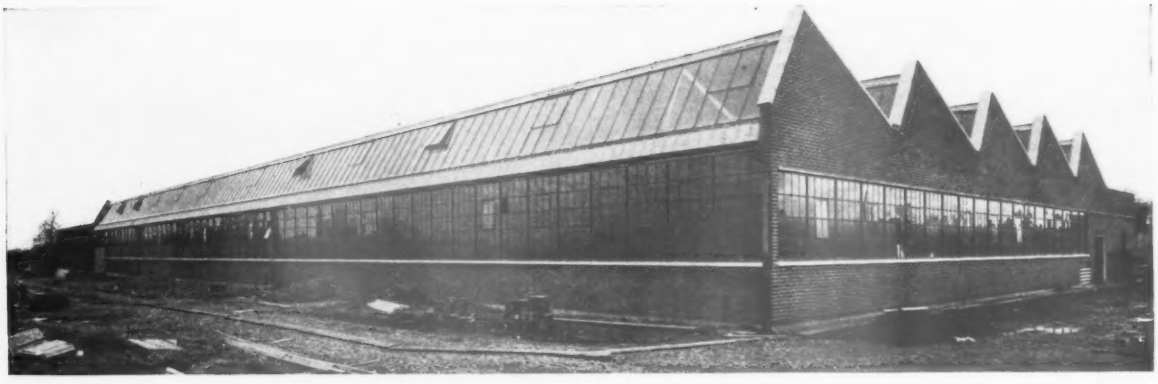
K

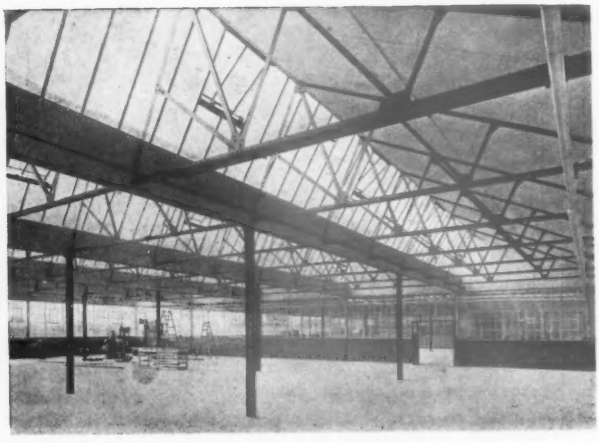
PROBLEM—Factory and offices for the Champion Sparking Plug Co., Ltd., at Hatton Corner, Great West Road, Feltham, Middlesex, for the manufacture and marketing of sparking plugs. The lay-out is arranged for easy extension.

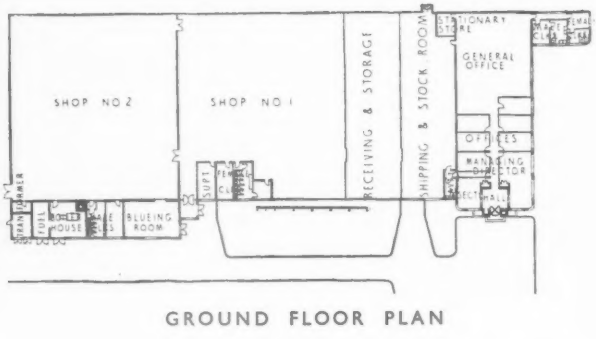
CONSTRUCTION—Steel framed; concrete floors; brick panel walls and parapets; artificial stone cills and copings; surround to main office entrance doorway, incorporating a canopy and flower boxes, concrete and brickwork, rendered with a granite aggregate.

INTERNAL FINISHES—Office block, plastered walls and ceilings; lavatories, terrazzo floors, dadoes and partitions; corridor and executive offices panelled to dado height; entrance hall walls, painted in stuc, with fittings of oak to match revolving door; radiator grilles painted same as walls, and with lighting fitting in the form of the company's Trade Mark.

Left, two general views, one taken by night, the other by day; below, the factory; bottom, a typical workshop.

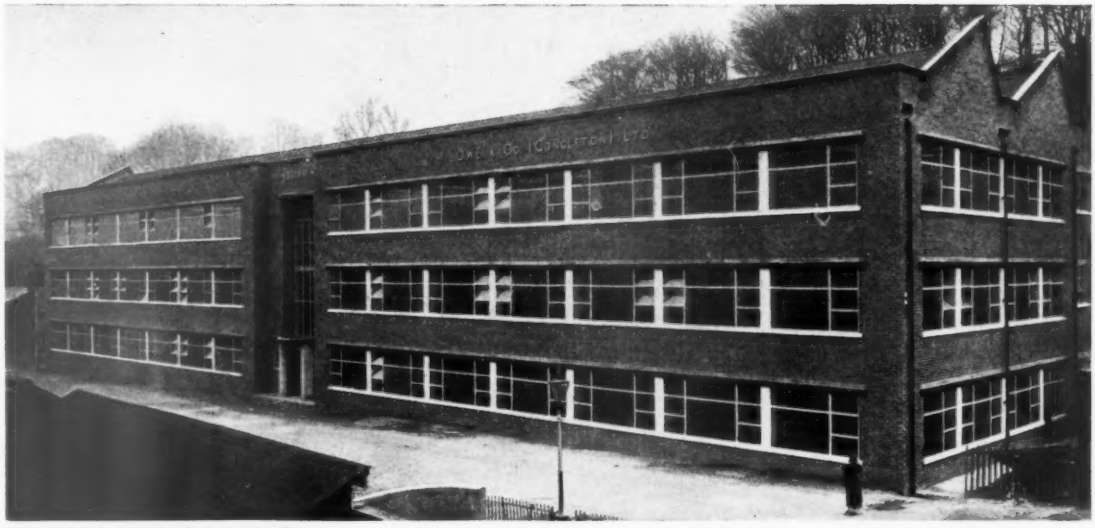


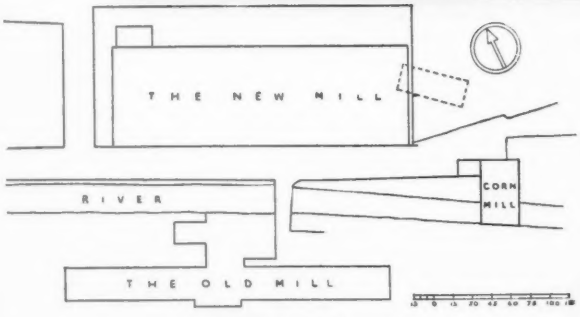




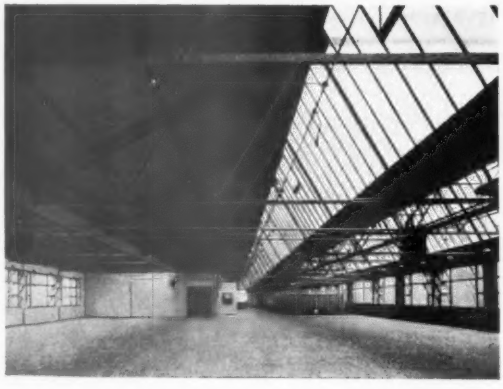
GROUND FLOOR PLAN

SPARKING PLUGS • FELTHAM, MIDDLESEX • BY WALLIS, GILBERT & PARTNERS

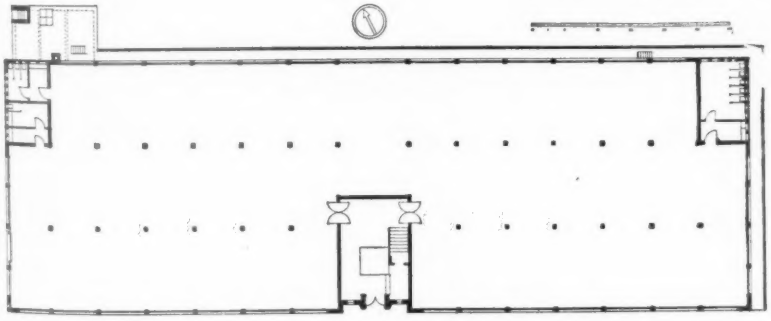




SITE PLAN



GROUND FLOOR PLAN



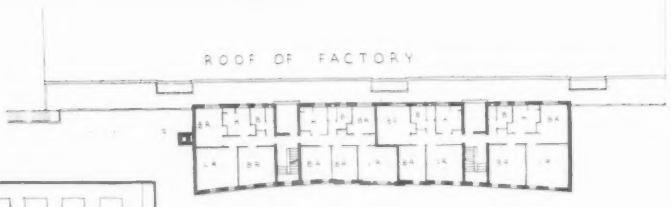
PROBLEM—Mill for the manufacture of ladies' artificial silk underclothing and all types of sports wear. Cutting out is done on the second floor, machining and making up on the first floor, and ironing, finishing and despatching on the ground floor. The adjacent main works are used for knitting the fabric and for dyeing processes.

CONSTRUCTION—Steel framed; hollow tile reinforced concrete floors; external walls, 11 in. hollow brick on a 14 in. blue brick plinth; internal walls, 9 in. brick; roof finished with asbestos and asphalte covered steel sheeting; projecting window hoods, entrance hood and copings, black glazed terra-cotta.

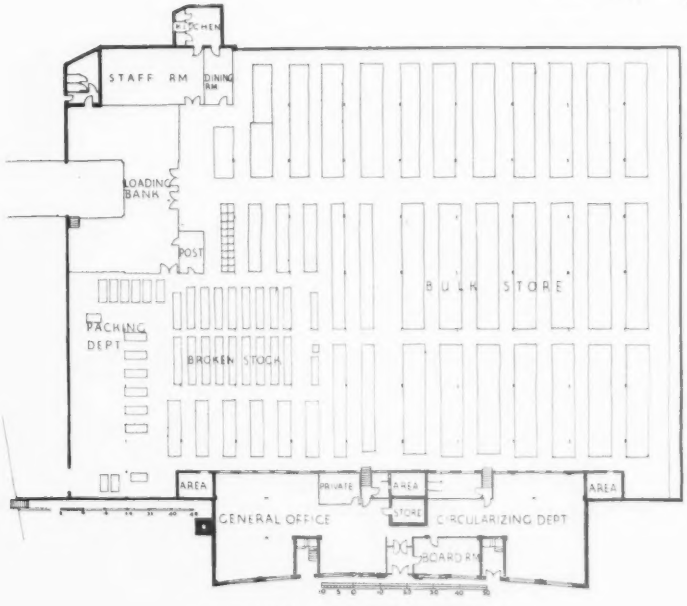
Above, main front; left, factory floor.

ARTIFICIAL SILK • CONGLETON, CHESHIRE • BY VENABLES AND BARKER

CONSTRUCTION—Brick and steel frame. Roofs asphalt or laminated bitumen. Steel windows. Floors generally grano. Internal finish, paint and distemper with flush-jointed brick on stairs.
Left, the conveyors from broken stock passing the packing desks. Below, the front elevation.



FIRST FLOOR PLAN



GROUND FLOOR PLAN

PROBLEM—Storage, packing and distribution depot for Sir Isaac Pitman and Sons on the North Circular Road. Three floors of flats have been built above the store and offices. The flow of books is from the loading bank to bulk stock. The broken stock, from which individual books can be collected, is fed from bulk stock. The order for a parcel of books is sent from office to " looker-out " desk by tube. The " looker-out " collects the books from broken stock, and by means of an endless conveyor sends each one to a particular packing desk ; with the last book he encloses the order, thus showing the parcel is complete. The packers then finish the parcel and send it by conveyor to a pre-selected despatch truck.

BOOK DISTRIBUTION • NEASDEN • BY LEY, COLBECK & PARTNERS

A general view of the canteen in the Jantzen knitting mills, showing canteen furniture and steel partitioning, with industrial lighting reflectors in the works beyond.

EQUIPMENT

INCLUDING REFERENCES TO THE FACTORIES ACT AND SUPPLEMENTARY REGULATIONS

BY W. E. J. BUDGEN, J. BERESFORD EVANS AND PHILIP SCHOLBERG

Since, in factory design, the choice of any material or fitting, be it a floor or a lighting reflector, depends almost entirely on the process to be carried out in that factory, any attempt to give, in general terms, the "best" way of doing a particular job would be completely valueless. Space forbids a piecemeal consideration of every factory type, and in the following notes certain assumptions have been made.

First, it is assumed that most factory jobs at the present time would come under the heading of Light Industry, and, second, that the architect is given a production or machine layout by the works engineer, and that his part of the work will consist of the provision of services and shelter for the machines and for the workers.

The Factories and other Acts, however, provide general regulations applicable to factories of all kinds, and these are detailed as a starting point. Thereafter the notes are divided up under various headings, starting always with the appropriate regulations of the Factories Act, continuing with a discussion of the various ways of providing the required services, and finishing with a check list of points which should be settled during interviews with the client.

A FACTORY, being a building, must comply with the building regulations in force in the district in which it is situated. In some cases, however, the normal requirements of these regulations as regards wall thicknesses and construction are relaxed for single storey buildings up to a certain size, thus allowing materials such as corrugated sheeting to be used.

Included in the normal building legislation mentioned above, is the important matter of regulations made under the Town Planning Act, and preliminary consent should always be sought at a very early stage as the powers of prohibition of factory construction under this Act are very wide. In many cases too, consent must be obtained from the authority administering the Restriction of Ribbon Development Act.

Further, in addition to compliance with statutory regulations, the question of insurance must be considered and the rules of the Fire Offices Committee followed in order to ensure favourable insurance terms. Industrial buildings are frequently subject to large fire risks and insurance rates are based on these risks, but with substantial rebates where adequate protection against fire is installed. Pamphlets giving the rules of the Fire Offices Committee for various classes of buildings can be obtained from their Surveyor's Department, 65 & 66 Watling Street, London, E.C.1.

Factories Act

Coming to the Factories Act itself (Factories Act, 1937. H.M. Stationery Office, price 2s. 6d.), this is in 14 sections of which only four are of direct concern to the architect.

These are :

Part 1, Health (General Provisions).

Part 2, Safety (General Provisions).

Part 3, Welfare (General Provisions).

Part 4, Health, Safety and Welfare (Special Provisions and Regulations).

The remainder of the Act deals chiefly with the conditions of employment of persons working in a factory.

In passing, it may be mentioned that the Act applies to building operations, and treats any person carrying on such operations as the owner of a factory.

Like most modern legislation, the Act itself deals mostly in generalities, and arranges for any detailed rules to be made in the form of statutory orders. This enables special trades to be considered, and many of the orders which have been made apply only to one particular trade.

Collections of these orders are issued periodically by the Home Office. (Factory and Workshop Orders, 1933 Edition, H.M. Stationery Office, price 4s.).

Safety and Welfare

In addition, the Home Office issue pamphlets dealing with safety and welfare, of which the most important to the architect are as follows. (All are published by H.M. Stationery Office.)

No. 2.—Messrooms and Canteens at Small Factories and Workshops, 4d.

No. 5.—Ventilation of Factories and Workshops, 1s.

No. 6.—Seats for Workers in Factories and Workshops, 1s.

No. 7.—Lighting in Factories and Workshops, 6d.

No. 8.—Cloakrooms, Washing Facilities, Drinking Water and Sanitary Accommodation in Factories and Workshops, 9d.

No. 13.—Fire Protection in Factories.

No. 14.—Safety Organization in Factories.

The Home Office also maintains (at Horseferry Road, Westminster, London, S.W.1) an Industrial Museum, which contains a "permanent exhibition of methods, arrangements and appliances for promoting safety, health and welfare of industrial workers."

Queries : General

(1) Name of district council administering Act.

(2) Is site subject to control by Restriction of Ribbon Development Act?

(3) Will factory on this site be approved under Town Planning Act?

(4) Is construction subject to any special requirements or relaxations under local byelaws?

(5) What structural regulations apply?

(6) What special fire risks are there, and what special fire office rules apply?

(7) Are sprinklers required, and if so, what sources of water supply are available?

(8) What other form of protection, i.e., fire mains (wet or dry), extinguishers, etc?

(9) What special Factory and Workshop Orders apply?

Typical locker ranges : the example shown is from a pithead bath.

Freestanding washing fountains allow a number of workers to wash at the same time and the water consumption is small.

The Act : Cleanliness Regulations

Daily removal of dirt and rubbish.

Cleaning of floors at least once a week by washing, or, if it is effective and suitable, sweeping, or other method.

All inside walls and partitions, ceilings, or tops of rooms, including those to passages and staircases, shall :—

(1) If they have a smooth and impervious surface be washed at least once every 14 months with hot water and soap or other suitable detergent.

(2) Where they are painted with oil-paint or varnished be repainted or varnished at least once in every period of 7 years and washed at least once every 14 months as (1).

(3) Where they are whitewashed or colour washed, be redecorated at least once every 14 months.

Cleanliness : Queries

(1) Is expense of providing hard impervious surface and thus avoiding painting worth while, e.g. is painting harmful to any process ?

(2) Will floor washing be employed ?

(3) Will process give rise to water on floor (in which case floor gulleys must be provided) ?

The Act : Overcrowding

As a standard of overcrowding the Act lays down a minimum of 400 cub. ft. space for every person employed in a room. In calculating this space no portion of the room more than 14 ft. from the floor is to be taken into account.

The floor space required for each person for various room heights is thus :—

Height of room	Approx. area required per person employed
14 ft.	29 sq. ft. or, say, 5 ft. 6 ins. by 5 ft. 6 ins.
12 ft.	33 sq. ft. or, say, 5 ft. 9 ins. by 5 ft. 9 ins.
10 ft.	40 sq. ft. or, say, 6 ft. 6 ins. by 6 ft. 6 ins.
8 ft.	50 sq. ft. or, say, 7 ft. 0 in. by 7 ft. 0 in.

Overcrowding : Queries

(1) What is maximum number of persons likely to be employed in any department ?

The Act :—Sanitary Accommodation

Sufficient and suitable sanitary accommodation is required in factories, both by the Factories Act and the Public Health Acts.

All arrangements must, of course, comply with the local sanitary byelaws.

The Factories Act lays down the following minimum standard accommodation :—

(*a*) One sanitary convenience for every 25 females.

(*b*) One sanitary convenience for every 25 males, except that where more than 100 males are employed or in attendance and sufficient urinal accommodation is provided then one convenience is required for every 25 males up to the first 100 and one for every 40 after the first 100.

The conveniences must be :—

Conveniently accessible.

Sufficiently lighted and ventilated.

Kept clean.

Under cover.

Separated from workrooms by the open air or a ventilated space.

Provided with separate approaches for men's and women's conveniences and with proper screening of the interior so as to be invisible from places where the other sex have to pass.

Provided with partitions to each convenience with, in the case of conveniences for women, proper doors and fastenings.

Discussion

The most important requirement is that all fittings should be durable, and reliable under rough usage. Ranges of lavatory basins may discharge into floor channels, and the circular washing fountain with a central spray is an improvement over the continuous sink with a series of taps above it. Flushing tanks may be of the continuous trough type and w.c. seats should preferably be open fronted or of the pad type. Clothes lockers are best in metal, properly ventilated, and with locks on the doors. Stops should prevent locker doors opening through more than a right angle, but there is also an improved type in which the doors, after opening, can be slid backwards into a recess at the side of the locker. Locker-rooms should be well heated, and extra lockers may be necessary if any of the employees need special clothing.

Top, a unit heater and fan. Below, wall and ceiling gas-operated radiant heaters.

Sanitary Accommodation : Queries

(1) Number of males and females employed ?

(2) Any special local byelaw requirements ?

(3) Water supply and sewers available ?

(4) Type of w.c. partition required :—

(1) Painted hard plaster or breeze, etc.

(2) Precast terrazzo slabs

(3) Metal-faced plywood

(4) Sheet steel, etc.

(5) Asbestos-cement.

(5) Type of w.c., i.e. "lifting seat" or "pad"?

High or low level w.w.p.s, no chains on latter to get broken, with separate flushing ?

Or trough flushing for range of w.c.s ?

The Act :—Heating, Ventilation and Lighting

In workrooms where a substantial portion of the work is done sitting and does not involve serious physical effort a temperature of 60° F. must be maintained after the first hour.

In other cases a suitable temperature may be prescribed by the Secretary of State.

The method of heating must be such that there is no escape of injurious or offensive fumes into the air.

Adequate ventilation must be maintained.

Special standards of ventilation and humidity are laid down for special factories, such as those in which humid conditions are necessary.

In cases where dust or fumes are caused to an extent likely to be injurious, special precautions must be taken to prevent inhalation of the dust or fumes, and if possible, exhaust appliances shall be provided near the origin of the dust or fumes.

Effective provision must be made for securing and maintaining sufficient and suitable lighting, whether natural or artificial, in every part of a factory.

Heating and Ventilation : Discussion

Such questions as the fuel and the type of heating boiler to be used, being almost entirely dependent on local fuel and labour costs, or whether there is any waste heat that can be utilized from manufacturing processes, are largely out of the architect's hands, his concern being with the distribution of the heat and its relation with ventilation.

Owing to the need for keeping the floor space unencumbered, the direct steam or hot water pipe is at a disadvantage ; if carried overhead, it loses much of its efficiency and, when starting from cold, it takes some time to produce the designed temperature. The modern use is to direct the heat downwards from an overhead system, which may be of radiant panels, small heater and fan units or plenum system outlets. Radiant panels, usually gas heated, though expensive to run, may be useful in certain processes, such as where workers are only intermittently present or where the air temperature must be kept low.

The unit heater is of the most general application owing to its flexibility and economy. By means of a fan it passes air through a heating coil and then directs it downwards on to the working plane. It is usually attached to piers or to the ceiling with the steam or hot water pipes running overhead. If the units are arranged progressively with a slight stagger, there is a movement of the whole body of air, which is essential to the well-being of the worker, and some of them may be connected to a fresh air inlet to assist natural ventilation.

The plenum system of heating is chiefly used where air conditioning is also a consideration, or where a frequent change of air is necessary ; generally, in this case, in conjunction with extract ducts. When in use with

Top, direct lighting in a cycle factory; centre, indirect lighting in a margarine factory; bottom, floodlighting in a power house, the floods are set low to miss the crane and avoid local shadows.

ozonized air there is likelihood of ionization due to its passage through a long duct, and a most unpleasant "dead air" effect in consequence. For factory purposes ventilation is mostly concerned with the removal of fumes, vitiated air and solid matter in suspension, fresh air entering through normal inlets, though there are occasional processes where a supply of cold air needs to be directed on to the workers.

Steam, hot air, fumes from forges, vats and the like are usually collected by cowls attached to a suction fan, the aperture of collection being sometimes constricted by a baffle to an annular form to increase the air velocity.

Solid matter, such as sawdust and dust from grinding and polishing wheels, should pass through an interception box for heavy particles before going through the fan, and then through a cyclone separator; passing finally, if it is very finely divided, through a filter. Where there is any vitiation the final outlet should be placed so that there is no chance of the air re-entering the building.

In cellulose work, doping or treatment with any inflammable volatile, the chamber must be especially well ventilated, twenty changes of air per hour being considered the minimum. Cellulose vapours being slightly heavier than air, the fresh air inlet should be at a high level, with an upcast duct so as to form a flame trap, and with the extractor leading directly to the outside. It is best to provide a water spray just before the outlet, to act as a scrubber and so to reduce the smell. The extracting motor, if not of a flameproof type with non-ferrous fan blades, should be housed outside the chamber, driving the fan in the duct by belt or shaft. Where the work is too large for a spraying booth, it should be on a turntable so that there is no chance of the worker being placed between the work and the extractor.

Ducts for inflammable volatiles and for cellulose in particular must have adequate ports for cleaning, as the deposit of cellulose particles becomes highly explosive if allowed to accumulate and decompose.

Lighting

The most economical and comfortable system of lighting is to provide an all-over illumination, more or less of a domestic intensity, with higher concentrations on the work itself. These are provided either by concentrating fittings, spotlights, or by low voltage local lighting.

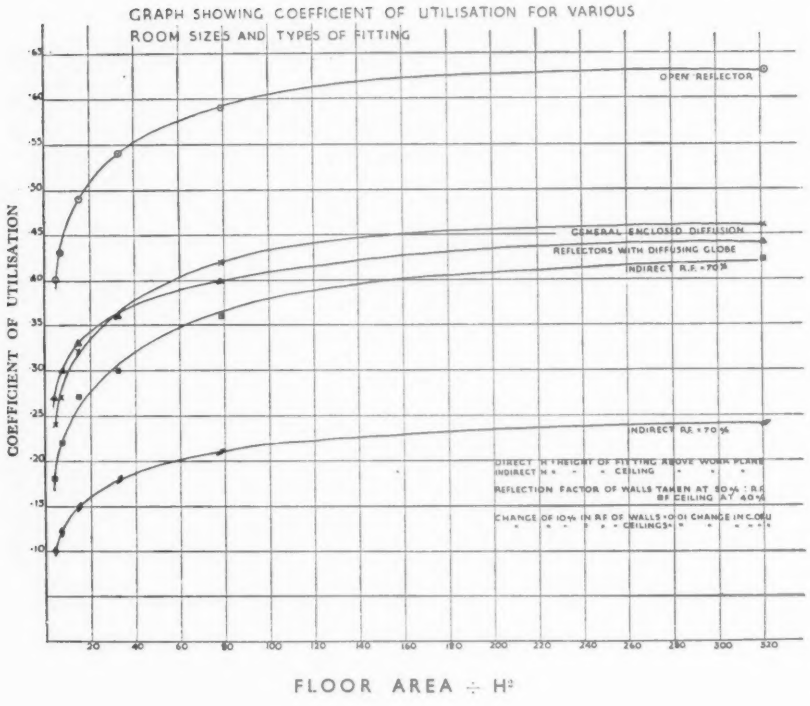
The intensity of illumination required on the working surface will depend on the nature of the work, and it must not be forgotten that lighting is an extremely empirical practice that we are endeavouring to treat as an exact science. The Home Office recommendation for the minimum all-over illumination of the working plane was 0·25 foot candles a few years ago, and it now recommends four times that amount. The difference is obviously worth while. This figure may be taken as the absolute bearable minimum, by modern standards, and would probably give an average of 1·5 foot candles. By comparison the recommended values of illumination published by the Lighting Service Bureau give averages seldom below 8 foot candles, except for very rough work.

The cost of attaining the higher illuminations is justified by increased output and is offset to some extent by the increased efficiency of the larger lamp sizes, but as the intensities of individual sources increase so does the necessity for screening or diffusing. A further most important consideration is that of glare from specular surfaces at the working level, which may be modified in some cases by giving a matt surface to bright metal parts, or it may be avoided by using local lighting in flexible supports, so that the fittings can be adjusted for each particular job.

These local lights can be got very close to the work, owing to their small size, so that they give an intensity in a restricted area that is much higher than would ordinarily be possible. They should be run on a low-voltage circuit, stepped down from the power lead to the machine; 12 volts being the most convenient, as there is a very large choice of small-sized bulbs available.

The intensities of illumination set out in the table (page 930) are in accordance with the latest recommendations of the Illuminating Engineering Society, and are indicative of good modern practice. The illumination values are taken at the plane or area of work, with the assumption of a reasonable uniformity within this area; the limit of variation being ± 15 per cent. The table takes no note of either the type or placing of fittings, or of the degree of contrast present in the work, and should be modified accordingly. The effect on the eye of an illumination of so many foot candles is dependent on the apparent brightness of the object and perception is largely the result of brightness difference. Therefore in such a place as a foundry, which is of necessity dark and monotonous, or wherever the work shows little contrast, a higher degree of illumination is necessary than would be normal to that class of work.

Body panel assembly shop showing small wall cranes on the left and a range of unit heaters on the right.



The type of fitting to be used is governed more by the location and by the distribution of light flux required than by illumination values. For instance, if a crane is to run the length of the room beneath the roof trusses, lights would have to be housed in long-throw concentrating fittings mounted above the crane, or else on the side walls beneath it. By using a large number of fittings and utilizing reflected light from walls and ceilings the harshness of shadows can be reduced to a point where it finally becomes harmful owing to lack of definition, as in the case of indirect lighting unrelieved by any other light source. The aim should be the softening of shadow, not its total elimination.

The maximum distance between points for dispersive reflectors should be 1·5 times the height from the plane of work ; with half that distance between points and the side walls, unless there are work benches along the side walls, when the spacing should be one-third of the distance.

It should be remembered that a certain amount of upward light, thrown on to the ceiling, even if it is of little value in the resultant intensity on the working plane, is a great asset in providing a cheerful aspect and in reducing contrast between the fitting and its background.

Makers will usually quote an overall efficiency and a utilization efficiency for a particular fitting under average conditions, which will need modifying according to the reflection factors of walls and ceiling, and according to the shape and size of room. The best conditions obtain in a large symmetrical room in which, with fairly light walls, the coefficient of utilization, i.e. the proportion of the total flux of the lamp reaching the working surface, would average about 0·4, and would rise to 0·6 under ideal conditions.

The efficiency is further modified by depreciation of the reflective quality of the walls and ceiling, deterioration of the reflector due to dirt and dust, and by the ageing of the lamps. It is usual therefore to multiply by 1·45 the figure arrived at for a new installation.

Taking all the above into consideration, the lamp lumens required per fitting at normal spacing are according to the following formula, from which a suitable lamp size to give the required lumens can be chosen.

$$\text{Lumens per fitting} = \frac{\text{Floor area per fitting} \times \text{Depreciation factor} \times \text{foot candles}}{\text{Co-efficient of utilization}}$$

As these calculations are based on there being a number of fittings, having a reasonable overlap, where single points or concentrating reflectors are used the lamp sizes will need increasing.

The normal gas-filled tungsten filament lamp has an efficiency of about 15 lumens per watt, whereas an electric discharge lamp will give 40 or more lumens per watt, which is one of the reasons for its increasing use. Against this must be set the peculiar colour of the light, which will rule it out for many purposes, and the pronounced stroboscopic or flicker effect which may cause moving parts to appear stationary. The colour can be partially corrected by the introduction of cadmium into the tube, with, however, a reduction of the efficiency, and flicker effects can be minimized by connecting adjacent lamps to different phases of supply. Mercury discharge light is found to be definitely advantageous in certain circumstances, particularly for the viewing of crystalline surfaces when it gives increased acuity of vision. Now that discharge lamps can be obtained in 80 and 125 watt units, housed in the same sized bulbs as 150 and 200 watt filament lamps, they can be used in ordinary small reflectors or can be grouped in the same reflector with one or two filament lamps for colour and flicker correction.

It must not be forgotten that discharge lamps can only be used on an A.C. supply and that they need to be in circuit with a choke and condenser. There is, however, a lamp which contains within its bulb, in addition to the discharge tube, a tungsten filament to give colour correction and to act in place of a choke and condenser, so that it can be used in an ordinary holder.

Gas lighting is worth considering when the heat output from the lamps can be utilized, as the colour is good and as control by distant switch is now available.

Heating, Vent and Lighting : Queries

(1) What temperature is required in various parts.

(2) What form of heating is preferred.

(3) What form of ventilation.

(4) Any special requirements as regards humidity, etc.

(5) What type and standard of lighting is required.

(6) Does any part of the process produce dust or fumes.

(7) Inflammable volatiles.

(8) Air changes per hour.

(9) Tungsten lamp, discharge lamp, colour correction, gas.

(10) Position of fittings.

(11) Type of fitting.

(12) Intensity of illumination required.

(13) Colour of walls, screening of windows.

Recommended Illumination Values

	Ft. candles
Assembly shops :—	
Extra fine work	25–50
Fine work	15–25
Medium work	8–15
Rough work	5–10
Book binding	8–15
Burnishing and polishing	8–15
Canteen and kitchen	5–10
Cements and clay :—	
Cleaning, colouring and pressing	8–15
Filter pressing, grinding and kiln rooms	5–10
Cloth cutting, inspecting and sewing :—	
Dark goods	15–25
Light goods	8–15
Die making	25–50
Drawing offices	25–50
Engraving	50–
Flour milling	5–10

Foundries :—	
General	5–10
Fine core making and fine moulding	8–15
Garages :—	
General	5–10
Repair department	8–15
Glass works :—	
Furnace rooms and mixing	3–5
Cutting to size, blowing, pressing, grinding and silvering	5–10
Bevelling, decorations, etching, fine grinding and inspection	15–25
Fine inspection and brilliant cutting	25–50
Glove manufacture	15–25
Hat manufacture :—	
General	8–15
Sewing	15–25
Inspection :—	
Rough	5–10
Medium	8–15
Fine	15–25
Extra fine	25–50
Jewellery and watchmaking	25–50
Leather manufacture :—	
Vats	2–4
Cleaning, stretching and tanning	3–5
Cutting, fleshing and stuffing	5–10
Finishing and scarfing	8–15
Leather working :—	
Pressing and winding	8–15
Cutting, grading, matching, scarfing and sewing	15–25
Machine shops :—	
Rough bench and machine work	5–10
Medium bench and machine work, medium buffing and polishing, ordinary automatic machines, rough grinding	8–15
Fine bench and machine work, fine buffing and polishing, fine automatics, and medium grinding	15–25
Extra fine bench and machine work, fine grinding	25–50
Offices :—	
General	5–10
Book-keeping and typing	8–15
Paint shops	5–10
Paper box manufacture :—	
Manufacturing	5–10
Storage	3–5
Paper manufacturing :—	
Beaters and grinding	5–10
Calendering	8–15
Cutting, finishing and trimming	15–25
Plating	5–10
Power houses	5–10
Printing industry :—	
Casting, matrixing, miscellaneous machines and presses	8–15
Electrotyping, lithographing and proof reading	15–25
Imposing, linotype, type-setting and stone engraving	25–50
Packing and sorting	5–10
Rubber manufacture	5–10
Sheet metal works :—	
General	8–15
Tinplate inspection	15–25
Shoe manufacture :—	
General bench work	8–15
Inspecting and sorting	15–25
Stitching	25–50
Smith's shop :—	
Rough forging	3–5
Fine forging and welding	5–10
Soap manufacture :—	
General manufacturing	3–5
Filling, stamping and packaging	5–10
Stairways and corridors	2–4
Stores :—	
Light	5–10
Heavy	2–4
Sweet making	8–15
Telephone, private exchange	4–6
Testing :—	
Rough	5–10
Fine	8–15
Extra fine instruments, scales, etc.	25–50
Tobacco :—	
Drying	2–4
Stripping	5–10
Grading and sorting	15–25
Toilet	6–10
Upholstering	8–15
Warehouses	2–4
Woodworking :—	
General bench and machine work, veneering	8–15
Fine bench and machine work, fine sanding and finishing	15–25

The Act : Safety

The major portion of the safety section deals with the fencing of machinery and does not directly concern the architect.

It also covers general requirements for lifts, hoists, staircases and passages.

The most important section is, however, that which requires that every factory shall be certified by the District Council before use, as being provided "with such means of escape in case of fire as may reasonably be required." The only specific requirements are :—

(1) In rooms where more than 10 persons are employed doors must open outwards.

(2) Escape doors must open in the direction of escape.

(3) Lifts and hoists must be enclosed by fire resisting materials except at the top where they must only be covered by some material easily broken by fire or provided with a vent.

(4) Windows, doors and exits affording means of escape, other than the means of exit in ordinary use, must be marked as such, in red letters of an adequate size.

(5) In factories employing more than 20 persons or factories with special risks a clearly audible system of fire warning must be provided.

The absence of detailed requirements in this section leads to difficulties in planning in the early stages. In London where the Act is administered in most cases by the L.C.C. the following principles have been laid down :—

General lighting in the G.E.C. research building.

Class of Building

Buildings used for trade purposes (Classes I–V) and provided with one staircase :

Must not exceed 1,000 ft. super in area at first floor, and must not be more than four storeys high.

If without fire-resisting floors, the staircase must be enclosed (except in cases where an external staircase is approved), and must be carried to the roof with alternative escape from the roof.

Maximum distance to the staircase from any part of the floor 50 ft.

If with fire-resisting floors, the area can be increased to 2,000 ft. super, and the distance to staircase to 60 ft.

If roof escape is not available, or if calculated accommodation above ground floor exceeds 150 persons, the approach to the staircase must be through properly enclosed corridors or lobbies provided with secondary fire doors. In trade purpose buildings this lobby must be ventilated to the open air.

Minimum widths of staircases and exits (number of persons accommodated is that above ground floor).

No. of persons accommodated	Minimum width Ft. Ins.
75 ..	2 6
100 ..	3 0
150 ..	3 6
200 ..	4 0
250 ..	4 6
300 ..	5 0 or 7 ft. with central hand rail.
400 ..	5 6 or 8 ft. with central hand rail.
500 ..	6 0 or 9 ft. with central hand rail.

Buildings used for trade purposes (Class VI) and provided with two staircases, i.e., as Classes I–V but larger.

Maximum distance between two staircases 120 ft. for buildings of non-fire-resisting construction and 180 ft. for buildings of fire-resisting construction. For isolated portions, the maximum distance from a staircase must not exceed 60 ft.

Minimum widths of staircases and exits.

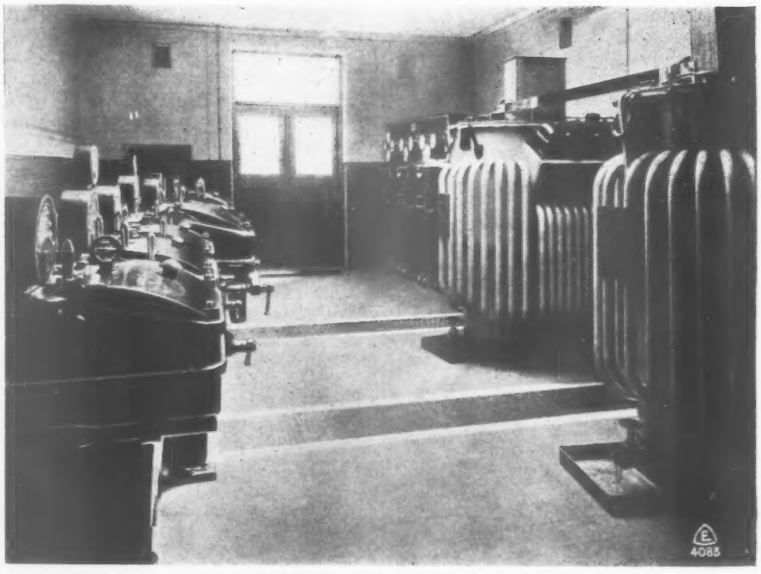
When the persons accommodated are distributed over floors above the ground floor.

No. of persons	Minimum width of each of the two staircases Ft. In.
300	3 6
400	4 0
500	4 6
600	5 0
800	5 6
1,000	6 0

When the persons accommodated are principally on one floor above the ground.

No. of persons		
200	For the staircases below the floor in question.	3 6
300		4 0
400		4 6
500		5 0
600		6 0

Typical canteen kitchen.



Transformer and switchgear station : cables are carried in the metal covered floor ducts.

Class VIII.

One storey buildings.

Direct access to the street or to approved open space.

If distance to exit from any part of the floor exceeds 60 ft., an additional exit should be provided.

In garage buildings, etc., at least two exits should be provided.

Safety : Queries

(1) Requirements of District Council.

(2) Any portions of factory with special risks, i.e., spraying shops, etc.

The Act: Welfare

(1) A suitable supply of drinking water from the public main or other approved source of supply is to be provided, and maintained at suitable points conveniently accessible to all persons employed. If the supply is not laid on, it shall be contained in suitable vessels renewed at least daily, and preserved from contamination. Except where water is delivered by an upward jet, suitable cups with facilities for rinsing must be provided.

(2) Washing facilities, including soap and clean towels (or other means of cleaning and drying) must be provided.

(3) Arrangements must be made for storing and drying clothing not worn during working hours.

(4) For female workers whose work is done standing "suitable facilities for sitting shall be provided to enable them to take advantage of any opportunities for resting."

(5) First aid boxes or cupboards or an ambulance station must be provided.

(6) In certain cases the following may be required (the Factory and Workshop Orders should be consulted for types of work to which they apply).

(*a*) Arrangements for preparing or heating and taking of meals.

(*b*) Supply and storage of protective clothing.

(*c*) Rest rooms.

(*d*) Special screens for the protection of eyes.

Canteen: Discussion

The type of canteen provided in any works may vary from a shed with plain benches and tables with a series of gas rings at which employees may warm up their own food, to the elaborate type, generally associated with large factories, with full kitchen and dining-room facilities, and rooms for different games or meetings, the latter possibly including some sort of stage for amateur theatricals. Since the points to be settled with the client are therefore so variable, the check list below is intended to be applicable to the more elaborate type of canteen and should therefore be modified to suit the demands of the simpler type.

Zigzag loading dock giving level approach at end and along one side of lorry.

Welfare: Queries.

(1) Type of drinking fountain and supply of water available.

(2) Type of washing fixture—fountain or basins.

(3) If basins, separate traps, etc., or discharge over floor channel.

(4) Soap, towels, etc.—soap solution, hot-air driers.

(5) What requirements for clothes storing and drying and changing? Will cloakrooms have attendant or what means will be taken to prevent pilfering?

(6) What seating required at machines and elsewhere?

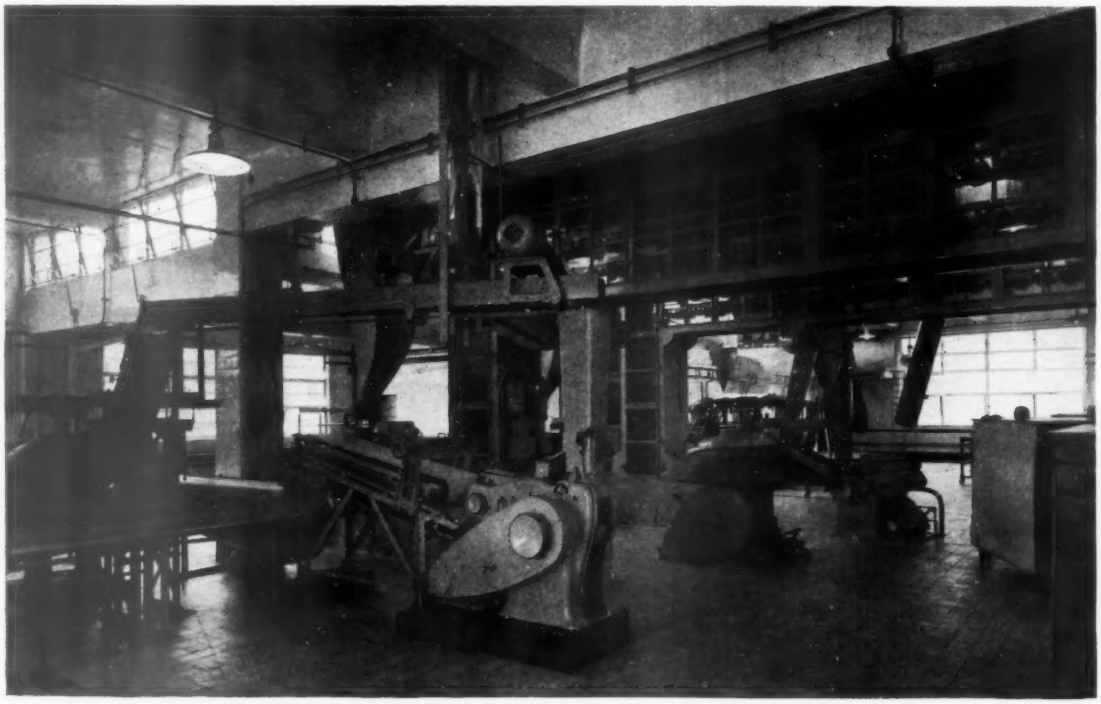
(7) What first-aid requirements?

(9) Rest-rooms — are they required, and to what standard?

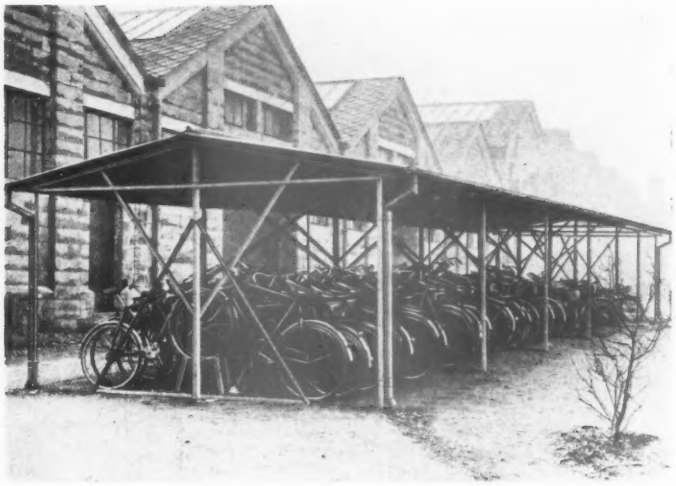
(10) Protective clothing — is this worn, and if so, are special facilities required for changing, washing, drying?

Canteen: Queries

Number and type of meals to be served to males, females, juveniles. (From these figures follow kitchen areas



Cleanliness in a bakery. Painted walls and ceiling, tiled floors and machine bases.



A separate outside cycle park: the same principle may also be applied to motor cycles.

Simple and economical bicycle storage, hooks for the front wheels, guides for the back.

and equipment and number of staff necessary.)

Is canteen to be in use at lunch time only or after works hours as well?

Type of service: tables and waitresses, tables and self-service counter, quick-service bar.

Games: pingpong, darts, skittles.

Other rooms, committees, works councils, etc.

Racks for cycles (preferably covered) should be provided, and possibly some parking space for cars.

Drinking fountains or taps clearly labelled "drinking water" should be placed in all cloakrooms and also at strategic points in the works.

Power Sources: (*see also* Heating and Lighting)

The choice of a power supply will depend on the proximity of gas mains, cables or collieries, but it may be assumed that a supply from the grid will be definitely uneconomic unless the demand is exceptionally large or unless there is already a substation supplying other factories in the district. All supply companies, however, will arrange special rates for factories, depending on the demand.

If electricity is the main power source space must be allowed for the appropriate transformers and switchgear, and there may also be electrode boilers and storage tanks if the heating supply is taken at off-peak periods. Switchgear for individual drives and portable machinery is considered under the heading of equipment.

Diesel-driven dynamos may also be used as a source of electricity supply provided the load is fairly constant. Heavy intermittent demands tend to make this method uneconomic.

Steam may be necessary for processing as well as heating and this will involve a boiler house, probably with automatic stokers and coal storage bins.

Gas may also be necessary for processing, and is a convenient means for heating furnaces of all kinds. The possibility of high-pressure gas supply should also be considered.

Stand-by lighting and processing plants may also be necessary and can be arranged with an automatic change-over switch to a battery supply or with a continuously running diesel and motor drive if the supply must be absolutely continuous.

Power Sources: Queries

Power services required:
Electricity A.C.
D.C.
Gas.
Steam.
Compressed air.

Is stand-by plant necessary?

Are all machines to be independently driven or can ranges of machines be grouped?

Will there be spare steam (or hot water) available for heating
washing
cooking ?

Testing and Research

The services required in the test shop will depend entirely on the product manufactured, but may include high and low pressure water, gas, drainage, electricity at various voltages, compressed air, etc., all of which may need accurate independent metering. Individual tests may also have to be carried out at any point in the production line. Benches and tool racks again depend on the product.

Tests to destruction will more probably be carried out in the research department, which will probably need all the services already suggested for the test shop. Various other special conditions may be necessary such as silence, absence of dust, constant temperature, etc. ; these are outlined in the list below. Finishes should be long wearing, and ease of cleaning is essential.

Test Shop : Queries

Type of test to be carried out.
Services necessary : Gas.
Electricity A.C.
D.C.
Water h.p. and l.p.
Compressed air
Drainage.
Metering.
Tests elsewhere in production line.
Benches and tool racks.
Independent light sources.
Research :—
Services necessary : *see* test shop above.
Research to be done : does it involve dark blinds?
Constant temperature.
Controlled humidity.
Silence.
Anti-vibration mountings for instruments.
Stand-by current supply.
Photographic plant.
Extract fans.
Absence of dust.
Freedom from electrical interference.

Other Services

Electrical

Switchboards and transformers should be housed in a large dry, well-ventilated building used for no other purpose, and situated if possible well away from any combustible material in surrounding buildings to reduce the fire risk. The chief fire danger is from the transformer and circuit breaker oil, and for this reason the transformers and switchgear should preferably be separated by a 9-inch brick wall. Transformers may also be mounted over a pit filled with granite or ballast. In addition to the space required by switchgear and transformers there should be space for maintenance inspection and for possible extensions.

Current distribution is most convenient from ring mains at ceiling level, where conduit is least liable to damage and the necessary runs or drops to machines or fittings are short. Wall drops can also be conveniently run to sockets for portable machinery or lighting, and these should be placed well up the wall, preferably at about shoulder level. All wiring should be in properly earthed conduit and it is usual to employ ironclad switches. All portable electrical apparatus must be fed by three-core cable and earthed.

Transport

Conveyors, either floor or overhead, are a possible alternative to wagons and trolleys ; roof trusses need stiffening for the overhead type and for any form of point loading caused by hoisting gear.

Protection

Fire alarms, extinguishers, hoses, sprinklers and fusible link gates on ventilating fans may all be necessary, and in remote districts an extra large separate water supply tank may be needed for hoses and sprinklers.

Control

Timekeepers' clocks and card racks should be near the main entrance. Clocks throughout the works may be controlled by a centralized master device or may be run direct from the mains if the supply is time-controlled A.C. If the timekeeper's clock is electric it should be of the self-starting type.

Floors and Walls

Various processes need special floor finishes, but a rough guide is given below.

Machine-shops : Creosoted deal planks on concrete sub-floor ; wood block on concrete sub-floor.

Light machine-shops : Maple flooring on concrete or wood sub-floor.

Floors involving wet processes : Asphalt ; close terrazzo jointed tiles.

Factories with explosion risk from dust : Maple or other hardwood on wood sub-floor. .

Foundry : Earth.

Staircases and corridor : Non-slip granolithic.

Packing and stores : Concrete with hardener or metal surface reinforcement.

Boiler-rooms : Quarry tile or granolithic.

Cloakrooms, etc. : Quarry tile or granolithic.

The corners of concrete columns should be protected by metal angles to prevent damage by trolleys.

The choice of a wall finish depends so much on the reflection factor required for lighting purposes, the regulations governing washing and cleaning, and first cost, that each case will involve consultation with the client. The same argument applies both to sound and heat insulation, most forms of which will show a good financial return on the capital invested, the amount of insulation employed depending largely upon how much capital the client has to spare.

Individual drive : dust hoods over grinding wheels.

Factory on the North Circular Road, N.W.10, for County Perfumery Limited. Architects: Nicholas and Dixon-Spain. A steel-framed building with brick infillings.

FACTORIES ILLUSTRATED: CONTRACTORS

On this and the two pages following we print the names of the general contractors and some of the sub-contractors for the factories illustrated in this issue. Owing to pressure on our space we are unable to print a full list of sub-contractors.

METERS, PARK ROYAL, MIDDLESEX (pages 883–884). Architects: Adie, Button and Partners. General contractors: Higgs and Hill, Limited. Sub-contractors: General Asphalte Company, Limited, asphalt; Trussed Concrete Steel Company, Limited, reinforced concrete; Broad & Company, Limited, supply of Haunchwood bricks; Banister, Walton & Co., Ltd., structural steel and runway track; John Thompson Beacon Window, Ltd., glazed steel screens; Flexo Plywood Industries, Ltd., flexo-metal lavatory cubicles; Mellowes & Co., Ltd., metal windows, lantern lights: Young, Austen and Young, Ltd., central heating; Leeds Fireclay Co., Ltd., sanitary fittings; J. W. Gray and Son, Ltd., lightning conductors.

LIGHTING, MORDEN (page 885). Architects: Stanley Hall and Easton and Robertson. General contractors: Commercial Structures, Ltd.

SOAP, IRLAM, LANCS (pages 886–887). Architect: W. A. Johnson. General contractors: Co-operative Wholesale Society, Ltd., who were also responsible for excavation, etc. Sub-contractors: Limmer and Trinidad Lake Asphalt Co., asphalt; Pilkington Bros., Ltd., glass; Shanks & Co., Ltd., sanitary fittings; Henry Hope and Sons, Ltd., casements; J. A. King & Co., Ltd., Glascrete lights.

GYRO-COMPASSES, CHISWICK (pages 888–889). Architects: Percy Tubbs, Son and Duncan. Associated Architect: W. J. A. Osburn. General contractors: E. H. Burgess, Ltd. Sub-contractors: T. W. Palmer & Co., Ltd., steelwork; Haywards, Ltd., patent glazing; Williams and Williams, Ltd., windows; British Reinforced Concrete Engineering Co., Ltd., reinforcement for concrete.

CUTLERY, OSTERLEY, MIDDLESEX (pages 890–891). Architect: Sir Banister Fletcher. General contractors: Higgs and Hill, Ltd. Sub-contractors: Matthew T. Shaw & Company, Limited, steelwork; Williams and Williams, Ltd., metal windows; Henry Hope and Sons, Ltd., patent roof glazing; J. A. King & Company, Limited, "King" floors and Glascrete lights; South-Western Stone Co., Ltd., Clipsham stone; Drake and Gorham, Ltd., electrical installation and floodlighting; E. J. Elgood, Ltd., "Elcon" flooring; Hollis Bros. & Co., Ltd., maple wood blocks; Proctor and Lavender, facing bricks; Dent and Hellyer, Ltd., plumbing (sanitary fittings); Art Pavements & Decorations, Ltd., terrazzo; Haywards, Ltd., iron staircases and roller shutters; Val de Travers Asphalt Paving Co., Ltd., asphalting; Braithwaite & Co., Ltd., water tower and pressed steel tanks; Comyn Ching & Co., Ltd., ironmongery; Fredk. Sage & Co., Ltd., show cases and counters; Smiths English Clocks, Ltd., synchronous clocks; Leeds Fireclay Co., Ltd., wall-tiling and Shepwood partitions; Jenson and Nicholson, Ltd., paint and distemper; Mander Bros., cellulose.

MANUFACTURING CHEMISTS, BEESTON (pages 892–894). By Sir E. Owen Williams. General contractors: Gray's Ferro Concrete Company, Ltd. Sub-contractors: Dent and Hellyer, Ltd., plumbing; Crittall Mfg. Co., Ltd., windows: Acme Flooring and Paving Co., Ltd., wood and block floors; General Asphalt Co., Ltd., asphalt; Stuart's Granolithic Co., Ltd., granolithic skirtings, etc.; John Broadfoot and Sons, linoleum; Herbert Morris, Ltd., travelling platform; G. W. King, Ltd., window-cleaning gear; Banister, Walton & Co., Ltd., roof trusses; Frederick Braby & Co., Ltd., steel dome and platforms; Cowan Hulbert, Ltd., concreting plant; Independent Sprinklers, Ltd., sprinkler installation; Marryat and Scott, Ltd., lifts; J. Jeffreys & Co., Ltd., heating; A. Bagnall Sons, Ltd., spray painting; G. A. Harvey & Co., steel tanks; Ericsson Telephones, Ltd., telephones; G. and T. Earle, Ltd., cement; Whitehead Iron and Steel Co., Ltd., steel; Trent Concrete Co., Ltd., sand and ballast; Bury and Jones, Ltd., timber; Pilkington Bros., Ltd., glass; Finlay Conveyor Co., Ltd., bolt hanger sockets.

MILK AND CANNING, CRICKLADE (page 895). Architect: L. G. Ekins. General Contractors, C.W.S. Building Department, who were also responsible for the excavation, foundations, plumbing and joinery. Sub-contractors: Trussed Concrete Steel Co., Ltd., reinforced concrete; A. D. Dawnay and Sons, Ltd., steel roof trusses; Henry Hope and Sons, Ltd., patent glazing; Korkoid Decorative Floors, flooring; Leeds Fireclay Co., Ltd., sanitary fittings; Mather Ltd., rolling shutters; Carter & Co., Ltd., wall tiling; C.W.S. Engineering Department were responsible for the central heating, and electric wiring, and the C.W.S. Tinplate Works for the cloakroom fittings.

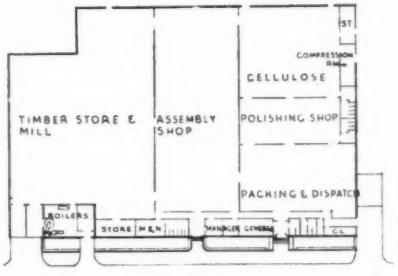
CIGARETTE PAPERS, WEMBLEY, MIDDLESEX (pages 896–897). Architect: H. Courtenay Constantine. General contractors: Y. J. Lovell and Son. Sub-contractors: General Asphalte Co., Ltd., asphalt and special roofings; Moler Products, Ltd., "Moler" blocks—partitions; A. Vigers, Sons & Co., Ltd., woodblock flooring; Ironite, Ltd., "Ironite" flooring; Gas Light and Coke Co., Ltd., gas fixtures and gasfitting; Benjamin Electric, Ltd., electric light fixtures; Unity Heating, Ltd., electric heating and "Unity" heaters; Crittall Manufacturing Co., Ltd., casements: Siemens Bros. & Co., Ltd., telephones; Gibbs Bros. and Lucas, Ltd., folding gates; Marquees, Ltd., sunblinds; May Acoustics, Ltd., acoustic plaster; Modern Surfaces, Ltd., decorative plaster; Walter W. Jenkins, Ltd., marble, mantels; Smiths English Clocks, Ltd., clocks.

FURNITURE, EDMONTON (page 898–899). Architects: Nicholas and Dixon-Spain. General contractors: Commercial Structures, Ltd., who were also responsible for the excavations, foundations and dampcourses. Sub-contractors: Rapid Floor Co., Ltd., fireproof construction; Universal Asbestos Co., Ltd., roofings; Moler Products, Ltd., partitions; London Brick Co., Ltd., bricks; Kelvin Construction Co., structural steel; W. H. Heywood & Co., Ltd., patent glazing; Jos. F. Ebner, Ltd., woodblock flooring; Cellulin Flooring Co., patent floor covering; Edgar Fitton & Co., central heating and boilers, etc.; City Electrical Co., electric wiring and electric light fixtures; Sturtevant Engineering Co., Ltd., ventilation; R. Cattle, Ltd., joinery (flush doors); F. R. Shadbolt and Sons, joinery (panelling).

CORSETS, SLOUGH (pages 900–901). Architects: Sir John Brown and A. E. Henson, in association with W. David Hartley. General contractors: Bowles and Son. Sub-contractors: W. Richards and Son, steelwork; Trussed Concrete Steel Co., R.C. floors; Shaws Glazed Brick Co., faience; Henry Hope and Sons, metal windows; D. Anderson and Son, Macasphalt patent roofing; Callenders Cables, wiring; Best and Lloyd, light fittings; Leeds Fireclay Co., sanitary goods; Mather and Platt, Ltd., rolling shutters; Dryad Metalworks, door furniture; Parker, Winder and Achurch, cloakroom fittings; Lenscrete, Ltd., glass birch windows; Birmingham Guild, Ltd., metal doors; Roneo, Ltd., partitions.

WINE AND SPIRIT BUILDING, WEMBLEY (pages 902-903).—Architect, E. E. Williams. Consultant, G. G. Winbourne. General contractors, Allnatt, Ltd. Sub-contractors: Reinforced Concrete Specialists, Ltd., r.c. design for basement, suspended floor and staircases; Banister, Walton & Co., Ltd., constructional steelwork; Brady & Co., Ltd., book lifts; Carter & Co. (London), Ltd., wall and floor tiling; A. N. Donovan, Ltd., flush doors; Gas Light and Coke Co., gas supply and appliances; Gliksten Doors, Ltd., standard doors; A. Goldstein & Co., Ltd., sash glazing; Haskins, roller shutters; W. H. Heywood & Co., Ltd., patent roof glazing; Keystone Paint and Varnish Co., Ltd., paints and distempers; Marryat and Scott, Ltd., goods lifts; Plastering, Ltd., plastering; Rapid Floor Co., Ltd., suspended office floor; Smith's English Clocks, Ltd., electric clocks; G. R. Speaker & Co., Ltd., asbestos roof sheeting; Wiggins-Sankey, Ltd., bricks, cement and sanitary goods; Williams and Williams, Ltd., standard and special metal window sashes.

Factory for Gordon Russell, Ltd., Park Royal, Middlesex, for the production of radio cabinets. Architect for the exterior : G. A. Jellicoe. Assistant : M. J. H. Bunney. Layout was to be flexible for easy adaptation to other forms of "clean" manufacture. Construction and finishes : Standard steel factory-type roofing with solid brick walls and all internal partitions movable. The south wall of the low office string was raised both to mask the factory roofing and also to provide a background for the clients' standard sign, and the external treatment had to comply with the standards already arrived at by the contractors on previous work. Brown-red stock brick ; concrete steps, string and cills ; door surrounds, cement rendered ; windows, standard steel casements, painted cream; lettering and sign of wood, save for the circular saw of the sign, which is of steel ; faces of the lettering painted cream and the edges bright blue ; sign finished in blue, cream and grey.



STEEL TUBES, BIRMINGHAM (pages 904–5). Architects : Bye, Simms, Gifford and Walker. General contractors: C. Bryant and Son, Ltd. Basement and foundations : Building Department of Accles and Pollock, Ltd. Engineer for steel and reinforced concrete work : A. Noel Proctor, M.SC. (LOND.), A.M.INST.C.E. Quantity surveyors : Henry Vale and Sons. Acoustical Advisor (Board Room) : Hope Bagenal, A.R.I.B.A. Sub-contractors : Rubery Owen, Ltd., steelwork ; Concrete, Ltd., reconstructed stone ; Henry Hope and Sons, Ltd., windows ; Apparatus for heating and hot water supplied by Simplex Electric Co., Ltd., and wired and fixed by Accles and Pollock, Ltd. ; Venetian Flooring Co., terrazzo ; F. McNeill & Co., Ltd., roof covering ; Venesta, Ltd., doors and plywood ; Mundet Cork Products, Ltd., flooring ; John Mallin & Co., Ltd., fibrous plaster ; Jas. Gibbons and Birmingham Guild, staircases ; Birmingham Guild, metal work ; Parker, Winder and Achurch, Ltd., sanitary fittings ; H. W. Cullum & Co,. Ltd., acoustic treatment ; Lamson Pneumatic Tube Co., Ltd., pneumatic tubes ; James Gibbons, Ltd., door furniture ; Marryat and Scott, hand lift ; Lockerbie and Wilkinson, Ltd., wire screens ; Accordo Blinds, Ltd., blinds ; J. A. King & Co., Ltd., pavement lights ; Pel, Ltd., and Roneo, Ltd., office equipment.

ORGANS, RUISLIP (page 906). Architects : Clifford Tee and Gale. General contractors : Haymills (Contractors), Ltd. Sub-contractors : Boulton and Pain, Ltd., steelwork ; Lion Foundry Co., Ltd., rainwater goods; Broadmead Products, Ltd., artificial stone; Kendalls Paving Co., Ltd., granolithic paving ; Plastona, Ltd., hardening treatment to paving ; Art Pavements and Decorators, terrazzo paving ; Val de Travers, asphalt roofing ; Turners Asbestos Cement Co., asbestos roofing and flat sheeting ; W. H. Heywood Co., Ltd., roof glazing ; Hollis Bros. Co., Ltd., block floors ; Venesta, Ltd., metal faced doors ; Nicholls and Clark, Ltd., ironmongery and sanitary fittings ; Crittalls Mfg. Co., steel windows ; Norris Warming Co., heating installation ; T. W. Palmer & Co., Ltd., fencing ; City Electrical Co., electrical installation ; Sevenoaks Brick Co., bricks ; R. Fox and Sons, cellulose spraying.

BEDDING, CROYDON (page 907). Architects: Hugh Macintosh and L. A. Macintosh. General contractors : R. Mansell, Limited, who were also responsible for demolition. Sub-contractors : Trussed Concrete Steel Company, foundations ; Permanite, Limited, asphalt and Twonlayer sheet asphalt ; Trussed Concrete Steel Co., Ltd., reinforced concrete ; Matthew T. Shaw & Co., structural steel ; London Brick Co., Ltd., partitions ; Haywards, Ltd., patent glazing ; Crittall Manufacturing Co., casements ; F. A. Norris & Co., iron staircase ; Marryatt and Scott, Ltd., lifts.

ELECTRIC METERS, PRESCOT, LANCS (page 908). Architect : Dudley Nisbett. General contractors : British Insulated Cables, Ltd. Sub-contractors : Siegwart Fireproof Floor Co., Ltd., reinforced concrete ; Ed. Wood & Co., Ltd., structural steel ; Ruberoid Co., Ltd., roof proofing ; Williams and Watson, Ltd., glass and Vitrolite glazing ; R. W. Brooke & Co., Ltd., wood block flooring ; Richard Crittall & Co., Ltd., central heating and ventilation ; Rowe Bros. & Co., Ltd., sanitary fittings ; Williams and Williams, Ltd., casements ; Pickerings, Ltd., lifts.

LEATHER TANNERY, ELMERS END, KENT (page 909). Architect : H. Reginald Ross. General contractors : G. H. Gibson, Limited, and James Carmichael & Company, Limited. Sub-contractors : Trussed Concrete Steel Co. Ltd., foundations (reinforced concrete) ; London Brick Co., Ltd., bricks ; Matthew T. Shaw & Co., Ltd., structural steel ; A. H. Herbert & Co., Ltd., Big Six asbestos sheets ; Mellowes & Co., Ltd., patent glazing ; Hollis Bros. & Co., Ltd., wood block flooring ; British Trane Co., Ltd., stoves ; John Bolding and Sons, Ltd., sanitary fittings ; Williams and Williams, Ltd., casements and window furniture ; Mather and Platt, Ltd., fireproof doors ; Matthew T. Shaw & Co., iron staircases ; Szerelmey, Ltd., waterproofing materials for engine room.

CHEESE, WEST SMITHFIELD. E.C.1 (pages 910–911). Architect : Joseph Hill. General contractors : W. H. Gaze and Sons, Ltd. Sub-contractors : Empire Stone Co., Ltd., artificial stone ; Shaws Glazed Brick Co., terra-cotta ; Lawford Asphalte Co., Ltd., dampcourse and asphalt ; Bower Engineering Company,

Limited, electric wiring; J. Wontner-Smith Gray and Company, Limited, hot water and heating; Clarke and Vigilant Co., sprinklers; J. and E. Hall, Ltd., insulation, refrigerating equipment, and lifts; O'Brien, Thomas & Co., sanitary fittings; Yannedis & Co., door furniture; Crittall Manufacturing Co., Ltd., iron casements; Haskins, Ltd., rolling shutters; Moreland Hayne & Co., structural steel.

CORRUGATED BOXES, MIDDLESEX (pages 912–913). Architect: Robert Sharp. General contractors: Commercial Structures, Limited. Sub-contractors: British Thomson-Houston, Limited, flood lighting; W. D. and J. Gough, Limited, office joinery; Pharaohs (Wallboards), Ltd., insulite; Lamson Engineering Company, Limited, pneumatic tubes; Chatwood Safe Co., Ltd., strong room; General Asphalte Co., Ltd., asphalt; Helical Bar and Engineering Co., Ltd., suspended floors; Turners Asbestos Cement Co., Bix Six asbestos.

INK, LIVERPOOL (page 914). Architects: Ley, Colbeck and Partners. General contractors: Wm. Thornton and Sons, Limited. Sub-contractors: Norris Warming Company, Limited, heating; Trussed Concrete Company, Limited, concrete floors; British Reinforced Concrete Engineering Company, Limited, steel reinforcement for water tanks and vats; Cement Marketing Co., Ltd., Snowcrete and Colorcrete; Crittall Manufacturing Co., Ltd., and Henry Hope and Sons, Ltd., windows; Arthur Sanderson and Sons, Ltd., Berners Factory White; Redpath, Brown & Co., Ltd., steelwork; Parker, Winder and Achurch, Ltd., oil fitting engineers, door furniture; Wm. Wadsworth and Sons, Ltd., lifts.

ICE-CREAM FACTORY AT WOLVERHAMPTON (page 915). Architects: Lavender and Twentyman. General contractors: Wilson Lovatt and Sons, Ltd. Sub-contractors: Doulton & Co., Ltd., faience; British Reinforced Concrete Engineering Co., Ltd., reinforced concrete work; James Gibbons, Ltd., aluminium windows, stainless steel stanchion casings, iron and aluminium staircase balustrades, metal lettering and bronze clock face; Marbello and Durus, terrazzo floors; Kleine Co., Ltd., Duromit floors; Gent & Co., electric clocks; Cherry-Burrell, Ltd., ice-cream plant.

TYPEWRITER ASSEMBLY, LEICESTER (page 916). Architects: Pick, Everard, Keay and Gimson. General contractors: J. Chapman and Sons, Limited, who were also responsible for the excavations, foundations and damp-courses. Sub-contractors: General Asphalte Company, Ltd., asphalt; Caxton Floors, Limited, hollow tile and concrete floors; Constone, Ltd., artificial stone; Banister, Walton & Co., Ltd., structural steel; D. Anderson & Co., "Macasfelt" roofing; Crittall Manufacturing Co., Ltd., partitions; Hollis Bros. & Co., Ltd., woodblock flooring; Cork Insulation Co., Ltd., flooring (cork tiling); Sika Francois, Ltd., waterproofing materials; Young, Austen and Young, central heating; Troughton and Young, Ltd., electric light fixtures; Young, Austen and Young, ventilation; Wm. Freer, Ltd., plumbing; Dryad Metalworks, door furniture; Ferrodo, stair treads; Henry Hope and Sons, Ltd., casements; Milners Safe Company, Limited, safe doors; Haywards, Limited, iron staircases; Samuel Elliott and Sons, Ltd., revolving doors; W. Herbert, plaster; Dryad Metalworks, and Birmingham Guild, metalwork; J. Chapman and Sons, Limited, joinery; J. and H. Patteson, Ltd., marble; Gordon Russell, Limited, and Perkins Bros., textiles; Gordon Russell, Ltd., furniture; Sankey, Sheldon & Co., Ltd., cloakroom fittings; Express Lift Co., and Gimson & Co., lifts; Gent & Co., clocks; Dryad Metalworks, signs; J. A. Tyler & Co., "Dulux" Painting; En Tout Cas Co., Ltd. shrubs and trees; I.C.I., Ltd. (Pioneer), partitions, plaster.

AIRCRAFT, HATFIELD (page 917). Architects: J. Monro and Sons. General contractors, Holland & Hannen and Cubitts, Ltd. Sub-contractors; Demolition and Construction Co., Ltd., preliminary works; Redpath Brown & Co., Ltd., steelwork; Trussed Concrete Steel Co., Ltd., reinforced concrete engineers, steel reinforcement; Ruberoid Co., Ltd., roofing; Pennycook Patent Glazing Co., Ltd., patent glazing; Wolverhampton Corrugated Iron Co., Ltd., ventilators; Hugh Twaddle and Sons, plumber work; Danial Adamson & Co., Ltd., power house installation; Crittall Mfg. Co., Ltd., steel sashes and partitions; Educational Supply Association, Ltd., folding doors; Ashwell and Nesbit, Ltd., steam mains, heating and cooking; North Metropolitan Electric Supply Co., electric lighting; Bryon & Co., tilework; Toffolo Jackson & Co., Ltd., terrazzo; Rippers, Ltd., joinery work; A. M. MacDougall and Son, Ltd., wood block flooring; W. B. Morrison and Sons, sanitary fittings; Haskins, entrance doors, etc.; George Boyd & Co., ironmongery; Potter Rax Gate Co., Ltd., cloakroom fittings, etc.; Guthrie and Wells, Ltd., painter work; Ryder and Son (1920), Ltd., garden.

SOAP, SILVERTOWN (page 918). Architect: L. G. Ekins. General contractors: the C.W.S. Building Department, who were also responsible for the excavation reinforced concrete, plumbing and joinery. The C.W.S. Engineering Department were responsible for the central heating and electric wiring. Sub-contractors: Cellactite, Ltd., and Paropa, Ltd., special roofings; Henry Hope and Sons, patent glazing; Prodorite, Ltd., patent flooring; Lillingtons, waterproofing materials; Leeds Fireclay Co., Ltd., sanitary fittings; Crittall Manufacturing Co., casements; Messrs. Sebel & Co., iron staircases; Messrs. Faience and Tile Crafts, Ltd., tiling; Haskings, rolling shutters. T.C., Ltd., Pioneer partition blocks.

BAKERY, STREATHAM ROAD, MITCHAM (page 919). Architect: S. W. Ackroyd. Sub-contractors: Val de Travers Asphalte Co., Ltd., asphalt; Eaton, Parr and Gibson, Ltd., glazing; Stevens and Adams, Ltd., wood block flooring; Haywards, Ltd., wired cast glazing; Camden Tile and Mosaic Co., Ltd., wall tiling; J. Starkie Gardner, Ltd., handrailing and buffer rail; Carter & Co., Ltd., cream quarry tiling; Trussed Concrete Steel Co., Ltd., reinforced concrete; Crittall Manufacturing Co., Ltd., metal windows; London Brick Co., Ltd., Fletton bricks; Cement Marketing Co., Ltd., Portland cement and Ferrocrete; T. Clarke & Co., Ltd., electric lighting; Brook Motors, Ltd., electric motors; Ideal Boilers and Radiators, Ltd., boilers and radiators.

RESEARCH BUILDING AND MACHINE STORES, HAYES (pages 920–921). Architect, A. P. Bodon. General contractors, Chief Engineer's Department, The Gramophone Company, Limited, who were responsible also for the electric wiring, electric light fixtures, electric heating and ventilation. Sub-contractors: Limmer and Trinidad Lake Asphalt Co., asphalt; Trussed Concrete Steel Co., Ltd., reinforced concrete; Smith and Owen, glass; John Williams and Sons (Cardiff), Ltd., casements and patent glazing; Holden, linoleum; Nye and Langston, plumbing; John Bolding, sanitary fittings; Hill and Son, door furniture; Henry Hartley, plaster.

SPARKING PLUGS, FELTHAM, MIDDLESEX (page 922). Architects: Wallis, Gilbert and Partners. General contractors: J. Jarvis and Sons, Limited. Sub-contractors: Johnsons Reinforced Concrete Engineering Company, Limited, reinforced concrete; Thomas Lawrence and Sons, bricks; Modern Surfaces, Limited, stone plaster finishes; Matthew T. Shaw & Co., Ltd., structural steel; Turners Asbestos Cement Co., asbestos roofings; Treetex, Ltd., roof linings; James Clark and Son, Ltd., special glass; Mellowes & Co., Ltd., lantern lights, patent glazing; Cork Insulation Co., Ltd., cork tile flooring; Carter & Co., Ltd., terrazzo flooring; R. C. Cutting & Co., Ltd., lightning conductor and flagmast; Hartley and Sugden, Ltd., boilers; Troughton and Young, Ltd., and Philips Lamps, Ltd., electric light fixtures; Leeds Fireclay Co., Ltd., sanitary fittings; Comyn Ching & Co., Ltd. and Nettlefold and Sons, Ltd., door furniture (metalwork), door furniture; Williams and Williams, Ltd., steel sashes and casements; Courtney Pope, Ltd., special bronze sashes; Newalls Insulation Co., Ltd., sound deadening treatment; Venesta, Ltd., flush doors; Mather and Platt, Ltd., fireproof doors; Fredk. Braby & Co., Ltd., internal factory screens, iron ladder.

ARTIFICIAL SILK, CONGLETON, CHESHIRE (page 923). Architects: Venables and Barker. General contractors, J. Gerrard and Sons, Limited, who were also responsible for excavation, reinforced concrete, woodblock flooring, sanitary fittings, etc. Sub-contractors: Tarmac Ltd., artificial stone; Leeds Fireclay Co., Ltd., terra cotta; J. Parks and Son, structural steel; Wolverhampton Corrugated Iron Co., special roofings; Mellowes & Co., Ltd., patent glazing; Saunders and Taylor, Ltd., central heating and ventilation; Barnett and Soans, Ltd., electric wiring and light fixtures; Rustproof Metal Window Co., Ltd., casements; Alexander Lees, folding gates; Wood & Co. (Longton), Ltd., tiling; Evans Lifts Co., lift; Sovex, Ltd., conveyors; Amcolite, Ltd., and Progress Foundry, signs.

BOOK DISTRIBUTION, NEASDEN (page 924). Architects: Ley, Colbeck and Partners. General contractors: A. E. Symes, Ltd. Sub-contractors: Lamson Engineering Co., Ltd., overhead carriers; Cellactite and British Uralite, Ltd., roofing material; Fredk. Braby & Co., Ltd., patent glazing; Tarmac, Ltd., tarmac for flat roofs; Trussed Concrete Steel Co., Ltd., suspended floors; F. Bradford & Co., Ltd., artificial stone; Crittall Manufacturing Co., Ltd., windows; D. Sebel & Co., balustrades to staircases; Norris Warming Co., Ltd., heating, ventilation and hot water; Ideal Boilers and Radiators, Ltd., boilers and radiators; John Lysaght, Ltd., steelwork; Clarke and Vigilant Sprinklers, Ltd., sprinklers; Haskins, roller shutters; Bell Bros. & Co., (London) Ltd., electric light; Claude-General Neon Lights, Ltd., neon signs.

FACTORY AT PARK ROYAL (page 937). General contractors: Allnatt, Ltd., and the Guinness Estate.

The Rates of Wages table is printed on page 940; the tables of current prices are held over from this issue; they will be resumed next week.

THE WEEK'S BUILDING NEWS

LONDON & DISTRICT (15 MILES RADIUS)

DEPTFORD. *Flats.* Plans passed by the Deptford B.C. : flats 18 Wickham Road for Mr. M. M. Hughes ; flats 62, 4 Tessilian Road for Messrs. Highgates (Builders), Ltd.

DEPTFORD. *Housing.* The L.C.C. is to provide rehousing in the Evelyn Street Area of Deptford at a cost of £7,500.

FINCHLEY. *Flats.* Plans for the erection of 54 flats in Gordon Road, have been submitted by Mrs. P. Straus, to the Finchley Corporation.

FINCHLEY. *Flats.* Messrs. Hillier Parker, May and Rowden are to erect 28 flats on the site of Sherwood Hall, East End Road, Finchley.

HORNSEY. *Town Hall Extensions.* The Hornsey Corporation has obtained sanction to borrow £23,508 for further town hall extensions.

ISLINGTON. *Community Centre.* The Islington B.C. is to acquire a site in Furlong Road for the erection of a community centre.

LONDON. *Tunnel.* The L.C.C. has now published details of the proposal for the duplication of Blackwall tunnel, the cost being estimated at three millions. The idea of the duplicate tunnel is to allow for one way traffic in each tunnel.

LONDON. *Re-housing, etc.* The L.C.C. has prepared a scheme for widening Notting Hill Gate at a cost of £1,260,000. This provides for re-housing persons who will be displaced and the construction of a new interchange station to take the place of the two existing underground stations in Notting Hill Gate.

SOUTHALL. *Flats.* A scheme has been prepared by Messrs. Austin Farr & Co., for the erection of 36 flats at Norwood Green, Southall.

STEPNEY. *Housing.* The Stepney B.C. is to acquire further property for the erection of dwellings on the Limehouse Fields clearance area.

STOKE NEWINGTON. *Flats.* The L.C.C. is to clear an area in Church Street, Stoke Newington, and provide re-housing for 750 persons in about 150 flats.

ST. PANCRAS. *Re-housing.* The L.C.C. is to undertake a rehousing scheme at a cost of £70,000 in Camden Road, St. Pancras.

TULSE HILL. *Housing.* The L.C.C. is to develop an estate of 33 acres in Tulse Hill, Brixton, at a cost of £657,900. About 965 flats will be erected.

EASTERN COUNTIES

EAST THURROCK. *School.* The Essex Education Committee has acquired a site in Lodge Lane, East Thurrock, for the erection of a junior school.

ESSEX. *Mortuary.* The Essex C.C. is to erect a new mortuary at the Billericay institution, at a cost of £1,130.

HARLOW. *School.* The Essex Education Committee has purchased a site at Harlow for a senior school.

HEDINGHAM. *School.* The Essex Education Committee has approved plans for the erection of a senior school at Hedingham, at a cost of £31,304.

HORNCHURCH. *School.* The Essex Education Committee has acquired land in Wingletye Lane, Hornchurch, for the erection of a junior school.

HORNCHURCH. *School.* The Essex Education Committee has obtained a site on the Lee Gardens Estate, Hornchurch, for the erection of a secondary school.

MALDON. *School.* The Essex Education Committee has acquired land at Maldon for the erection of a senior school.

ROMFORD. *Hospital.* The Essex C.C. has approved plans by the county architect for the erection of a convalescent hospital at Pyrgo Park, Romford, at an estimated cost of £100,684.

ROMFORD. *School.* The Essex Education Committee has approved plans for the erection of a junior school in Straight Road, Romford, at a cost of £19,073.

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

UPMINSTER. *School.* The Essex Education Committee has approved amended plans for the erection of a junior school, at Upminster, at a cost of £19,487.

UPSHIRE. *School.* The Essex Education Committee has approved plans for a junior school at Upshire, at a cost of £13,445.

YARMOUTH. *Houses.* Plans passed by the Yarmouth Corporation : 39 houses, "Koolunga" Estate, High Road, Gorleston, Mr. J. W. Codrington.

YARMOUTH. *Flats.* The Yarmouth Corporation is to prepare plans for the re-development of the two cleared areas with flats in four-storey blocks for accommodating approximately 976 persons.

YARMOUTH. *Housing.* The Yarmouth Corporation has purchased 6 acres in Lawn Avenue, for the erection of working-class dwellings.

SOUTHERN COUNTIES

BASINGSTOKE. *School.* The Hampshire Education Committee is to erect a secondary school for boys at Basingstoke, at a cost of £28,890.

BOTLEY. *School.* The Berks. Education Committee has approved plans for a new council school at Botley.

BROCKENHURST. *School.* The Hampshire Education Committee is to erect a secondary school at Brockenhurst, at a cost of £37,259.

DARTFORD. *Gymnasium, etc.* The Kent Education Committee has approved revised estimates for the erection of the proposed assembly hall and gymnasium at the County School for Girls, Dartford.

EDENBRIDGE. *School.* The Kent Education Committee has acquired a site for the erection of an elementary school at Edenbridge.

MEOPHAM. *School.* The Kent Education Committee has purchased a site at Culverstone Green, Meopham, for the erection of a school.

ORPINGTON. *School.* The Kent Education Committee has purchased a site at Orpington for a central school.

PORTCHESTER. *School.* The Hampshire Education Committee is to erect a junior school for 480 children on the Wicor Farm site, Portchester.

SANDERSTEAD. *Shops, etc.* Plans passed at Sanderstead : 15 shops with flats over, Addington Road, Selsdon, Marshall and Tweedy.

SWALE. *Houses.* The Swale, Kent, R.D.C. is to erect 13 houses in various parishes.

SWANSCOMBE. *Cinema.* Plans passed by the Swanscombe U.D.C. : Cinema, Ames Road, for Wards Theatres, Ltd.

WINDSOR. *School.* The Berks. Education Committee has obtained sanction to borrow £21,742 for the erection of a secondary school at Windsor.

MIDLAND COUNTIES

LEICESTERSHIRE. *School.* The Leicestershire Education Committee has purchased a site for the Kirby Muxloe Wolfdale Modern School

WOLVERLEY. *School.* The Worcestershire Education Committee is to obtain a site at Wolverley for the erection of a school for 200.

NORTHERN COUNTIES

AINTREE. *School.* The Lancashire Education Committee has purchased a site at Aintree for a junior and infants' school.

BRIERFIELD. *School.* The Lancashire Education Committee is to erect a senior school at Brierfield, at a cost of £32,362.

CONSETT. *Houses.* Mr. T. M. Francis is to erect 44 houses in Elsdon Terrace, Consett.

CONSETT. *Cinema.* Mr. W. H. Cole is to erect a cinema in Harvey Street, Consett.

COUNTY DURHAM. *Houses.* Messrs. Geo. Cairns and Sons are to erect 16 houses east of Murton Station level crossing, County Durham.

COUNTY DURHAM. *Houses.* Mr. J. Gray is to erect 19 houses in Trunk Road, Rushyford, County Durham.

COUNTY DURHAM. *Cinema.* North-Eastern Cinemas De Luxe, Ltd., are to erect a cinema in Front Street, Fencehouses, County Durham.

COUNTY DURHAM. *Cinema.* Mr. E. J. Hinge is to erect a cinema in Chapel Row, Shiney Row, County Durham.

CREWE. *Bus Station.* The Crewe Corporation has prepared a scheme for the construction of a bus station at Market Square, at an estimated cost of £49,633.

DURHAM. *Library.* The Durham County Council has approved plans for the erection of a branch library at West Stanley, at a cost of £5,250.

DURHAM. *Boiler-house, etc.* The Durham County Council is to proceed with the erection of a permanent boiler-house and laundry instead of the temporary buildings, at an extra estimated cost of £31,000, at the Mental Colony at School Aycliffe.

FAILSWORTH. *School.* The Lancashire Education Committee is to erect a senior school at Failsworth, at a cost of £29,904.

FISHBURN. *Houses.* Messrs. Hudson and Knotts are to erect 30 houses in Chaytor Terrace, Fishburn.

FLEETWOOD. *Clinic.* The Lancashire C.C. is to erect a clinic at Fleetwood, at a cost of £5,555.

FULWELL. *Schools.* The Sunderland Education Committee is to erect schools for 400 infant children in Hudson Road, and for 880 senior children in Dykelands Road, Fulwell.

HAYDOCK. *Clinic.* The Lancashire C.C. is to erect a clinic at Haydock, at a cost of £5,565.

HUYTON. *Relief Station.* The Lancashire C.C. has purchased a site in Twig Lane, Huyton, for the erection of a relief station.

HETTON. *Houses.* The Hetton U.D.C. is to erect 36 houses in Springwell Terrace, Hetton-le-Hole.

NETHERTON. *School.* The Lancashire Education Committee has purchased a site at Netherton for a junior and infants' school.

POYNTON. *Cinema, etc.* Mr. R. Bailey has prepared a scheme for the construction of a cinema, swimming pool, shops and tennis courts at London Road, Poynton, near Macclesfield.

PORT CLARENCE. *Houses.* Billingham U.D.C. is to erect 40 houses at Port Clarence.

RAINFORD. *School.* The Lancashire Education Committee is to erect a senior school at Rainford, at a cost of £21,430.

RISHTON. *School.* The Lancashire Education Committee is to erect a senior school at Rishton, at a cost of £21,030.

RYHOPE. *Houses.* Mr. J. Drakesmith is to erect 12 houses in Stockton Road, Ryhope.

RYHOPE. *Houses.* Sunderland R.D.C. is to erect 62 houses in Ryhope Street, Ryhope.

THORNTON. *Clinic.* The Lancashire C.C. is to erect a clinic at Thornton at a cost of £5,540.

WAKEFIELD. *School.* The Wakefield Education Committee has approved plans of the proposed school of Arts and Crafts.

WAKEFIELD. *Housing.* The Wakefield Corporation has asked the housing architect to prepare plans for the erection of 200 houses for re-housing displaced tenants.

SCOTLAND

GLASGOW. *Electricity Department Stores.* The Glasgow Corporation has approved plans for the erection of centralized stores for the electricity department at Port Dundas, at a cost of £39,000.

WALES

CARDIFF. *Schools.* The Cardiff Education Committee has purchased sites at Fairwater and Birchgrove for the erection of schools.

RATES OF WAGES

The initial letter opposite every entry indicates the grade under the Ministry of Labour schedule. The district is that to which the borough is assigned in the same schedule. Column I gives the rates for craftsmen; Column II for labourers. The rate for craftsmen working at trades in which a separate rate maintains is given in a footnote. The table is a selection only. Particulars for lesser localities not included may be obtained upon application in writing.

			I. s. d.	II. s. d.
A	ABERDARE ...	S. Wales & M.	1 7	1 2½
A	Aberdeen ...	Scotland	1 7	1 2½
A_1	Abergavenny ...	S. Wales & M.	1 6½	1 2
A_2	Abingdon ...	S. Counties	1 5½	1 1½
A	Accrington ...	N.W. Counties	1 7	1 2½
A_2	Addlestone ...	S. Counties	1 6	1 1½
A	Adlington ...	N.W. Counties	1 7	1 2½
A	Airdrie ...	Scotland	*1 7	1 2½
C	Aldeburgh ...	E. Counties	1 3	0 11½
A	Altrincham ...	N.W. Counties	1 7	1 2½
B_2	Appleby ...	N.W. Counties	1 3½	0 11½
A	Ashton-under-Lyne	N.W. Counties	1 7	1 2½
B	Aylesbury ...	S. Counties	1 5	1 0½
B	BANBURY ...	S. Counties	1 5	1 0½
B_1	Bangor ...	N.W. Counties	1 4½	1 0½
A_2	Barnard Castle	N.E. Coast	1 6½	1 1½
A	Barnsley ...	Yorkshire	1 7	1 2½
B	Barnstaple ...	S.W. Counties	1 5	1 0½
A	Barrow ...	N.W. Counties	1 7	1 2½
A	Barry ...	S. Wales & M.	1 7	1 2½
B	Basingstoke ...	S.W. Counties	1 5	1 0½
A_2	Bath	S.W. Counties	1 6	1 1½
A	Batley ...	Yorkshire	1 7	1 2½
A_2	Bedford ...	E. Counties	1 6	1 1½
A_2	Berwick-on-Tweed	N.E. Coast	1 6	1 1½
A_2	Bewdley ...	Mid. Counties	1 6	1 1½
B	Bicester ...	S. Counties	1 5	1 0½
	Birkenhead ...	N.W. Counties	*1 8	1 3
a	Birmingham ...	Mid. Counties	1 7	1 2½
A_1	Bishop Auckland	N.E. Coast	1 6½	1 2
A	Blackburn ...	N.W. Counties	1 7	1 2½
A	Blackpool ...	N.W. Counties	1 7	1 2½
A	Blyth	N.E. Coast	1 7	1 2½
B	Bognor ...	S. Counties	1 5	1 0½
A	Bolton ...	N.W. Counties	1 7	1 2½
A_2	Boston ...	Mid. Counties	1 5½	1 1½
A_2	Bournemouth...	S. Counties	1 6	1 1½
B_2	Bovey Tracey	S.W. Counties	1 4	1 0
A	Bradford ...	Yorkshire	1 7	1 2½
A_1	Brentwood ...	E. Counties	1 6½	1 2
A	Bridgend ...	S. Wales & M.	1 7	1 2½
B	Bridgwater ...	S.W. Counties	1 5	1 0½
A_1	Bridlington ...	Yorkshire	1 6½	1 2
A	Brighouse ...	Yorkshire	1 7	1 2½
A	Brighton ...	S. Counties	1 6	1 1½
A	Bristol ...	S.W. Counties	1 7	1 2½
B	Brixham ...	S.W. Counties	1 5	1 0½
A	Bromsgrove ...	Mid. Counties	1 7	1 2½
B	Bromyard ...	Mid. Counties	1 5	1 0½
A	Burnley ...	N.W. Counties	1 7	1 2½
A	Burslem ...	Mid. Counties	1 7	1 2½
A	Burton-on-Trent	Mid. Counties	1 7	1 2½
A	Bury	N.W. Counties	1 7	1 2½
A_1	Buxton ...	N.W. Counties	1 6½	1 2
A_1	CAMBRIDGE ...	E. Counties	1 6½	1 2
b_1	Canterbury ...	S. Counties	1 4½	1 0½
A	Cardiff ...	S. Wales & M.	1 7	1 2½
A	Carlisle ...	N.W. Counties	1 7	1 2½
B	Carmarthen ...	S. Wales & M.	1 5	1 0½
B	Carnarvon ...	N.W. Counties	1 5	1 0½
A_1	Carnforth ...	N.W. Counties	1 7	1 2½
A	Castleford ...	Yorkshire	1 7	1 2½
A_2	Chatham ...	S. Counties	1 5½	1 1½
A_2	Chelmsford ...	E. Counties	1 5½	1 1½
A_2	Cheltenham ...	S.W. Counties	1 5½	1 1½
A	Chester ...	N.W. Counties	1 7	1 2½
A	Chesterfield ...	Mid. Counties	1 7	1 2½
B	Chichester ...	S. Counties	1 5	1 0½
A	Chorley ...	N.W. Counties	1 7	1 2½
P_1	Cirencester ...	S. Counties	1 4½	1 0½
A	Clitheroe ...	N.W. Counties	1 7	1 2½
A	Clydebank ...	Scotland	1 7	1 2½
A	Coalville ...	Mid. Counties	1 7	1 2½
A_2	Colchester ...	E. Counties	1 6	1 1½
A_1	Colne	N.W. Counties	1 6½	1 2
A_1	Colwyn Bay ...	N.W. Counties	1 6	1 1½
A_1	Consett ...	N.E. Coast	1 6½	1 2
A_2	Conway ...	N.W. Counties	1 6	1 1½
A	Coventry ...	Mid. Counties	1 7	1 2½
A_2	Crewe	N.W. Counties	1 6	1 1½
A_1	Cumberland ...	N.W. Counties	1 5½	1 1½
A	DARLINGTON ...	N.E. Coast	1 7	1 2½
A	Darwen ...	N.W. Counties	1 7	1 2½
B_1	Deal	S. Counties	1 4½	1 0½
A_2	Denbigh ...	N.W. Counties	1 5½	1 1½
A	Derby	Mid. Counties	1 7	1 2½
A	Dewsbury ...	Yorkshire	1 7	1 2½
B	Didcot ...	S. Counties	1 5	1 0½
A	Doncaster ...	Yorkshire	1 7	1 2½
B_1	Dorchester ...	S.W. Counties	1 4½	1 0½
A_2	Driffield ...	Yorkshire	1 5½	1 1½
A_2	Droitwich ...	Mid. Counties	1 6	1 1½
A	Dudley ...	Mid. Counties	1 7	1 2½
A_2	Dumfries ...	Scotland	1 6	1 1½
A	Dundee ...	Scotland	1 7	1 2½
A	Durham ...	N.E. Coast	1 7	1 2½
A_2	EASTBOURNE ...	S. Counties	1 6	1 1½
A_1	Ebbw Vale ...	S. Wales & M.	1 6½	1 2
A	Edinburgh ...	Scotland	1 7	1 2½
A_2	Exeter ...	S.W. Counties	*1 6	1 1½
B	Exmouth ...	S.W. Counties	1 5	1 0½
A_2	FELIXSTOWE ...	E. Counties	1 5½	1 1½
A_2	Filey	Yorkshire	1 5½	1 1½
A	Fleetwood ...	N.W. Counties	1 7	1 2½
B_1	Folkestone ...	S. Counties	1 4½	1 0½
A	Frodsham ...	N.W. Counties	1 7	1 2½
B_2	Frome ...	S.W. Counties	1 4	1 0
A	GATESHEAD ...	N.E. Coast	1 7	1 2½
B	Gillingham ...	S. Counties	1 5	1 0½
A_1	Glamorganshire, Rhondda Valley District	S. Wales & M.	1 6½	1 2
A	Glasgow ...	Scotland	1 7	1 2½
A_2	Gloucester ...	S.W. Counties	1 6	1 1½
A_2	Goole	Yorkshire	1 6	1 1½
A_2	Gosport ...	S. Counties	1 6	1 1½
A_2	Grantham ...	Mid. Counties	1 5½	1 1½
A_1	Gravesend ...	S. Counties	1 6½	1 2
A	Greenock ...	Scotland	*1 7	1 2½
A	Grimsby ...	Mid. Counties	1 7	1 2½
B	Guildford ...	S. Counties	1 5	1 0½
A	HALIFAX ...	Yorkshire	1 7	1 2½
A	Hanley ...	Mid. Counties	1 7	1 2½
A	Harrogate ...	Yorkshire	1 7	1 2½
A	Hartlepools ...	N.E. Coast	1 7	1 2½
B	Harwich ...	E. Counties	1 5	1 0½
B	Hastings ...	S. Counties	1 5	1 0½
A_2	Hatfield ...	S. Counties	1 6	1 1½
B	Hereford ...	S.W. Counties	1 5	1 0½
A_2	Hertford ...	E. Counties	1 6	1 1½
A	Heysham ...	N.W. Counties	1 7	1 2½
A	Howden ...	N.E. Coast	1 7	1 2½
A	Huddersfield ...	Yorkshire	1 7	1 2½
A	Hull	Yorkshire	1 7	1 2½
A	ILKLEY ...	Yorkshire	1 7	1 2½
A	Immingham ...	Mid. Counties	1 7	1 2½
A_2	Ipswich ...	E. Counties	1 6	1 1½
B_2	Isle of Wight ...	S. Counties	1 4	1 0
A	JARROW ...	N.E. Coast	1 7	1 2½
A	KEIGHLEY ...	Yorkshire	1 7	1 2½
A_2	Kendal ...	N.W. Counties	1 5½	1 1½
A_2	Keswick ...	N.W. Counties	1 5½	1 1½
A_1	Kettering ...	Mid. Counties	1 6½	1 2
A_2	Kidderminster	Mid. Counties	1 6	1 1½
B_1	King's Lynn ...	E. Counties	1 4½	1 0½
A	LANCASTER ...	N.W. Counties	1 7	1 2½
A_1	Leamington ...	Mid. Counties	1 6½	1 2
A	Leeds	Yorkshire	1 7	1 2½
A	Leek	Mid. Counties	1 7	1 2½
A	Leicester ...	Mid. Counties	1 7	1 2½
A	Leigh	N.W. Counties	1 7	1 2½
B	Lewes	S. Counties	1 5	1 0½
A_2	Lichfield ...	Mid. Counties	1 6	1 1½
A	Lincoln ...	Mid. Counties	1 7	1 2½
	Liverpool ...	N.W. Counties	*1 8½	1 3½
A_2	Llandudno ...	N.W. Counties	1 6	1 1½
A	Llanelly ...	S. Wales & M.	1 7	1 2½
	London (12-miles radius)		1 8½	1 3½
	Do. (12-15 miles radius)		1 8	1 3
A	Long Eaton ...	Mid. Counties	1 7	1 2½
A	Loughborough ...	Mid. Counties	1 7	1 2½
A_1	Luton	E. Counties	1 6½	1 2
A	Lytham ...	N.W. Counties	1 7	1 2½
A_1	MACCLESFIELD ...	N.W. Counties	1 6½	1 2
A_2	Maidstone ...	S. Counties	1 5½	1 1½
A_2	Malvern ...	Mid. Counties	1 5½	1 1½
A	Manchester ...	N.W. Counties	1 7	1 2½
A	Mansfield ...	Mid. Counties	1 7	1 2½
B_1	Margate ...	S. Counties	1 4½	1 0½
A_2	Matlock ...	Mid. Counties	1 5½	1 1½
A_1	Merthyr ...	S. Wales & M.	1 6½	1 2
A	Middlesbrough ...	N.E. Coast	1 7	1 2½
A_2	Middlewich ...	N.W. Counties	1 6	1 1½
B_2	Minehead ...	S.W. Counties	1 4	1 0
B_2	Monmouth ...	S. Wales & M.	1 4	1 0
	& S. and E. Glamorganshire			
A	Morecambe ...	N.W. Counties	1 7	1 2½
A_2	NANTWICH ...	N.W. Counties	1 6	1 1½
A	Neath	S. Wales & M.	1 7	1 2½
A	Nelson ...	N.W. Counties	1 7	1 2½
A	Newcastle ...	N.E. Coast	1 7	1 2½
A	Newport ...	S. Wales & M.	1 7	1 2½
A	Normanton ...	Yorkshire	1 7	1 2½
A	Northampton ...	Mid. Counties	1 7	1 2½
A	North Shields...	N.E. Coast	1 7	1 2½
A	North Staffs ...	Mid. Counties	1 7	1 2½
A_1	Norwich ...	E. Counties	1 6½	1 2
A	Nottingham ...	Mid. Counties	1 7	1 2½
A	Nuneaton ...	Mid. Counties	1 7	1 2½
A_2	OAKHAM ...	Mid. Counties	1 5½	1 1½
A	Oldham ...	N.W. Counties	1 7	1 2½
A_2	Oswestry ...	N.W. Counties	1 5½	1 1½
A_1	Oxford ...	S. Counties	1 6½	1 2
A	PAISLEY ...	Scotland	*1 7	1 2½
B_2	Pembroke ...	S. Wales & M.	1 3½	0 11½
A	Perth	Scotland	*1 7	1 2½
A_1	Peterborough ...	E. Counties	1 6½	1 2
A	Plymouth ...	S.W. Counties	*1 7	1 2½
A	Pontefract ...	Yorkshire	1 7	1 2½
A_1	Pontypridd ...	S. Wales & M.	1 6½	1 2
A_2	Portsmouth ...	S. Counties	1 6	1 1½
A	Preston ...	N.W. Counties	1 7	1 2½
A	QUEENSFERRY ...	N.W. Counties	1 7	1 2½
A_2	READING ...	S. Counties	1 6½	1 2
B	Reigate ...	S. Counties	1 5½	1 1½
A_2	Retford ...	Mid. Counties	1 6½	1 1½
A_1	Rhondda Valley	S. Wales & M.	1 6½	1 2
A_2	Ripon	Yorkshire	1 6½	1 1½
A	Rochdale ...	N.W. Counties	1 7	1 2½
B	Rochester ...	S. Counties	1 5	1 0½
A_1	Ruabon ...	N.W. Counties	1 6½	1 2
A	Rugby ...	Mid. Counties	1 7	1 2½
A_2	Rugeley ...	Mid. Counties	1 6	1 1½
A	Runcorn ...	N.W. Counties	1 7	1 2½
A_1	ST. ALBANS ...	E. Counties	1 6½	1 2
A	St. Helens ...	N.W. Counties	1 7	1 2½
B_2	Salisbury ...	S.W. Counties	1 3½	0 11½
A_1	Scarborough ...	Yorkshire	1 6½	1 2
A	Scunthorpe ...	Mid. Counties	1 7	1 2½
A	Sheffield ...	Yorkshire	1 7	1 2½
A	Shipley ...	Yorkshire	1 7	1 2½
A_2	Shrewsbury ...	Mid. Counties	1 6	1 1½
A_2	Skipton ...	Yorkshire	1 6	1 1½
A_2	Slough ...	S. Counties	1 6	1 1½
A_1	Solihull ...	Mid. Counties	1 6½	1 2
A_2	Southampton ...	S. Counties	1 6	1 1½
A_1	Southend-on-Sea	E. Counties	1 6½	1 2
A	Southport ...	N.W. Counties	1 7	1 2½
A	S. Shields ...	N.E. Coast	1 7	1 2½
A_1	Stafford ...	Mid. Counties	1 6½	1 2
A	Stirling ...	Scotland	1 7½	1 2½
A	Stockport ...	N.W. Counties	1 7	1 2½
A	Stockton-on-Tees	N.E. Coast	1 7	1 2½
A	Stoke-on-Trent	Mid. Counties	1 7	1 2½
B	Stroud ...	S.W. Counties	1 5	1 0½
A	Sunderland ...	N.E. Coast	1 7	1 2½
A	Swansea ...	S. Wales & M.	1 7	1 2½
A_2	Swindon ...	S.W. Counties	1 5½	1 1½
A_1	TAMWORTH ...	N.W. Counties	1 6½	1 2
B	Taunton ...	S.W. Counties	1 5	1 0½
A	Teesside Dist....	N.E. Coast	1 7	1 2½
A_2	Teignmouth ...	S.W. Counties	1 6	1 1½
A	Todmorden ...	Yorkshire	1 7	1 2½
A_1	Torquay ...	S.W. Counties	1 6½	1 2
B_2	Truro	S.W. Counties	1 4	1 0
A_2	Tunbridge Wells	S. Counties	1 5½	1 1½
A	Tunstall ...	Mid. Counties	1 7	1 2½
A	Tyne District....	N.E. Coast	1 7	1 2½
A	WAKEFIELD ...	Yorkshire	1 7	1 2½
A	Walsall ...	Mid. Counties	1 7	1 2½
A	Warrington ...	N.W. Counties	1 7	1 2½
A_1	Warwick ...	Mid. Counties	1 6½	1 2
A_1	Wellingborough	Mid. Counties	1 6½	1 2
A	West Bromwich	Mid. Counties	1 7	1 2½
A_2	Weston-s.-Mare	S.W. Counties	1 6	1 1½
A_2	Whitby ...	Yorkshire	1 6	1 1½
A	Widnes ...	N.W. Counties	1 7	1 2½
A	Wigan ...	N.W. Counties	1 7	1 2½
B	Winchester ...	S. Counties	1 5	1 0½
A_2	Windsor ...	S. Counties	1 6	1 1½
A	Wolverhampton	Mid. Counties	1 7	1 2½
A_2	Worcester ...	Mid. Counties	1 6	1 1½
A_2	Worksop ...	Yorkshire	1 5½	1 1½
A_1	Wrexham ...	N.W. Counties	1 6½	1 2
A_2	Wycombe ...	S. Counties	1 5½	1 1½
B	YARMOUTH ...	E. Counties	1 5	1 0½
B	Yeovil ...	S.W. Counties	1 5	1 0½
A	York	Yorkshire	1 7	1 2½

* In these areas the rates of wages for certain trades (usually painters and plasterers) vary slightly from those given.

The rates for every trade in any given area will be sent on request. The rates of wages have been revised consequent upon the increase in wages which came into operation on February 1, together with all revisions following authorized annual regradings.