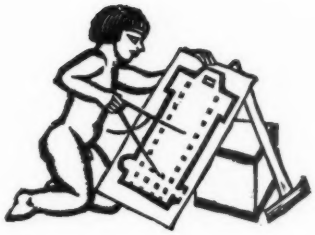
AN ARCHITECT'S RUG

MR. MAUFE'S HOUSE IN SUSSEX

THE rug shown above is to the design of Mr. Edward Maufe and was executed by Prudence Maufe. It measures 7 ft. by 5 ft. and is in dull Indian reds, greys, off-whites and a few low-toned greens and blues. The design represents the stables and outbuildings of Mr. Maufe's house at Shepherd's Hill, Buxted, Sussex.

S E R V I C E

As soon as an air liner has disgorged its load of passengers the service gang starts work. Above is a photograph of an Imperial Airways Handley-Page machine undergoing high-speed treatment. Under each engine is the telescopic travelling staging for routine examination, while in the foreground is a mobile tank unit delivering a fresh supply of petrol. Meanwhile the cabin is being cleaned out and the refreshment buffet supplied with a fresh stock. On pages 589-604 of this issue is an Information Supplement by C. D. Palmer and C. D. G. Nicholson on aerodromes and their equipment.



MEMORIAL

THE past fourteen days have seen two events mentioned in the news with what seems a less than worthy amount of space devoted to them. And, perhaps less remarkably, no suggestion has been made that it might be both possible and desirable to establish a link between the two.

At the beginning of April the Executive Committee which is considering suggestions for an appropriate memorial to King George held its first meeting. After this meeting it was announced that the 180 suggestions made had been reduced to seven—three for a statue in the centre of a large site and four advocating a philanthropic scheme. Upon the more detailed examination of these seven schemes a sub-committee is now engaged.

Almost simultaneously with this discussion of a memorial upon which the whole country feels most deeply, the first results were published of the L.C.C. Overcrowding Survey under the Housing Act, 1935. Those results show that over seven per cent. of the population of London are still living in conditions in which a full and healthy life is impossible.

In the opinion of this JOURNAL it would be impossible to find a memorial to his late Majesty more exactly suitable than a fine solution to the rehousing of the whole, or at least, of a substantial part, of these 70,000 families.

We are aware that objections facile, multitudinous and pointed may be encountered by such a proposal, and that risk of exposing to controversy a matter on which the public feel so widely and sincerely may seem to many a condemnation ready-made and overwhelming. But there is another point of view. Is there not a danger, by too determined a search for a tribute which has not a voice raised against it anywhere, that in the end the scheme which eventually passes through such a test may fail in the deeper expression of the tribute which the country would wish to pay to the memory of King George?

It has been suggested that a fund should be raised for purchasing property near the Houses of Parliament, and by the space so acquired both to make a more dignified setting for Parliament and a square dedicated to the memory of his late Majesty. The Government has notified its readiness to make a grant in aid should this scheme be approved.

No one can well deny that the site of Parliament would be vastly improved by this scheme's execution; the whole Empire would no doubt gladly contribute to it. But in breadth of imagination, even in depth of symbolism, is it not possible that something is lacking in this plan?

The improvement of the surroundings of Parliament is a thing that should be done, but it would seem to be a thing to be done rather as a matter of course and as a matter of self-respect by a great country, rather than achieved through the desire of a whole people to achieve a memorial suited to one of its greatest social servants.

Against this suggestion it may be perhaps maintained that the proper housing of the country's population is an exactly similar duty. That is true, but for one difference. The improvement of the surroundings of Parliament can be achieved at any time that Parliament so desires; and at a cost truly negligible in comparison with the nation's income. The rehousing of those too poor to rehouse themselves cannot be so disposed of. It is a duty only assumed in earnest, which, indeed, has only been generally realized as a duty, during the reign of King George V. Its accomplishment has already lasted years and will last for years to come.

The continuance of so great and costly a work needs a continuing inspiration. One portion of this work, placed in Central London where all the world could see it, and finely executed as a tribute to the memory of King George would provide this example and a memorial most exactly fitting.

That London should be so helped in a duty which is common to all cities is not inequitable, for the housing problem in London dwarfs that of all other cities. In cities of under a hundred thousand in population it is rare for open country of some kind to be beyond reach of a reasonable walk. In London the countryside is beyond reach of thousands. And the presence in London of a single and national housing scheme embodying all the knowledge, skill, and progress that seventeen years of research have brought to the solution of the housing problem would have an influence fourfold of the same effect spread throughout the country. The housing of the poorer citizens of the capital city of the Empire should be an example to the whole Empire.

This JOURNAL trusts that the Executive Committee considering the memorial to King George will weigh this suggestion with care. An open space about Parliament may do much to preserve the memory of King George V. It is respectfully suggested that an ideal city in miniature for London's poorer families, situated with equal prominence in Lambeth, Westminster or Vauxhall, with its cost in great measure paid for by the nation as a perpetual memorial to the late King, would prove a tribute even greater.

The Architects' Journal
Westminster, S.W.1
Telephones: Whitehall
9 2 1 1 - 7
Telegrams
Buildable
Parl
London

NOTES & TOPICS

NEWSPAPER ENTERPRISE

NEWSPAPERS do such strange things, which seem so little related to the primary purpose of newspapers, that one should not be surprised at anything they do, but the *Glasgow Weekly Herald* has surprised me considerably by starting a town-planning service.

*

Within recent weeks it has made suggestions as to how various towns should be planned, and now it has engaged the services of a Scottish architect and town-planner who has returned from America (his name is not given, but I can only think of one man who fits the description), and offers to supply any community with a plan suitable for its particular needs. All that is necessary is to apply to the "Town-planning Service Department."

*

This offer is embodied in an article full of the stock town-planning jargon, but a lot of it good sense, nevertheless; and adding an assurance that publicity will not be given to those using the service if they do not desire it.

*

Whether this is just a stunt or not, it is impossible to tell, but I do think that it is rather encouraging that town-planning should be considered of such public interest by a non-technical paper.

TRAVEL AND TEARS

Recently both Professor Richardson and Mr. Noel Carrington have wept over English railway station architecture, adding distinguished to the already copious tears shed upon stations.

*

The Professor looks back to the early accomplishments in the London termini and deplores the technical loss of a fine tradition—or at any rate of some half a dozen quite different beginnings which might have so developed.

*

Mr. Carrington looks to the future through the facts of today, gives the engineer his due of praise for fine locomotives and bridges, and tells him that through his training and career he has never understood the psychology of travel.

*

Which is all very true. And our railway stations will continue to be places we avoid whenever possible until that simple fact is realized. Mr. Charles Holden understood the main issues in connection with the new Underground stations, worked them down to detail and proved to us that travel (even below ground) need not be a miserable, dismal and shabby experience begotten solely of engineering formulæ.

EUSTON ROAD

Railway stations, of course, remind me of Euston Road, that thoroughfare of lost architectural causes. Kiosks barnacled on to the directness of King's Cross. St. Pancras to re-kindle the Gothic flame, which for some reason or other did not spread. St. Pancras Church likewise the Greek revival, which did have a slight echo towards the Gower Street end.

*

Then the brick period, which produced the most promising co-operation in the Society of Friends House, the L.C.C. Weights Office, Euston Telephone Exchange, and Nettlefolds' offices.

*

And now Mr. A. J. Thomas, in an interview last week, says, in describing his new St. Pancras Town Hall, that "mine will be more like a Government building than a Town Hall. A classical building on true architectural lines, it has no fads and fancies . . . a steel-framed and concreted fireproof structure of Corinthian design."

*

One of these days I shall make bold and deliberately walk along the whole length of Euston Road.

REALITY?

The problem of providing houses to sell at $3,000 each is disturbing architects and builders in America. Professor Vandervoort Walsh and Mr. Barry Wills discuss the difficulties at some length in *The Christian Science Monitor* of Boston.

*

The standard of equipment, we are told, has reached an almost impossibly high level, including air-conditioning and automatic stoking in addition to the luxury of one open fire, refrigerator, window blinds, lino floors, elaborate electric wiring and fittings, a gas stove, elaborate hardware and interior and exterior decoration.

*

Professor Walsh examines these demands of a highly conventionalized mode of living and dismisses the problem as insoluble—or, to use his own words, "largely a

Roofs at Cordoba, Spain. From a photograph by Eric S. de Maré

phantom chased by inventors, pre-fabricators of houses, architects and builders."

*

Mr. Wills, in an attempt at realism, chases a more phantom ideal than the Professor has even suggested—his conclusions are based on the old fallacy that one can safely disregard conventional life in entrenched villadom.

*

One sympathizes with Mr. Wills when he asks the public to throw over their conventions and approach the problem with an open mind. The trouble is that very few people will. The reality of the business is that most people simply will *not* be told how they ought to live.

RADIO ACOUSTICS

We are reminded from time to time of the elaborate experiments and tests which the B.B.C. does in arriving at the perfect studio.

*

Recently the meticulous comparative tests carried out at the Maida Vale studios have attracted attention in technical circles. The plain and the corrugated studios, for example, each have their champions in the argument.

*

These tests must have been of great value to the B.B.C. It seems a pity that some detailed report is not popularly published and given publicity for the benefit of the building industry and the public at large.

TOO MANY CINEMAS

According to reports the cinema proprietors of Lancashire are alarmed at the present wave of building new cinemas all over the country, and the announcement of a plan to build yet fifty more is apparently likely to lead to organized opposition. In some towns it is said that the ridiculous state has been reached of the number of cinema seats approaching the number of the population.

*

It is difficult to account for a cinema building boom in a county suffering so much from industrial depression; silent mills and super-cinemas seem strange companions.

SLATE

From Wales comes a complaint of the declining use of slates for roofing. Competition from both clay and cement tiles complicates the position, and the modern habit of eliminating all these bits and pieces from a roof does not help the slate quarries.

*

Technical research is reducing the cost of almost every type of roofing other than slate, while the slate quarries obviously must work under increasing difficulties as they go deeper and wider.

*

Geologically, at any rate, nature has been singularly lax in applying standardization and pre-fabrication methods.

CANALS FOR PLEASURE

For years I have regretted that the Grand Union Canal, which has its delightful and interesting stretches in London and elsewhere, has not been available for pleasure.

*

Now I read that the G.U. Canal Company is to spend many thousands in making the reservoirs at Ruislip and Elstree into bathing resorts—into Lidos.

*

In London at any rate the Company has of late expended much money on strengthening the banks against the wash of the modern screw-driven barge. Now that this is done is there any reason why suitably controlled private boats should not be allowed on the canals, with private boathouses in approved positions?

*

And the old cul-de-sac branch leading from Regent's Park to the Cumberland Market site might be turned to some pleasurable use. It has great possibilities, is large enough to be attractive and yet small enough for easy control. And its brief length passes through as interesting a variety of scene as the most indolent oarsman may expect.

ESSAY PRIZES

The open essay prizes given both by the R.I.B.A. and the A.A. have produced works on a very wide range of subjects, and, because the choice is open, have on occasion given us profound words on a subject of particular appeal to its proposer and essayist.

*

Sir Banister Fletcher has recently very generously offered a silver medal and £25 annually for essays by probationers and students of the R.I.B.A.

*

But the essay title each year is to be decided not by the individual student, but by examiners. The title this year, "The influence of Northern Italian Romanesque Architecture on the development of later medieval building in France and Germany" makes one nervous of the prize's reception by the present-day student.

ASTRAGAL

In this issue we publish the ninth of our series of Information Supplements. This Supplement is devoted to aerodromes and their equipment. Working Details and Trade Notes have been held over until next week.

NEWS

POINTS FROM THIS ISSUE

COUNCIL OFFICES, HARROW

The Harrow Council has accepted the winning design of the architect, Mr. Verner O. Rees, in the recent competition for the new Council offices at Kynaston Court; and application is now to be made to the Ministry of Health for the borrowing of the sum of £73,981 for the work.

£250,000 KENSINGTON SCHEME

A new building of shops and flats is to replace fourteen shop properties on the east side of Sloane Street, at the Knightsbridge end. It will rise to about 80 feet and have a 260-ft. frontage. The ground and first floors will be occupied by shops and showrooms, with 60 flats on five storeys above. The cost of the rebuilding is estimated at £250,000.

SOUTHEND'S £220,000 SCHEME

The Southend Council proposes to spend £220,000 on extending the parade from Westcliff to Leigh and reclaiming a large part of the foreshore for sunbathing beaches, games and a pavilion.

SHEFFIELD ARCHITECTS AT DINNER

"The proposed Sheffield Assize Court and the proposed theatre for Sheffield should be designed by local architects, and built by local firms employing Sheffield workmen." This statement was made by Mr. F. J. Coddington at the annual dinner of the Sheffield and South Yorkshire District of Architects and Surveyors. "I am," he continued, "a great believer in the circulation of money in Sheffield—a circulation that has its reflection in the pockets of the ratepayers."

Mr. Percy Thomas, P.R.I.B.A., said he understood the centre of Sheffield was going to be replanned. He suggested a competition among architects would be a very useful thing in obtaining ideas for that development. "I am one of those who believe that architects, with their trained vision, are the people who are most competent to deal with the planning of the central area of a great city. I am sure you would find the results justified the experiment."

THE ARCHITECTS' DIARY

Thursday, April 16

INSTITUTION OF STRUCTURAL ENGINEERS. *Yorkshire Branch. At the Hotel Metropole, Leeds. "Modern Trusses and Frames." By J. B. M. Hay.* 7 *p.m.*

HOUSING CENTRE, 13 *Suffolk Street, S.W.1. Exhibition of Working Class Housing. To be opened by Lewis Silkin (Chairman of the Housing Committee of the L.C.C.), at* 8 *p.m.*

IDEAL HOME EXHIBITION. *At Olympia. Until April* 18. 10 *a.m. to* 10 *p.m.*

Friday, April 17

ROYAL SANITARY INSTITUTE. *At the Guildhall, Swansea. Discussions on "The Co-ordination of General Hospital Services and the Provision of Additional Accommodation" (to be opened by Professor R. M. F. Picken), and "The Co-ordination of Housing, Rehousing and Redevelopment under the Housing Acts with Regional and Town Planning" (to be opened by W. Hunter).* 2.45 *p.m.*

Saturday, April 18

LONDON SOCIETY. *Visit to Fishmongers' Hall, London Bridge, E.C.4.* 2.30 *p.m. Also visit to the South Western Stone Company, New Road, S.W.11.* 2.30 *p.m.*

Monday, April 20

R.I.B.A., 66 *Portland Place, W.1. "Library Planning." By Harold A. Dod.* 8 *p.m.*

ROYAL SOCIETY OF ARTS, *John Street, Adelphi, W.C.2. "Problems of Road Research." By R. E. Stradling.* 8 *p.m.*

Wednesday, April 22

ROYAL SOCIETY OF ARTS, *John Street, Adelphi, W.C.2. "The Port of Liverpool." By Sir Percy Douglas.* 8 *p.m.*

Thursday, April 23

INCORPORATED ASSOCIATION OF ARCHITECTS AND SURVEYORS. *Visit to Watney's Brewery Mortlake.*

Friday, April 24

TOWN PLANNING INSTITUTE. *At Caxton Hall, Caxton Street, S.W.1. "Some Practical Planning Problems." By T. F. Thompson.* 6 *p.m.*

Saturday, April 25

LONDON SOCIETY. *Visit to Hornsey Town Hall.* 2.45 *p.m.*

Tuesday, April 28

R.I.B.A., 66 *Portland Place, W.1. Exhibition of architects' working drawings. Until Tuesday, May 5, between the hours of* 10 *a.m. and* 8 *p.m. (Saturdays* 5 *p.m.). Also, a special students' evening at* 8 *p.m.*

SOUTH-EASTERN SOCIETY OF ARCHITECTS. *At* 1 *Edridge Road, Croydon. "Architectural Lighting." By R. Waldo Maitland.* 8 *p.m.*

Thursday, April 30

SOCIETY OF ANTIQUARIES, *Burlington House, Piccadilly, W.1. "Excavations in Pin Hole Cave, Creswell Crags, Derbyshire." By A. L. Armstrong.* 8.30 *p.m.*

SCOTTISH ARCHITECTS

At the last meeting of the Council of the Royal Incorporation of Architects in Scotland, held at 15, Rutland Square, Edinburgh, it was decided to hold the annual convention in Aberdeen on June 12 and 13. The following new members were elected: Mr. J. C. Cunningham, St. Andrews, as Fellow; Mr. James Hutchon, Dundee; Mr. A. B. Kerr, Edinburgh; Mr. W. F. Milne, Dundee; and Mr. H. Paterson, Glasgow, as Associates; and Messrs. A. A. Dixon, W. Logan, J. Ratcliffe, P. Turnbull, and F. A. Walker, Edinburgh, and Messrs. D. G. Keir and R. J. Robertson, Glasgow, as students.

SOUTH WALES INSTITUTE OF ARCHITECTS

The annual general meeting of the South Wales Institute of Architects was held recently at Cardiff, under the chairmanship of Mr. W. S. Purchon, F.R.I.B.A.

Mr. Purchon said that they had heard with pleasure of the competitions for the Newport civic buildings and for the Glamorgan County Council hospital. Some of them advocated a competition for the Cardiff station approach, but were glad to hear that Mr. Thomas had been appointed as consultant architect for that work.

The past year had been a memorable one in their annals, as for the first time a provincial architect was elected President of the R.I.B.A. He was one of their members—Mr. Percy Thomas. He was doing the important administrative work of that high office as well as he did his architecture.

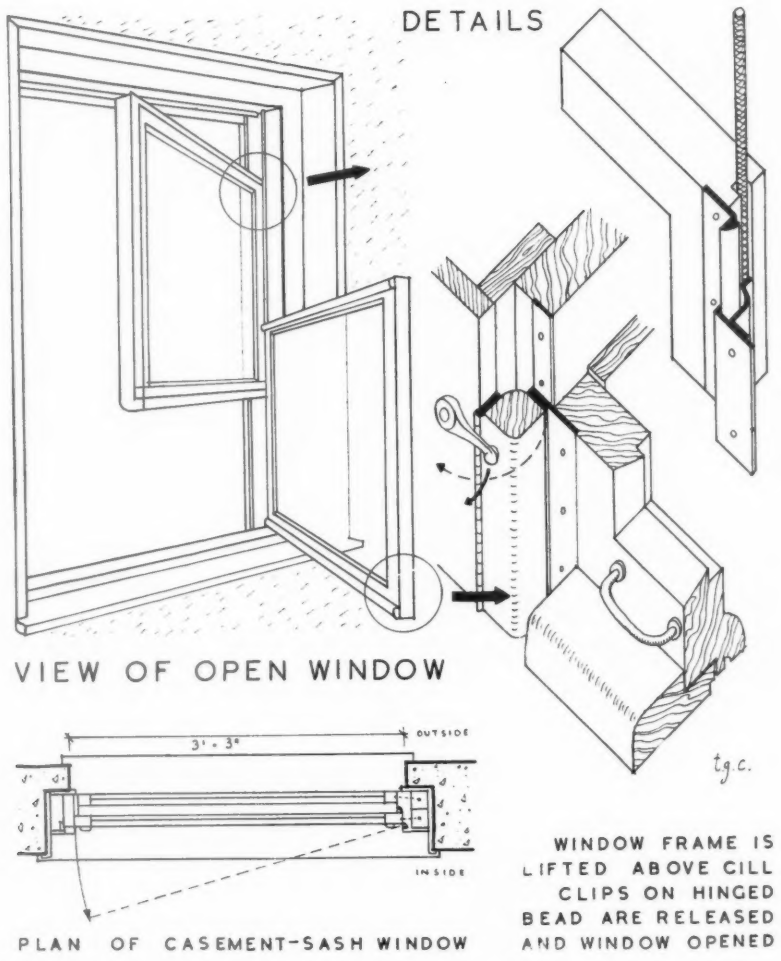
He also stated that, at the dinner of the South Wales branch of the Federation of Building Trades Employers, he threw out the suggestion that they might with advantage form a committee representative of architects, builders, and craftsmen, not to deal with controversial matters such as wages and the like, but with the object of arousing increased interest in the various aspects of their work and of developing their understanding of each other by means of lectures, discussions, visits to buildings, and meetings for social intercourse. He had followed this up with a letter to the secretary of the local branch of the Federation of Building Trades Employers, and he trusted that something definite would result during his term of office.

The following officers were elected: President, Mr. W. S. Purchon, M.A., F.R.I.B.A.; vice-presidents, Lieut.-col. E. H. Fawckner, T.D., F.R.I.B.A., and Mr. O. S. Portsmouth, A.R.I.B.A.; hon. treasurer, Mr. H. Teather, F.R.I.B.A.; hon. auditor, Mr. Edwin Smith, A.R.I.B.A., P.A.S.I.; hon. librarian, Mr. Lewis John, M.A., A.R.I.B.A.; hon. secretary, Mr. Ivor P. Jones, A.R.I.B.A.

THE DECORATION OF SHIPS

The *Orion* and the *Queen Mary* were fully discussed by Mr. John De La Vallette in a paper entitled "The Fitment and Decoration of Ships" read before a recent meeting of the Royal Society of Arts. Extracts from the paper are printed below:—

"The *Orion* is very good as a passenger



Patent casement-sash window. (*Sturmann and Co., Düsseldorf.*)

ship, because one cannot help feeling that, even to those who may not like certain of her decorative details, she will, after a couple of days on board, prove to be a comfortable, unassuming ship, which does not all the time force one to be in ecstasy about either art or industry. If she is, in my submission, not a perfect specimen of her type, it is because her architect does not make one feel that he has yet found his sea-legs at this work. The ship is still too much a replica of a shore 'period' style, even though that style be '1933' instead of any special 'Louis.' The point I am alluding to is not very apparent in the first class or the tourist dining-rooms, both, it seems to me, pleasant places for their purpose, but, for instance, in the Long Gallery. You will observe the needless angularity of this apartment, the sheer and camber lines which could have added grace to it, as they do to similar rooms in the *Queen Mary*, having been wilfully obliterated. This, clearly, is a survival of modern land architecture which entails too great an addiction to the T-square, and too little appreciation of graceful curves. Again, the fitments in the special cabins are comfortable, but shore practice has here again designed bookcases from which the books are bound to slide as soon as the ship rolls.

"Even so, one feels strongly that the architect is on the right lines, and we can only hope that the managers of the Orient Line will continue their connection with him in their next building contracts, so that their collaboration, so happily begun, may mature, as all good things mature, by further experience and exertion. The only thing one would plead for is that on future occasions the use of materials which are entirely unsuitable in ships should be avoided. I am referring to such things as the big glass panels which are now sometimes also misused on land. On board they seem even more out of place, unless one really likes to see strange animals and alleged human beings crawling over the reflection of all the rest of the room.

"The *Queen Mary* seems to me the perfect embodiment of British views on what a passenger ship should be, both technically and decoratively. She was conceived in the right way, and her design, as well as the completion of every detail, were supervised in accordance with certain fixed general principles, firmly held in view.

"Those principles resolved themselves into three :—

"1. The ship's structure and means of propulsion should be such as to enable her to perform with unfailing reliability the service that was demanded of her. This service was to accomplish in all weathers, all the year round, a fortnightly service between Southampton and New York, instead of the three-weekly departures hitherto maintained by the fastest ships afloat.

"2. Next, her passenger accommodation was to embody everything which the long and carefully recorded experience of the two greatest transatlantic shipping companies in the world could suggest as useful or attractive to passengers.

"3. In the fitment and decorations absolute comfort should be aimed at in combination with distinction and grace, while a sense of unity should prevail throughout all the variety which would be achieved.

"To solve such great problems, problems which prior to the laying down of the *Queen Mary's* keel no shipowner in the world had ever attempted to solve, required utilizing the best brains and experience which this country can muster. It therefore entailed an enormous amount of committee work. It stands to the lasting credit of the Board and management of the company that, with so many different experts to consider, the final decisions were so sternly controlled at the centre that complete unity of conception was enabled to prevail.

"The next impression was that of a complete absence of any attempt at perpetrating 'stunts' to strike the idle imagination. I have not come across any detail which does not reasonably spring from either some practical, or a perfectly sound artistic consideration. It is this guiding principle which has enabled the Board of the Company to maintain cohesion in the vast mass of decorative and artistic work carried out by a great number of artists.

"The sculptors seem to me to have splendidly entered into the essentials of their tasks. Spirited as their respective contributions are, they all fall peacefully into their surroundings. In no place do they attempt to jut into prominence. Their works are intended to lighten and break up big spaces. This they do very pleasingly—but the big surfaces are still the essence of the effect. Not all the painters seem to me to have equally grasped the need for their subordination to their surroundings. They have made good pictures, but often they might just as effectively be shown elsewhere, or other pictures put here.

"The big effects depend everywhere entirely upon the beautiful disposition of the spaces, and the magnificent, yet utterly simple, treatment of the walls, ceilings and lighting effects. The veneered woods have been selected with a sound eye, not merely to their preciousness, but to their natural effects. The artificial patterning of timber, so repellent to all who have a liking for natural woods, is here completely absent."

OBITUARY

We regret to record the death, at the age of seventy-seven, of Mr. Joseph Crouch, Retired Fellow of the R.I.B.A.

Mr. Crouch was born at Birmingham and

received his architectural training at the Birmingham School of Architecture and the South Kensington Schools. He commenced private practice in Birmingham in 1885, and, since that year, has been responsible for the design of numerous public buildings throughout the country, including: public baths, Birmingham; municipal buildings and library, Rawtenstall; Grammar School, Barnsley; Training College, Dudley; Art Gallery and Library, Manchester; and churches, schools, etc.

He was elected a Fellow of the Institute in 1913 and retired from active practice last year.

HOUSING PROGRESS

LONDON

ON Tuesday of last week the London County Council had before it a detailed report by the Housing and Town Planning Committee on the overcrowding problem in London, as disclosed by a survey made in compliance with the Housing Act, 1935, which required every local authority in the country to have its district inspected to ascertain what working class dwelling-houses were overcrowded on the standard laid down in the Act. The results of the survey, with an introductory memorandum by the Clerk of the Council, are contained in a volume entitled *County of London Overcrowding Survey*, which is published by the Council and can be obtained from the Council's publishers (P. S. King & Son), price 1s.

To expedite the survey the Council discussed with the metropolitan borough councils their proposals for employing additional staff and approved the number to be engaged in each borough. To ensure, as far as possible, that the survey should be carried out in a uniform manner, the County Council supplied a code of instructions to the staff engaged on the work and the necessary forms.

An enumeration was made in respect of about 652,000 separate houses occupied by more than 1,014,000 families and the floor area was measured in all the rooms in some 132,000 houses in which doubtful cases of overcrowding had been disclosed by the preliminary enumeration to ascertain definitely whether the families occupying the rooms were or were not overcrowded on the standard laid down.

The survey started on November 1, 1935, and was completed in all the boroughs by the first week in February, 1936—two months in advance of the date (April 1, 1936) fixed by the Minister of Health for the completion of the survey. Over 1,000 additional staff were engaged for the work and the wages paid amounted to £23,570.

The survey has disclosed that, of more than 1,014,000 *families* of which particulars have been obtained, over 70,900 (about 7 per cent.) are living in overcrowded conditions, more than 57,000 (about 5.7 per cent.) occupy accommodation of the minimum size required by the Act, and some 886,000 (about 87.3 per cent.) have accommodation in excess of that standard. The number of *persons* living in overcrowded conditions is 9.1 per cent. of the total population of London.

Statistical Record of the Survey

From the information obtained as a result of the survey, the Council has published statistics which show the accommodation occupied by the working-class families in each metropolitan borough, together with a composite return for the County of London as a whole.

The overcrowding standard laid down in the Act provides that there must be sufficient accommodation to secure proper sex-separation and fixes the maximum number of persons who may be permitted to sleep in the house.

The Minister of Health in an explanatory memorandum on the Act says "It is relevant to point out that the standard does not represent any ideal standard of housing, but the minimum which is in the view of Parliament tolerable while at the same time capable of immediate or early enforcement."

The Extent and Incidence of Overcrowding

Table 1 shows the number of working-class families in London classified according to size (children under 10 counting as half a person).

To give a comparative indication of the incidence of overcrowding in the County of London, the Council has prepared statistics showing the proportion of the population in each borough which is living in overcrowded conditions.

Shoreditch, Stepney, Bethnal Green and Finsbury are the four boroughs with the highest proportion of overcrowding, the four lowest being Hampstead, Hackney, Wandsworth and Woolwich. Details are given below :—

	Percentage of families overcrowded	*Percentage of total population overcrowded*
Shoreditch ..	17·2	23·6
Stepney ..	15·5	19·7
Bethnal Green	15·0	21·7
Finsbury ..	15·0	20·5

The four boroughs in which the proportion of overcrowding is lowest are :—

	Percentage of families overcrowded	*Percentage of total population overcrowded*
Hampstead ..	2·5	2·4
Hackney ..	2·4	6·9
Wandsworth	2·2	3·2
Woolwich ..	1·7	2·7

Of the 70,900 odd overcrowded families in London, some 53,900 live in two or three rooms.

Persons in Family	Over-crowded	Not over-crowded	Total
1	228	150,786	151,014
1½ ..	113	2,803	2,916
2	1,957	265,502	267,459
2½ ..	3,264	79,817	83,081
3	3,179	179,604	182,783
3½ ..	10,140	35,218	45,358
4	12,064	97,098	109,162
4½ ..	3,885	21,024	24,909
5	5,926	54,375	60,301
5½ ..	6,078	10,985	17,063
6	8,086	21,493	29,579
6½ ..	3,452	5,478	8,930
7	3,935	9,926	13,861
7½ ..	1,869	2,838	4,707
8	2,994	3,298	6,292
8½ ..	1,274	944	2,218
9	1,042	1,354	2,396
9½ ..	501	311	812
10	445	404	849
10½ ..	213	104	317
11	143	130	273
11½ ..	65	29	94
12	47	72	119
12½ ..	20	16	36
13 and over	33	71	104
Totals	70,953	943,680	1,014,633

Table 1

Density of Overcrowding

In considering the overcrowding problem an important factor, in addition to the numbers of families overcrowded and the sizes of the dwellings which are overcrowded, is the density of overcrowding. Table 2 shows the numbers of families living at densities of more than 2, 3, 4, etc., "equivalent persons" a room (i.e. counting children under 10 as half a person) in dwellings of various sizes.

In reading the figures in table two it must be remembered that the numbers, at any degree of overcrowding, include all those at higher degrees; thus the number at more than 3 "equivalent persons" a room includes those at more than 4 "equivalent persons" a room, and so on.

	Number of overcrowded families occupying dwellings consisting of approximately					Total over-crowded families
	1 room	2 rooms	3 rooms	4 rooms	5 or more rooms	
	9,020	33,532	20,368	7,183	850	70,953
Living more than—						
2 "equivalent persons" a room ..	6,722	11,576	6,659	2,150	260	27,367
3 "equivalent persons" a room ..	1,274	1,615	189	7	—	3,085
4 "equivalent persons" a room ..	366	140	3	—	—	509
5 "equivalent persons" a room ..	120	7	—	—	—	127
6 "equivalent persons" a room ..	37	—	—	—	—	37
7 "equivalent persons" a room ..	10	—	—	—	—	10
8 "equivalent persons" a room ..	3	—	—	—	—	3

Table 2

The survey shows that there has been a considerable improvement in the position as regards overcrowding in London since 1931. During the period 1921-31 the number of families overcrowded in London on the basis of more than two persons a room fell from 110,496 to 89,600, a decrease of 20,896, or 19 per cent., and the survey results indicate that the number of overcrowded families has continued to decrease. Since the census of 1931, about 30,000 additional dwellings have been provided in London, including many provided by the Council and the metropolitan borough councils in place of unfit dwellings demolished under slum clearance schemes.

The Next Stage

The metropolitan borough councils are now preparing their estimates of the numbers of new dwellings required to abate the overcrowding in their respective boroughs. When these estimates have been collated and examined the next task will be for the L.C.C., in conjunction with the metropolitan borough councils, to submit to the Minister of Health proposals for providing the accommodation required to abate the overcrowding disclosed.

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HACKNEY MARSHES

At the same meeting of the L.C.C., the following recommendations put forward by the Housing and Public Health Committee and the Parks Committee were accepted by 67 votes to 34 :—

"That application be made for the granting of powers in the session of Parliament, 1935-36 (i) to enable the Council to utilize for housing purposes a portion, about 30 acres in extent, of Hackney Marsh, . . . (ii) to provide that the Council shall utilize as public open space the land, about 50 acres in extent, now forming part of the Chigwell housing site, . . .; (iii) to provide that the Council may, with the consent of the Minister of Health, substitute as public open space such other land in lieu of land at Chigwell as the Council may determine; and (iv) to provide for any incidental matters in connection therewith."

SCOTLAND

The following extracts dealing with housing and town planning in Scotland during 1935 are reproduced from the annual report of the Department of Health for Scotland (H.M. Stationery Office, price 3d.) :—

"Substantial housing progress was made during the year. The output of houses during 1935 by local authorities—18,651—was the highest ever achieved, and the number of houses built with State aid since 1919 has now reached the total of 200,284. These accommodate probably a fifth of the total population of Scotland. Altogether over 235,000 working-class houses, with and without State aid, have been built in Scotland since 1919. Progress in slum clearance during 1935 was specially gratifying; of the total output of houses by local authorities, over 15,000 were built under slum-clearance schemes; and the local authorities have now completed, after only two years' work, 37 per cent. of their total programme to clear the slums within five years. An excellent start has been made also in bringing into action the programmes of local authorities, under the Housing Act of 1935, for the relief of overcrowding; and it can be said that the campaign to raise the standard of housing in Scotland to a reasonable level is progressing more determinedly and confidently than at any time since the national post-war housing movement began. The Department is endeavouring to secure that the new housing schemes will achieve a high standard in lay-out and design. Something more than hygienic and comfortable accommodation is required. Upwards of 20,000 houses will probably be built every year. To make their full contribution to civic life and to avoid creating problems for the coming generation, the schemes must be laid out, planned and designed with an eye to outward appearance, amenity and civic convenience. Housing sites must be chosen so as to fit in with town and regional plans and they must be laid out and the houses designed by competent architects. The local authorities are responding in an encouraging way to the Department's efforts to secure that the housing schemes are architecturally satisfying, and several noteworthy examples of well-laid-out schemes are referred to in this Report. Scotland is still slow, however, to rise to the need for well-ordered town and country planning schemes and a new drive is wanted."

COMPETITION NEWS

THE SOUTHPORT COMPETITION

We are informed that thirty-seven designs were submitted in the competition for police headquarters, fire station and courts for the Southport Corporation. The result is shortly to be announced.

COMPETITION RESULT

Sir Felix Clay, F.R.I.B.A., the assessor of the competition for the new High School for Girls at Boston, Lincolnshire, has awarded the first prize to the design submitted by Mr. Thomas F. Trower, L.R.I.B.A., of Elsom House, Broad Street, Spalding. The estimated cost of the building is £30,000.

A.A. COMPETITION

The announcement of the awards in the competition organized by the Architectural Association for the Cornish Quarry Masters Association will be made at a meeting to be held at 36 Bedford Square, W.C.2, at 6 p.m. on Wednesday, April 22.

GRAMMAR SCHOOL, DONCASTER

Conditions of the limited competition for a new grammar school in Doncaster have recently been issued. The promoters are the Doncaster Town Council, the Education Committee and the Governors of the School, and the competition is open to registered architects in private practice having offices in the Doncaster district on January 1, 1935; to any old boy of the Doncaster Grammar School who is a registered architect and in private practice; and to the following architects who have been nominated by the President of the R.I.B.A. : Messrs. C. T. Adshead, A.R.I.B.A.; Leonard Barnish, F.R.I.B.A.; Buckland and Haywood, FF.R.I.B.A.; J. R. Leathart, F.R.I.B.A.; Tatchell and Wilson, FF.R.I.B.A.; and William and T. R. Milburn, FF.R.I.B.A. The assessor is Professor W. G. Newton, F.R.I.B.A.; and the following premiums are offered : £200, £100 and £75. The last day for questions is Wednesday next, April 22; and the latest date for submission of designs is June 17. Conditions of the competition are obtainable from Mr. G. R. H. Danby, M.A., Secretary, Education Offices, Doncaster. (Deposit £1 1s.)

Competitions Open

May 18.—Sending-in Day. Sub-fire station to be erected at Erdington for the Birmingham Corporation. (Open to architects of British nationality practising in the City of Birmingham.) The last day for applications was March 16. Assessor : T. Cecil Howitt, F.R.I.B.A. Premiums : £100 and £50. Designs to be submitted to Mr. Herbert J. Manzoni, City Engineer and Surveyor, Council House, Birmingham, 2, by May 18.

May 22.—Sending-in Day. Five-apartment semi-detached cottage for the Glasgow Corporation in connection with the Housing and Health Exhibition to be held at Kelvin Hall, Glasgow, in October (open to architects practising in Scotland). Assessors : J. M'Kissack, W. B. M'Nab and J. H. Fernie. Premiums : £75, £50, and £25. The designs must be sent to the Manager, Kelvin Hall, Glasgow, not later than May 22, 1936.

May 25.—Sending-in Day. Public health hospital at Church, near Pontypridd, for the Glamorgan County Council. (Open to architects of British nationality.) Assessors : E. Stanley Hall and W. James Nash, FF.R.I.B.A. Premiums : £500, £300 and £150. The last day for questions was February 28. Conditions are obtainable from the Clerk to the County Council, Glamorgan County Hall, Cardiff. (Deposit £1 1s.)

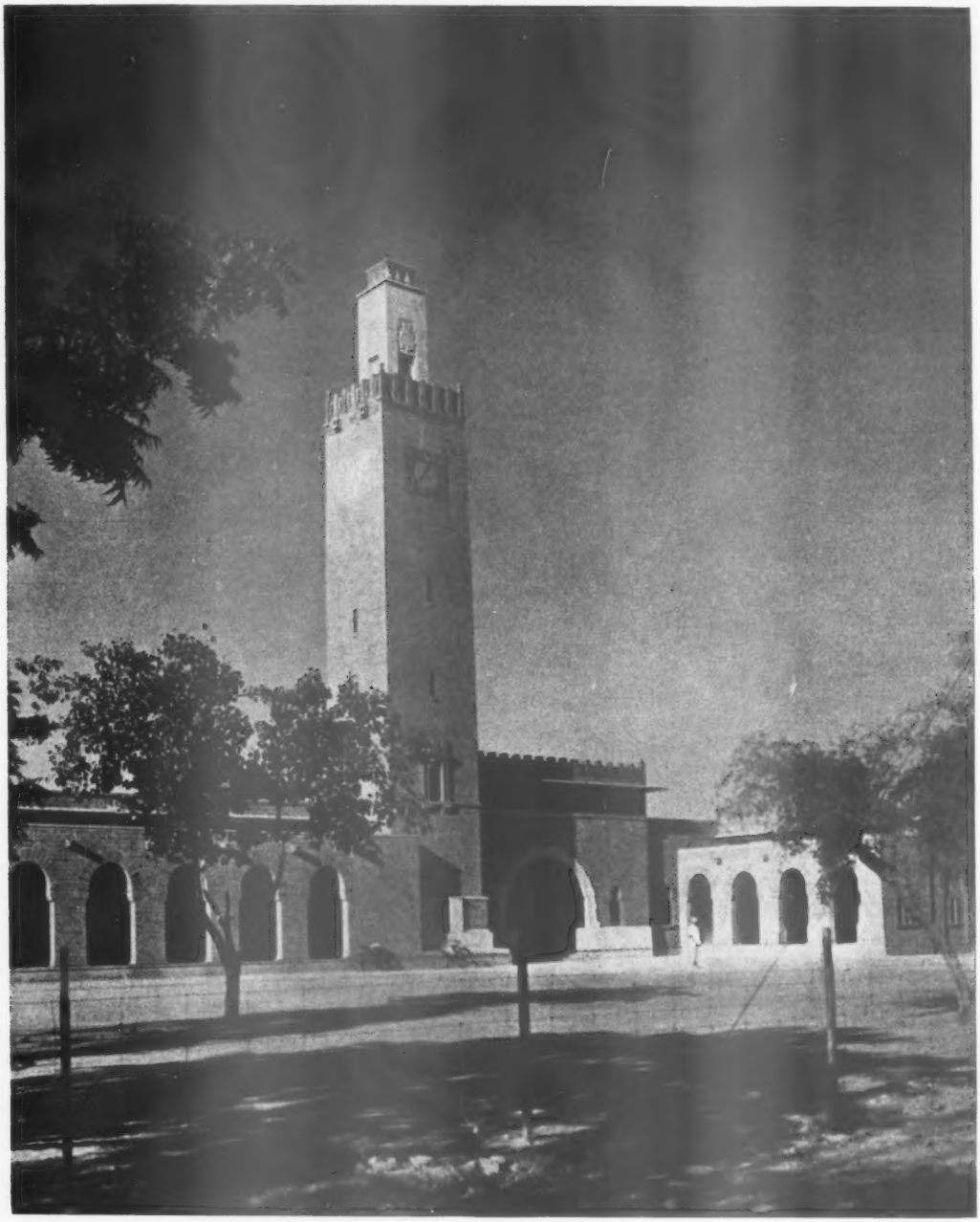
May 27.—Sending-in Day. Secondary school for boys at Luton for the Bedfordshire County Council. Assessor : Professor W. G. Newton, F.R.I.B.A. Premiums : £200, £100 and £50. The last day for questions was March 25. Conditions are obtainable from Mr. J. B. Graham, Clerk of the Bedfordshire County Council, Shire Hall, Bedford. (Deposit £1 1s.)

June 1.—Sending-in Day. Public elementary schools, to accommodate 650 children, to be erected at Surrenden Road, Folkestone, for the Folkestone Borough Council. (Open to architects of British nationality.) Assessor: Verner O. Rees, F.R.I.B.A. Premiums : £200, £125 and £75. The last day for questions was March 31. Conditions are obtainable from Mr. J. A. Wilkinson, Clerk of the Folkestone Borough Education Committee, Education Offices, Old Harvey Grammar School, Foord Road, Folkestone. (Deposit £1 1s.)

July 11.—Sending-in Day. Working-class flats to be erected, in concrete, on the Emily Street and Vaughton Street area, for the Public Works and Town Planning Committee of the Birmingham Corporation. (Open to architects of British nationality.) Assessor : Louis de Soissons, F.R.I.B.A. Premiums : £400, £250, £150 and £100. Conditions are obtainable from Mr. Herbert J. Manzoni, City Engineer and Surveyor, Council House, Birmingham, 2. (Deposit £2 2s.) The last day for applications was April 11, 1936.

September 14.—Sending-in Day. Town hall and municipal buildings, Barking, for the Barking Corporation. (Open to architects practising in the United Kingdom.) Assessor : H. V. Lanchester, F.R.I.B.A. Premiums : £500, £250 and £200 for distribution as recommended by the assessor. The last day for questions is May 1. Conditions are obtainable from Mr. S. A. Jewers, Town Clerk, Town Hall, Barking. (Deposit £2 2s.)

MUSLIM SCHOOL, JODHPUR:



GENERAL PROBLEM.—*The Jodhpur Government School for boys of the Muslim Community. The school is non-residential, and has been built to the order of Lt.-Col. His Highness the Maharaja Sir Umaid Singhji, Ruler of Jodhpur, and under the supervision of Mr. S. G. Edgar, Public Works Minister of the Jodhpur Government and his staff.*

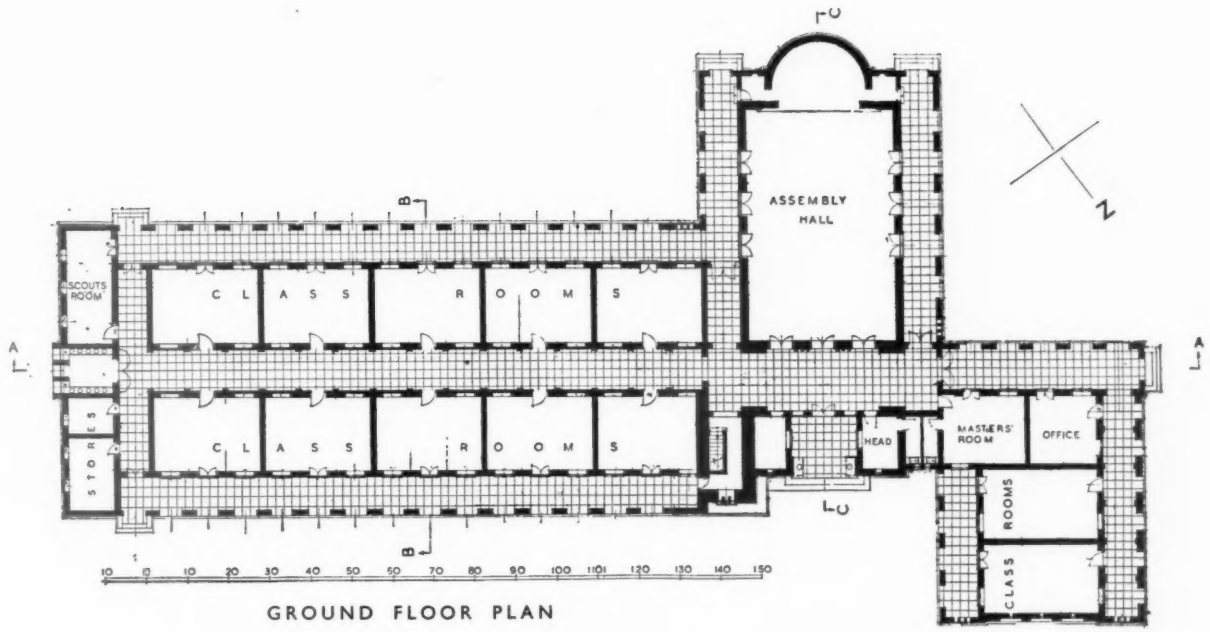
SITE.—*A large triangular one, subject to intense heat in the summer, and very heavy tropical storms. The shape of the site, and the climatic conditions prevailing suggested an L-shaped building, with verandas on all sides and flat roofs.*

PLAN.—*The main portion of the school, shown on the accompanying drawings, has been built. Future extensions will be made on the shorter axis of the building and will balance the class rooms in the longer wing, with the tower and entrance in the centre of the scheme. In the class rooms, which are planned to avoid direct sunlight, side lighting is obtained from windows in the verandas and corridors and clerestory lighting from windows above the verandas and corridors. The upper windows are protected from the sun by a projecting slab. The balcony in the assembly hall is provided with a curtain to screen the faces of the Purdah women from public view during school functions.*

The photograph is of the main front, showing the verandas to the class rooms, the tower and the entrance archway.

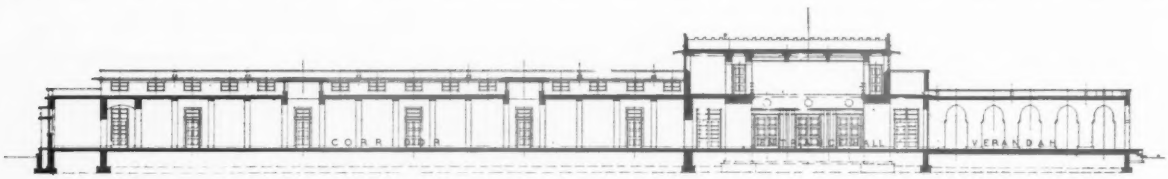
DESIGNED BY SHEIKH ABDUL HAMID

A detail of the entrance arch.

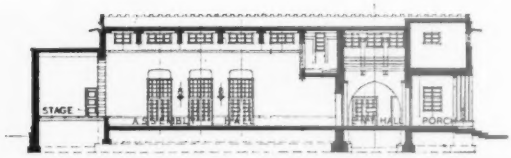


GROUND FLOOR PLAN

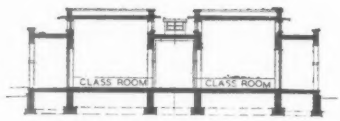
MUSLIM SCHOOL, JODHPUR



LONGITUDINAL SECTION THROUGH CENTRE CORRIDOR



SECTION THROUGH ASSEMBLY HALL



SECTION THROUGH CLASSROOMS

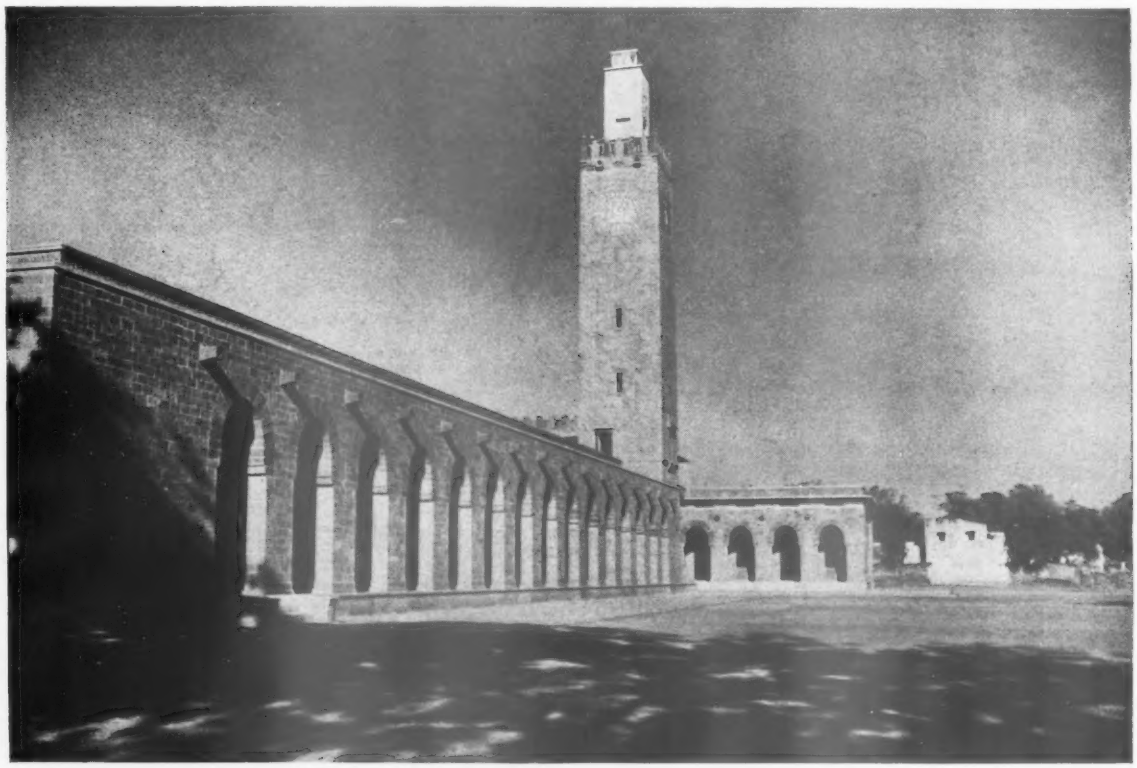
CONSTRUCTION.—*The school is built in local stone by local craftsmen. Jodhpur is well known for its export trade in stones and marbles, and for the skill of its craftsmen, which has been shown in Saracenic work during many centuries.*

The walls are of red sandstone, built in courses 6 ins. deep, and the dressings are of white stone, known locally as sursagar. The floors and roofs are stone slabs, 4 ins. thick, supported on steel joists of 10 ft. span and covered with a layer of concrete and "rastal" 6 ins. thick. The floors of the assembly hall and the entrance hall are finished with terrazzo tiles; the floors of the classrooms are in cement; the verandas are stone-paved.

The tower is supported on a reinforced concrete foundation and is entasised. The lower portion is built in cement mortar, and the upper portion in lime mortar to allow for movement of the tower from wind pressure. Electric light is installed throughout the building, and the heating, which is seldom used, is by electric radiators.

ELEVATIONAL TREATMENT.—*The arched verandas, the entrance arch, with its Arabic lettering and the tower of "Minaret" type, maintain the Eastern character of the building.*

The photograph is a general view of the main front.



DESIGNED BY SHEIKH ABDUL HAMID

TOWN HALLS

Departments *(continued)*

SMALLER DEPARTMENTS AND ASSEMBLY HALL

The Engineers and Surveyors Department

THE general arrangement of this section should follow the usual office layout which is found in architectural offices, but with larger rooms for the storage of plans.

A limited number of people visit the main inquiry office, the building inspector's room and, in large towns, the estates management room of this department.

The department should be placed to obtain a good north light for the drawing office and not primarily for the convenience of visitors.

The drawing office should have a fireproof plan store near it, and in large schemes a room for a photo-printing machine. This room need not have first quality daylight, but should be well ventilated and provided with a sink and a drying rack on one wall. A room for sample building materials is sometimes provided.

The building superintendent's offices should be placed adjoining the general inquiry and waiting rooms.

Large fireproof store rooms must be provided in the basement, in addition to the storage for current plans provided in the department.

The remaining rooms do not require any special planning, and accommodation should be provided in large schemes for the city engineer, deputy engineer, secretary, clerks' office, architect's drawing office, engineer's drawing office, town planning officer, sewage engineer, water engineer, estates department inquiry and waiting rooms, together with filing and storage room.

The department should be kept in the municipal offices if possible. Consultations are frequently held between the surveyor, the town clerk and the treasurer.

Small Departments

There are usually a number of small departments in the town hall, administering the parks, waterways, allotments, shops, markets, information and publicity of the town, weights and measures and registration of births, deaths and marriages.

With the exception of, perhaps, the weights and measures and the registration sections, these departments can be planned as normal offices.

The weights and measures inspector requires a store room near his office with easy access from the road, so that heavy weights can be moved to and from his store room without trouble.

The registrar's department may be placed on the ground floor or first floor near one of the entrances. A larger room is sometimes set apart for marriages and waiting, otherwise the department should occupy normal office accommodation.

General Departmental Planning

The general layout of all departments can be based on the following rules: (1) that rooms to be reached by the public should be placed near entrances from the street and staircases; (2) rooms for the heads of departments to be placed away from the public space; (3) secretaries' rooms should be *en suite* with the heads of the departments' rooms; (4) waiting and inquiry rooms should be provided for almost every department that the public visit; the best position for these rooms is between the general and the public offices. In small schemes the inquiry office may be combined with the waiting room and screened off from the general office. Access to the interview room may be through the general office or from the opposite side of the waiting room.

A very large amount of storage space is required in municipal offices for the preservation and storage of muniments, etc., and it is generally desirable to keep the current files in fireproof stores actually attached to the department, "dead" files only being stored in strong rooms in the basement. If possible, these strong rooms should be directly under and fairly accessible to the department to which they belong.

Addressing machines and such heavy gear should be placed in the basement if possible, so that their bases may be insulated against noise without need for expensive and costly construction.

The Caretaker's Quarters

The position of the caretaker's quarters is usually left rather vague in the majority of competition conditions. Usually the best position for the caretaker is in the municipal offices upon the top floor, and preferably near a lift. Care should also be taken that this accommodation is in a position where it is easy of access by a stairway.

The Relationship of the Various Departments

It is generally agreed by officials that, where possible, all the administrative departments should be planned as part of the municipal offices, or at least on the same site as the offices. This arrangement undoubtedly both allows for the most efficient administration and for easy expansion and rearrangement. If, however, the site is small, the public assistance committee's department, the medical officer and the education department could easily be detached from the scheme. The present system of the committees' working as heads of the departments makes this isolation possible; but it is necessary in this case to keep these departments, or, at least, their administrative quarters, near the municipal offices and in a central position, because visitors inquiring at the municipal offices for these departments should not be compelled to walk two or three miles to reach their destination. Also, in the case of the public assistance committee and the juvenile employment section of the education department, the treasurer is responsible for the paying out of money for all relief, and his representative generally carries the money to the departments and superintends the paying out.

D

THE ASSEMBLY HALL

THE insistence of local authorities on the assembly hall being a building of great flexibility and variation has made this part of the town hall most difficult to design. The so-called "all purpose" hall which sets out to cater for concerts, dances, political meetings, banquets, and dramatic performances, is attempting the impossible. A hall can be designed which will partially satisfy these varied conditions, but it can never do more than that. To dance under a balcony gives a feeling of claustrophobia, and to eat a banquet in the frowning face of vacant seats dissipates a sense of decorum.

The designer must make up his mind definitely what he intends the hall to be. The choice is very limited, because the hall may either be a fine chamber in the Regency sense, where dances, banquets and receptions may be held—or it may be used for concerts, dramatic performances or similiar entertainments. This rough division could be particularised—the theatre, for instance, requires different sight lines, acoustics and lighting from a concert hall, but it would be impossible to provide different types of halls for each requirement, and the grouping of the halls into either "banqueting rooms" or "concert halls" does allow the designer a better chance of creating a good-looking interior.

It is interesting to examine Mr. Percy Thomas's approach to the problem at Swansea Civic Centre, where the assembly hall has no balcony, and the walls are decorated to enhance the impression of a great hall rather than a concert room. The omission of the balcony has undoubtedly helped the appearance of the hall, and the problem has been tackled by the right approach, but it is very doubtful whether many town councils would allow so much room to be "wasted." A compromise might be made by having two halls—one with fixed seats and a balcony, and one, a fine room, some fifty by hundred feet with a flat floor, which could be used for dancing; but this suggestion would perhaps always be rejected on the grounds of economy. There do not seem to be any further solutions at present, and presumably the "all purpose" hall will continue to be barely capable of fulfilling any of its varied functions.

This lack of success is not through any lack of trying, because most of the best designers have attempted to provide concert and meeting halls in which banquets and dances can be gracefully held. The presence of the balcony is the chief difficulty; the extra wide proscenium opening which choral work requires can be masked off by curtains.

The design of a comparatively small hall is easier, because it can be made into a large and spacious chamber without the appearance of a concert hall.

The information which follows has been written for the "all purpose" hall, because this type of hall is in general use to-day, and because the information can be used for both types of hall.

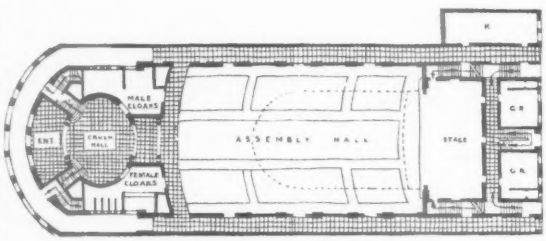
Where the mayor's rooms or the council suite are attached to the assembly hall, it is essential for the public to be able to use the hall to its full extent without disturbing work in the mayor's rooms.

Conversely, the mayor should be able to use the hall, on occasions, as the part of his reception suite in which he can hold receptions, dances, banquets and luncheon parties. The access from the mayor's rooms to the hall should be easy and graceful, and there should be no need to duplicate kitchens, cloak rooms or lavatories.

Municipal assembly halls usually consist of a hall with a flat floor and unfixed seating; a balcony with fixed seating; a stage with orchestra pit, entrance vestibule, cloakrooms and lavatories, a refreshment room and kitchen, a projection room with talkie apparatus, an organ, chair and carpet stores, green room and artists' dressing-rooms.

Competition conditions and programmes generally state the seating capacity of the hall, and so, when first roughing out a plan, the size of the hall must be worked out from this capacity. In estimating this size, it is mistaken to allow for a large balcony, such as a cinema might have. The hall is to be used as a place of varied entertainment, and must be designed for that purpose. It is unpleasant, as has been said, to dance under a large balcony.

The spacing of the seats should be estimated



Wimbledon

on the generous side, and adequate gangways and exits should be allowed.

The Arrangement of the Hall

The hall must be designed so that every seat has an unobstructed view of the stage, and so that every member of the audience can hear well. This is not an easy task.

Gangways

Gangways from front to back of the hall are usually 3 ft. 6 in. wide, but some authorities require them to be wider, especially where the hall is very big. "Cross-over" gangways from side to side of the hall are generally 4 ft. 9 in. or 5 ft., and should provide a clear passageway of 5 ft. 6 in. when the seats are tipped up. The gangways should lead as directly as possible to exits.

TOWN HALLS

Seating

Seats with arm rests should be spaced at 1 ft. 8 in. from centre to centre, and have a minimum measurement of 2 ft. 4 in. from back to back. Seats without arms should be placed 1 ft. 6 in. centre to centre, and if without backs they may be 2 ft. from back to back. In all cases there must be a clear seatway or space of at least 1 ft. measured perpendicularly between the back of one seat and the front of the seat immediately behind.

The rule is that no seat shall be more than 10 ft. from a gangway at the end of the row, but it will be usually found that a row of fifteen seats is permissible when there is a gangway at each end, or seven seats with a gangway at one end. Longer rows of seats are sometimes allowed if the " clear seating " of 1 ft. is increased to 1 ft. 2 in. or 1 ft. 3 in.

Regulations say that where unfixed chairs are used, they must be screwed together in sets of not less than five.

As a rule, seats spaced 2 ft. 6 in. from back to back are reasonably comfortable, but an increase in this distance to, say, 2 ft. 10 in., makes for luxury; a happy medium is 2 ft. 8 in. In the tier 2 ft. 6 in. is not enough, and the steeper the tier (the rake must not exceed 35°; 30° is average) the greater will be the spacing. This is because the overhang of the back seat reduces the knee room; 2 ft. 7½ in. may be regarded as about minimum in a balcony.

If a gangway is placed behind the last row of seats on the balcony, it should be at least 5 ft. wide. Guard rails not less than 3 ft. 6 in. high above the floor level must be provided on the fronts, or " resters " in front of gangways.

Exits

There must be two separate exits from each part of every house discharging into different thoroughfares or ways. Two exits, each 4 ft. wide, will be sufficient for 300 people. Between 300 and 500 people require two 5 ft. exits, and an additional 5 ft. exit is required for each 250 people above 500. If any part of any tier is 40 ft. or more above the pavement level, the exits from these parts must be increased by 25 per cent.

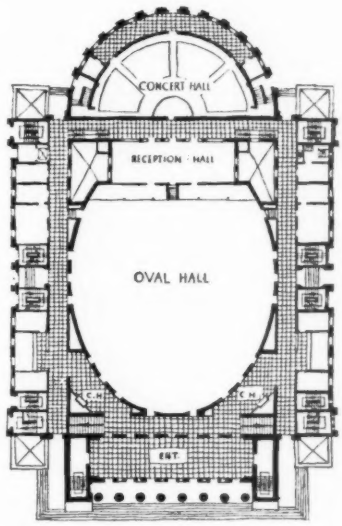
Although 5 ft. is the commonly accepted width of an exit, this must not be taken as a hard and fast rule. Five 4 ft. exits are frequently accepted in lieu of four 5 ft. ones.

In designing an exit 5 ft. wide, it must be remembered that in no place must the exit measure less than 5 ft. If doors are 2 in., the exits must be 5 ft. 4 in. overall, with the doors recessed into the wall. No projections are allowed in corridors within 6 ft. 9 in. of the floor except handrails, which may project 2 in.

Where several exits and staircases debouch into the foyer, the exits from the foyer must be increased in width by at least one-third. For example, if there are three 5 ft. exits from the auditorium into the foyer, then there must be four 5 ft. (or their equivalent) exits from the foyer to the street.

It is important that the entrances from the foyer to the auditorium should be as direct as possible.

Exits to the street from the foyer should be provided with two pairs of doors for the exclusion



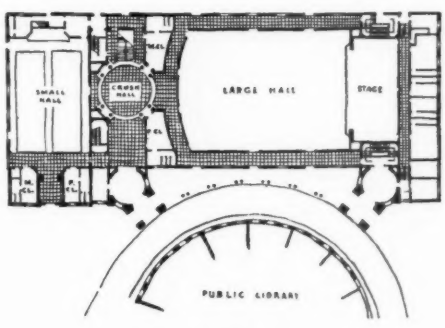
Leeds

of draughts, and it may be found desirable to enter through revolving doors of the panic-collapsible type. One set of doors should swing both ways for entry and exit, while the remainder should open outwards only with panic fittings.

Generally, in planning exits it is better to lead the people away from the stage and the projection room (if any).

Staircases

Staircases have to be the same width as corridors, winders are not permitted, and flights must have at least three steps and not more than 16 steps each; not more than two flights



Leith

must be used without a turn. Two flights may only be used without a turn provided there are no more than 12 steps to each flight. Staircases must be of fire-resisting construction, and unless of reinforced concrete must have solid square steps. Landings must be no less than 6 in. thick unless of reinforced concrete.

Treads must be at least 11 in. wide and risers not more than 6 in. high. Tread and risers must be the same size in each flight. A continuous hand-rail must be fixed on each side of all steps and landings at a height of 2 ft. 9 in. above the steps or landings, and at returns, and the newel wall must be chased so as to allow hand-rail to turn without projecting into the landing space. All landings must be at least the width of the flight of stairs. Long enclosed staircases should be reduced to a minimum. Doors should be of the panic type and should open outwards. Doors must not open onto steps without at least a 3 ft. landing.

Galleries

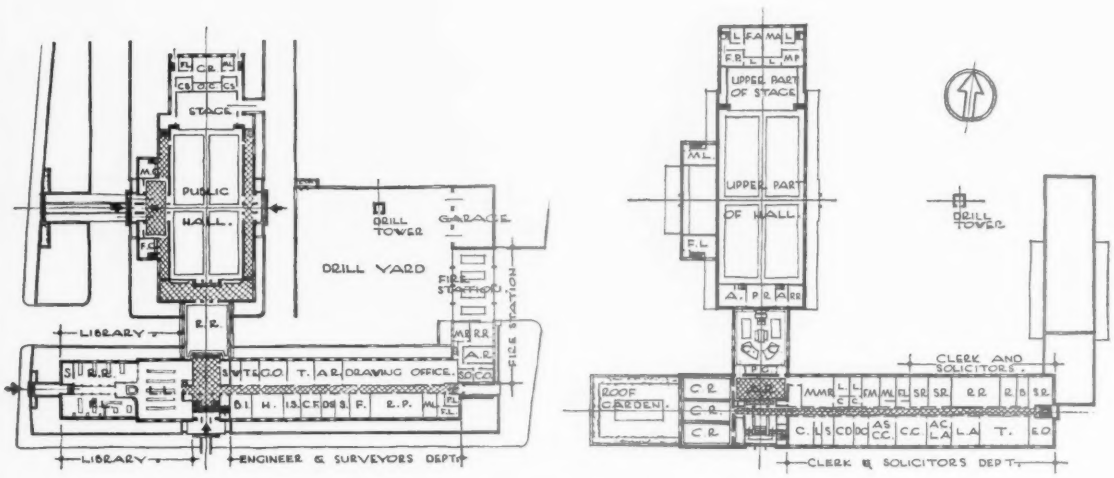
Galleries must not have a greater slope than 35 degrees, but a lesser incline is more satisfactory for the arrangement of gangway steps. A minimum clear height of 10 ft. is required at all points above and below the gallery.

Ramps

The L.C.C. prefer the use of ramps instead of steps and landings; the gradient of these must not exceed 1 in 10.

Corridor Round the Hall

A corridor is sometimes placed round the hall on the ground floor, as at Walthamstow, Swansea, Tunbridge Wells and Wembley; its purpose is to allow the audience to circulate freely without causing disturbance, and is also valuable because it helps to exclude draughts and outside noises. The corridor should be at least 6 ft. wide. The provision of such a corridor is usually worth the expense.



Wembley: First and Second Floor Plans

KEY TO PLANS

FIRST FLOOR PLAN:
FIRE STATION

M.R.	Mess Room
R.R.	Recreation Room
A.R.	Assembly Room
S.O.	Second Officer
C.O.	Chief Officer

ENGINEER AND SURVEYOR'S DEPT.

A.R.	Accounts Room
T.	Typists
G.O.	General Office
T.E.	Telephone and Enquiries
W.	Waiting
S.	Service
R.R.	Refreshments
B.I.	Building Inspectors
H.	Housing
I.S.	Instruments and Samples
C.F.	Clerk of Works and Foreman
D.S.	Deputy Surveyor
S.	Surveyor
F.	Files
R.P.	Records and Plans
M.L.	Male Lavatory
P.L.	Principals' Lavatory
F.L.	Female Lavatory

LIBRARY

L.L.	Lending Library
R.R.	Reading Room
R.L.	Reference Library
S.	Staff

PUBLIC HALL

F.C.	Female Cloaks
M.C.	Male Cloaks
C.S.	Chair Store
O.C.	Organ Chamber
F.L.	Female Lavatory
G.R.	Green Room
M.L.	Male Lavatory

SECOND FLOOR PLAN:
CLERK AND SOLICITOR'S DEPT.

E.O.	Enquiry Office
T.	Typists
L.A.	Legal Assistants
A.C.L.A.	Assistant Clerk and Legal Assistant
C.C.	Committee Clerks
A.S.C.C.	Assistant and Senior Committee Clerks
D.C.	Deputy Clerk
C.O.	Clerk's Office
S.	Secretary
L.	Lavatory
C.	Chairman
S.R.	Spare Room
R.R.	Records Room
R.	Registry
B.	Burial Office
S.R.	Stationery Room

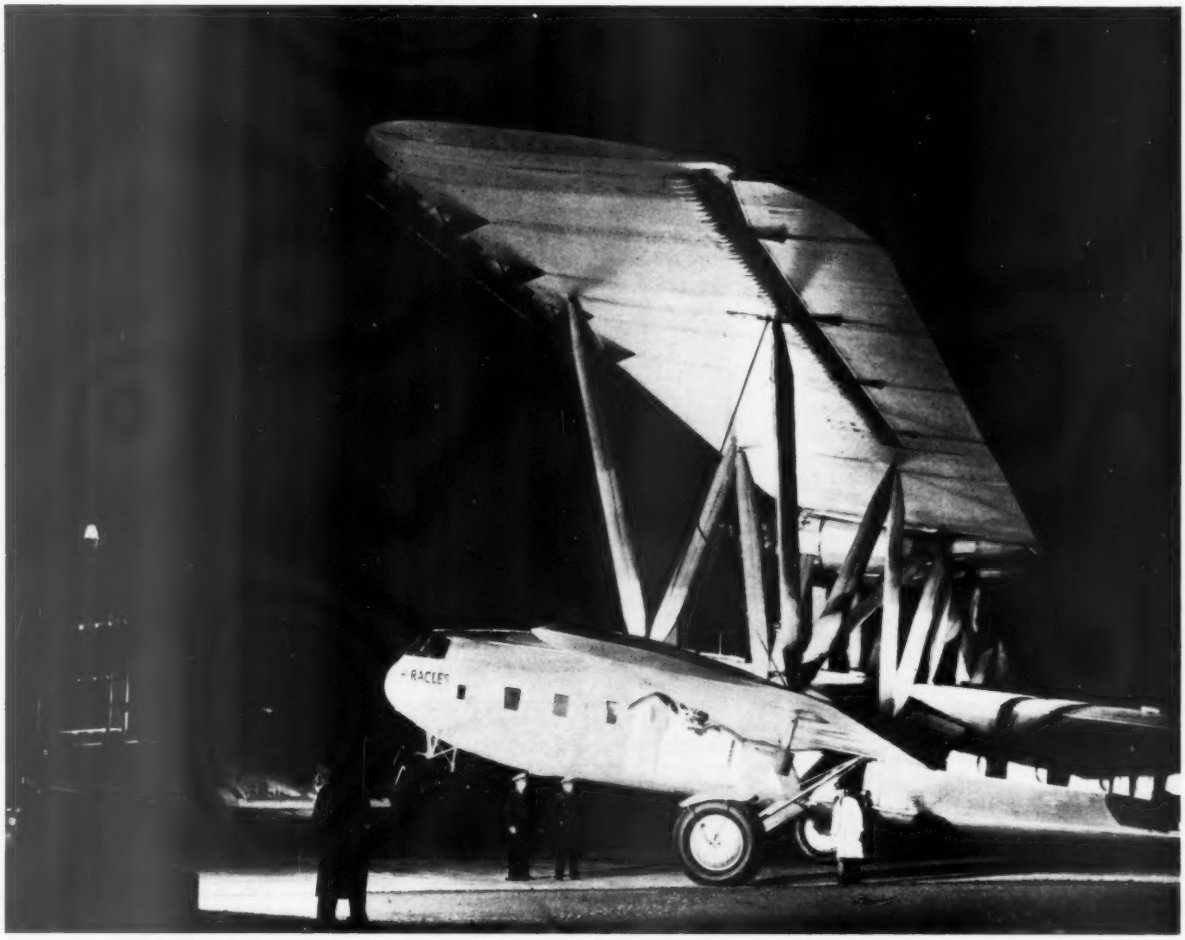
COUNCIL SUITE

C.C.	Council Chamber
P.G.	Public Gallery
A.R.	Ante Room
C.R.	Committee Room
M.M.R.	Male Members' Room
L.	Lavatory
C.	Cloaks
F.M.	Female Members
M.L.	Male Lavatories
F.L.	Female Lavatories

PUBLIC HALL

A.	Area
P.R.	Projection Room
R.R.	Rewind Room
F.L.	Female Lavatory
M.L.	Male Lavatory
M.P.	Male Performers
F.P.	Female Performers
L.	Lavatory
F.A.	Female Artists
M.A.	Male Artists

INFORMATION SUPPLEMENT



9: AERODROMES

BY C. D. PALMER AND C. D. G. NICHOLSON

The increasing volume of traffic carried, not only by the Continental services but also by the internal air lines in this country, makes the question of aerodrome planning one of steadily increasing importance. On this and the following fifteen pages are outlined the principal factors which influence the design of the present-day aerodrome and its buildings, together with a schedule of necessary equipment: elsewhere in this issue will be found the first of a series of five Information Sheets on Aerodrome Planning. Since, to some, the subject of air liners and aerodromes may be a little unfamiliar, the introduction outlines the procedure of landing and servicing a large machine and touches briefly on the problems of air-line operation. Mr. Palmer is a regular contributor to the "Aeroplane," and writes regularly on aeronautical subjects in the "Sphere": Mr. Nicholson holds a private pilot's "A" licence, and has recently completed the Dunstable headquarters of the London Gliding Club.

INTRODUCTION

FOR the benefit of those who are not conversant with flying and airport control it may be worth while to explain how modern commercial aircraft are handled in order to ensure the maximum degree of safety.

In the first place, aeroplanes must take off and land into the wind. The wind helps the take-off, because the machine becomes airborne in a shorter distance in relation to the ground than if it takes off in still air or down wind. It is the speed of the machine relative to the air, not its speed in relation to the ground, which provides its lifting power. Supposing, for example, that a machine becomes air-borne at 50 m.p.h. air speed in still air. If it is taking off against a 20 m.p.h. wind, it will become air-borne when its ground speed is only 30 m.p.h., because, before it starts moving at all, the wind is already driving the air over its surfaces at 20 m.p.h., and it has only to increase this air speed by another 30 m.p.h. to obtain sufficient lift to be able to leave the ground.

If the machine takes off down wind, it will first have to overcome the 20 m.p.h. wind behind it, and then have to build up a speed of 50 m.p.h. relative to the air. Thus, it will have to reach 70 m.p.h. over the ground before it can take off. The same conditions apply in landing.

Thus the shortest possible landing and taking-off run is obtained by facing directly into the wind, and all aerodromes are therefore provided with one or more methods of showing pilots the direction of the wind. These commonly consist of wind sleeves mounted on poles, a smoke smudge in the centre of the aerodrome, and a landing tee which swings automatically to show the wind direction. The latter is usually picked out with lamps to show the wind direction at night.

All aerodromes must be licensed by the Air Ministry, which has laid down the minimum dimensions for the landing areas for various types of aerodromes according to the landing and taking off characteristics

of the machines which use them. Thus an aerodrome for small private machines may be much smaller than a commercial airport dealing with big air liners, and is licensed in a different category.

Air traffic has long ceased to operate in a haphazard manner. For the sake of the safety of machines and passengers, a control is established at all commercial aerodromes which regulates air traffic to and from the air port and keeps check on all machines within its area. Machines may not land at, or take off from, the airport without permission of the control officer. Wireless communication between machines and the control is the essence of air line operation today. With the exception of the actual landing in thick fog, wireless and modern instruments have made flying possible and safe in any weather, and already considerable progress has been made towards solving the fog landing problem.

The control room of an airport is situated in a position, usually above the main airport administrative building, commanding a view of the whole landing area and its approaches. There is usually a balcony, on which is stationed a look-out man who handles the lamp used for close-range signalling to the machines. The wireless room is in close contact with the control room, so that there is no delay in passing messages between the control officer and machines in the air.

The control officer is in touch with every machine flying on the regular air routes by wireless telegraphy or telephony. The machines periodically report their position on the route, and the control officer marks this position on a big map by means of a flag bearing the aeroplane's registration letter. He can therefore see at a glance the general situation of traffic within his area.

When weather conditions are bad, a pilot may be uncertain where he is and ask for his position by wireless, and this is given him from the control tower by the following procedure. When a pilot on the Continental route, for example, asks for position, his request is heard simultaneously by the Air Ministry direction-finding stations at Croydon, Pulham and Lympne. The Croydon station instructs him to transmit for half a minute, and during that time the three stations tune in and take his bearing. Pulham and Lympne report the bearings they have taken to Croydon, and the three bearings are plotted on another large map in the control room by means of weighted strings which hang from pins fixed at the positions of the direction-finding stations.

Ideally, all three strings should cross at a point, but more usually slight inaccuracies cause them to form a small triangle. In this event, lines are drawn from the points of the triangle to the centres of the opposite sides, and the point of intersection of these lines marks the position of the machine. All this may seem a somewhat lengthy business, but in practice the control officer can give a pilot his position within a minute and a half of receiving his request.

The volume of traffic on the Continental routes is such that some time ago it was found necessary to institute a more rigid control system during conditions of bad visibility in order to safeguard against collisions. This system will be extended to other parts of the country as traffic develops.

For traffic approaching and leaving Croydon a controlled zone has been established south of the Thames bounded by a line joining Kingston, Redhill and Penshurst and running north again to the Thames. When visibility is bad (defined officially as less than 1,000 yards horizontally and 1,000 ft. vertically), this controlled zone is brought into operation. All aircraft are warned by wireless and ground signal that the control is in force, and no machine may then enter the zone without being ordered to do so by the control officer. At the same time, a special short-wave wireless system is brought into use so that messages to incoming machines shall not be interfered with.

The regulations are that machines without wireless must land at an aerodrome outside the controlled zone, and the pilot must ask permission by telephone from the control officer before he can enter it. Machines with wireless are kept outside the zone, if necessary for safety's sake at different heights and positions, and are given a turn for landing. There may be several machines waiting to land, and their arrival may have to be fitted in with the scheduled departures of outgoing services. A pilot may be told that he is third in order of landing, and when his turn comes he will be told to enter the controlled zone, approach the aerodrome by a certain route, and land.

By this arrangement every machine is under the orders of the control officer by wireless, and those not fitted with this essential adjunct to flying safety are kept out of the way until there is sufficient gap in the traffic to allow them to approach safely. The system foreshadows a series of controlled zones along the air routes somewhat analogous to the railway block signalling system. Eventually, as traffic develops, zones will be established to control traffic all along the routes, and machines will be passed on or held up according to whether the zone in front is clear or obstructed.

Although with this system of control machines can be led safely and without risk of collision over the airport, the problem of landing in thick fog has not yet been solved. Greater progress in this direction has been made abroad than here. In Germany a system, standardized on German air liners and at many airports on the Continent, is in regular use, by which an aeroplane can be led down a wireless beam to the ground. Machines using this apparatus can land safely in extremely thick weather but, under conditions of really thick fog and no visibility, its use is still experimental.

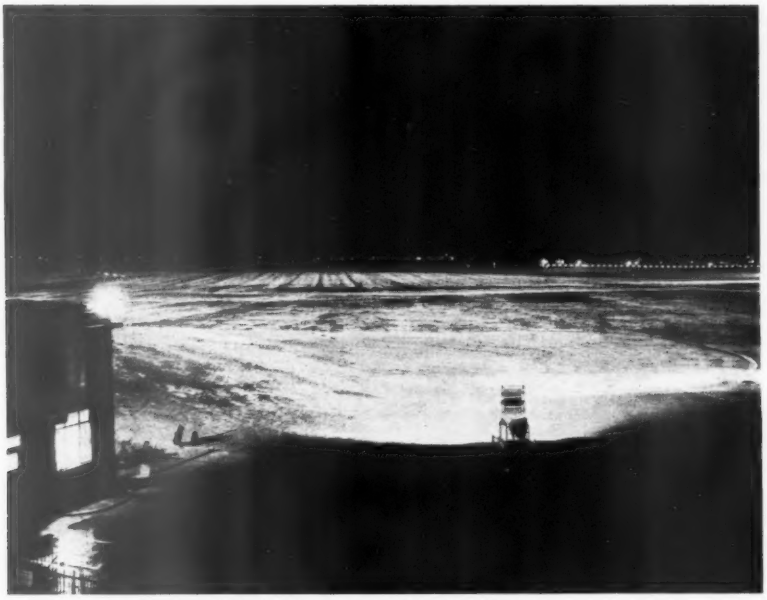
At the moment, the position in this country is that only one airport, Heston, is equipped with wireless fog-landing apparatus, and this is of the German "Lorenz" type. It is being used for demonstration work, and as yet no British air liners in regular service are equipped to use it. Meanwhile, the Air Ministry is experimenting with British apparatus which, as far as can be ascertained, is similar in principle to the German system.

There is not the slightest doubt that the problem of landing in fog is on the way to solution, but what added requirements of space for landing and clear approaches the system eventually adopted here will demand is unknown.

When an air liner has landed at its terminal, it often has to be unloaded and serviced very quickly before starting on a return journey. At intermediate aero-

A typical illuminated landing Tee, used to indicate the direction of the wind, and hence the direction of landing. The example shown is at Croydon.

A 3-kilowatt landing floodlight installed at Croydon.



The landing area at Croydon, floodlit.

dromes things are simpler, and often only the passengers have to be on-and-off loaded and perhaps the machine refuelled. But at a terminal such as Croydon machines are often scheduled to start back across the Channel half an hour after arriving.

The machine lands and taxies up to the arrival gangway, the passengers disembark and pass to the Customs examination hall where their baggage, which has been unloaded simultaneously, is brought for examination, and the mails are quickly transferred from the machine to the motor coach or mail van for London.

While this has been going on the pilots have handed the air liner over to the ground staff, a tractor has been attached and the machine is drawn away to the servicing point. Specially-designed staging is wheeled up to the machine, and ground engineers mount it and begin the routine inspection and checking of the engines. Others inspect the machine, and it is replenished with oil and petrol either by hose from an underground refuelling pit, from a mobile refuelling unit, or perhaps direct from the oil company's tank wagon.

Meantime, the remnants of the refreshments consumed on the inward journey are removed, the buffet is replenished, and the saloon cleaned and tidied. In an incredibly short time the tractor is recoupled and the machine taken back to the departure gangway ready to take another load of passengers.

Such a rapid turn round is, of course, part of regular daily working. At regular intervals the machine and its engines receive more detailed overhaul and inspection, and once a year it undergoes a very complete overhaul for the renewal of the Air Ministry Certificate of Airworthiness.

Naturally, air transport companies deal with such overhauls and with repairs as far as possible at their home aerodromes. For such work good hangar and workshop accommodation is essential, and much more hangar space will be required at the home terminal of a company's line than at ports of call along it. Hangar lighting is a most important point, for the engineers of a busy air line do a great deal, one might say most, of their work at night.

It is from the rents of hangar accommodation and landing fees that any airport must derive most of its income. Like a harbour, an airport must have dues to help pay for the services which it provides for air traffic. At Croydon, for example, machines pay landing fees which vary in accordance with their maximum permissible weight as authorised on their Certificates of Airworthiness. A machine with a maximum permissible weight of 1,200 lb. pays 2s. 6d. for each landing, or £2 10s. per month. The latter payment allows 40 landings, extra landings being paid for *pro rata*. Charges are on a rising scale, and machines with a maximum permissible weight of 30,000 lb. have to pay £2 5s. per landing, or £45 per month, with an extra charge of 5s. 6d. per landing, or £5 per month, for each 5,000 lb. or part thereof, over 30,000 lb. The large air liners of Imperial Airways vary in weight between 29,500 lb. and 32,000 lb., fully loaded.

Housing fees are fixed in relation to the area occupied by machines. Small machines pay 2s. 6d. per 24 hours, or £3 per month. Big machines of the largest air liner class pay £3 10s. for 24 hours, or £75 per month. Housing fees cannot be avoided by parking machines in the open, for they are then liable to pay half the set housing fees for their class, but are allowed to stand for six hours free.

Another source of revenue are the rents charged to air transport companies for office accommodation at the airport, and at Croydon an important item is the revenue from the admission fees paid by the public to watch the flying and see over the airport.

The statement was made by one of the speakers at the recent Aerodrome Owners' Conference that the average annual cost of municipal aerodromes in England is £5,500, and the average annual income only about £250 — including landing and housing charges and office rentals. It was estimated that about 200 passengers with appropriate baggage would be needed every day of the year, three operating companies requiring offices, and six machines requiring petrol and oil daily, to cover the annual cost of £5,500.

It is thus evident that the internal air traffic of this country has not reached that stage of development where the average municipal aerodrome can earn a profit. It will have to increase very considerably before this is possible, but encouragement may be gained by taking an analogy from large dock schemes, which cost very large sums, and in some instances earn no profit for twenty years. Air transport is developing so rapidly that some of the most important municipal aerodromes should be paying their way before many years have passed, though it can hardly be expected that all those already established or in contemplation can do so for many years to come. Some of them are unlikely ever to earn a profit.

PROBLEM

AVIATION is still in its early childhood. When the present century opened no one had flown on a power-driven heavier-than-air machine, yet by 1936 the aeroplane has become a normal vehicle of public transport throughout the world, and this in spite of an interlude of four years of war when development was diverted to one end only, the needs of the fighting services. Undoubtedly the war years produced intensive development, but the efforts made then had no relation to the requirements of civil flying. Safety and economy in operation, essential factors in civil flying as a commercial proposition today, had no part in the design of wartime aircraft, which were judged simply and solely by their performance in terms of military requirements. When civil flying was started in 1919 the military aspect dominated civil aviation and the mushroom growth of the war years proved in fact a serious handicap.

Today civil aviation has sloughed off the military influence and is progressing rapidly on lines of its own. Looking back on the crazy contraptions of wood and wire which 25 years ago were hailed as marvels when they made a few short staggering hops, and comparing them with the great air liners which now fly with passengers, freight and mails across the world, no attempt to estimate the state of development which may be reached a quarter of a century hence can be more than an optimistic speculation.

It is for future development rather than immediate needs that the planners of aerodromes and the architects of aerodrome buildings must provide. Just as the railways, after 100 years of operation, now find their lines cramped by bottle necks at the entrances to main stations and by station accommodation inadequate to deal with the needs of modern traffic so the much more rapidly growing airways may find themselves, and in some instances are already finding themselves, cramped and hampered because those who planned could not visualize their future needs.

Thus in planning an aerodrome and in designing its buildings the probable future development of flying must be a primary consideration, whether the aerodrome be one for a small flying club or a commercial airport with booking offices, customs, bonded stores, restaurant and all the appendages of a busy terminus.

SITE

Airport development naturally falls into two divisions: first, the choice and preparation, and one may add the safeguarding of the site, to make and keep it suitable for

the use of all types of aircraft in the immediate and more distant future; and secondly the design, siting and construction of the airport buildings so that while being as perfect as possible for the needs of that particular airport, they will allow for expansion without undue disturbance to the regular working of the port, and will cause the minimum obstruction to flying.

Hitherto few of the airports in this or any other country have been chosen as the result of careful planning. Too often convenience has been sacrificed to cheapness, and technical and operational suitability to other considerations, such as the availability of old military aerodromes. Ideally the selection of an airport site should be a part of a definite town-planning scheme. Primarily the problem is one of planning, whether it be from the national aspect, for example the selection of the site for the national terminal for landplanes and flying boats operating the Empire services which is to be situated on the South Coast, or on a smaller scale such as the airport serving a small provincial town.

Such a problem can only be solved by close co-operation between a variety of specialists; aeronautical consultants, town planners, engineers, surveyors and architects. These specialists should be in attendance at the birth of every airport project, which should receive their combined care until the labour is safely over.

In these days of building development it is increasingly difficult to find an aerodrome site within reasonable reach of the town it is to serve. Often the best and apparently most obvious sites have been built over before municipalities had woken up to the fact that good sites were being destroyed for ever. The result has been that a great deal of the speed which is the essence of air transport is lost on the long journey to and from the airport. The airport of London, Croydon, is 45 minutes by car from Piccadilly, and Le Bourget is a similar distance in time from the centre of Paris. We have therefore 1½ hours of time, the equivalent of the air journey between Croydon and Le Bourget, wasted in ground transport.

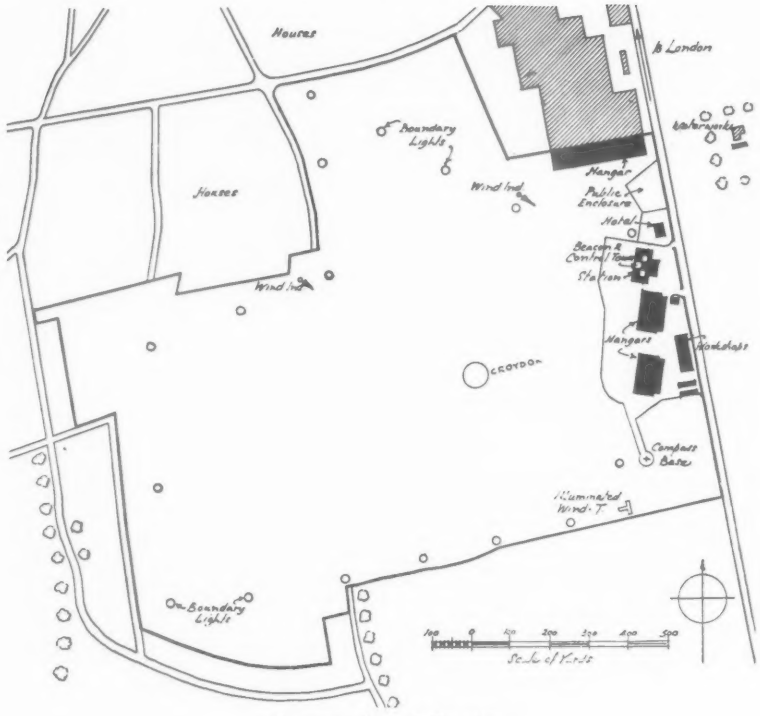
The length of the ground journey is comparatively unimportant where the air journey is a long one, for example the stages of the Empire routes; but on short journeys, such as the stages within the British Isles, it is of vital importance and may impose a very severe handicap. Some very interesting figures were given by Colonel Shelmerdine, Director General of Civil Aviation, when he delivered the first Brancker Memorial Lecture before the Institute of Transport last October.

It may be taken that the average distance of a provincial airport in this country from the town which it serves is 3½ miles. The average speed of a motor coach through built-up areas is 12 m.p.h., so that the journey should take 17½ minutes. For safety, one must allow 20 minutes. Five minutes must be allowed at each end of the journey for embarking and disembarking passengers, therefore, this allowance, added to the surface journey time at each end, will add up to 50 minutes of the total journey time. In the aeroplane itself, 15 minutes must be allowed for manœuvring on the ground, traffic delays, etc., so that the passengers will be on the ground for 65 minutes of their travelling time, however short or long their journey.

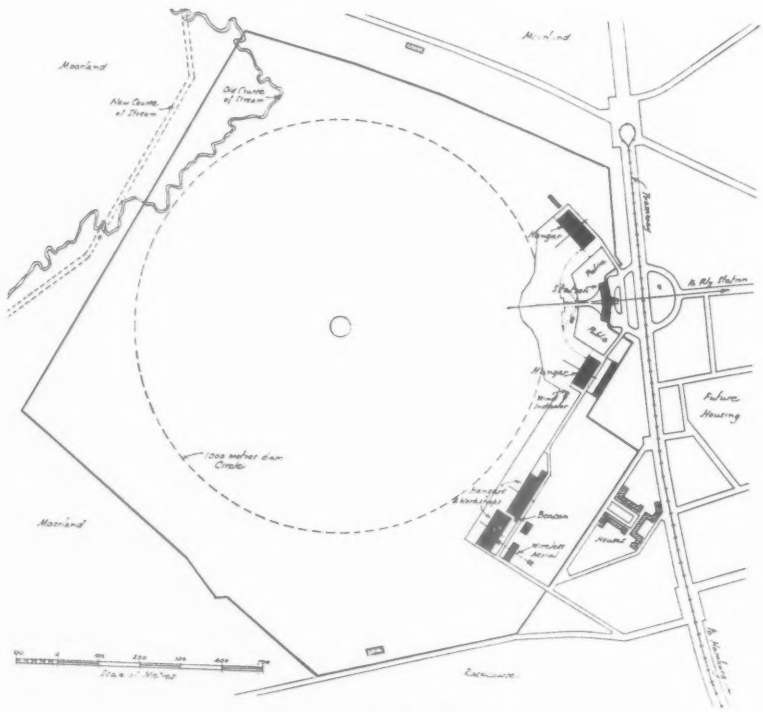
Suppose the journey is one of 100 miles only, and the cruising speed of the aeroplane is 160 m.p.h., the journey will be made up as follows :—

Road journey to and from the airport 20 minutes each way	40 min.
On and off loading the aircraft	10 ,,
Aircraft manœuvres allow	15 ,,
100 miles at 160 m.p.h. ..	37 ,,
Total	1 hr. 42 min.

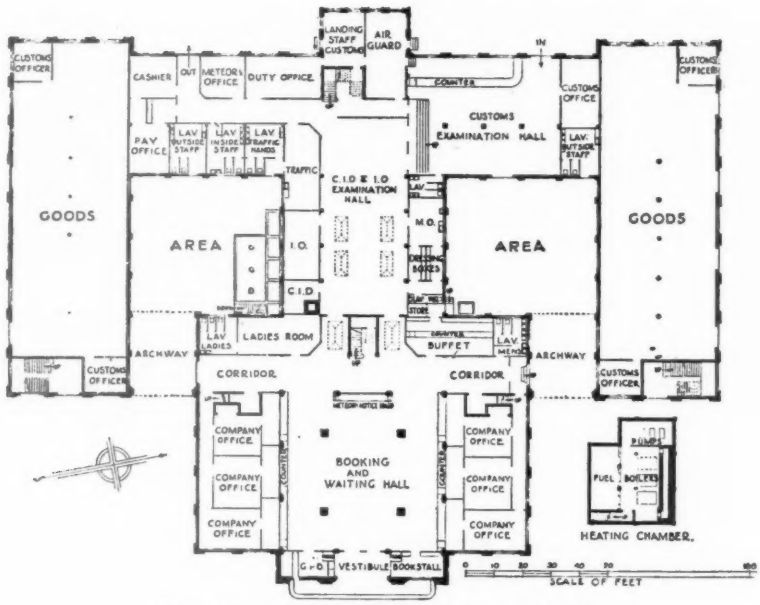
The passenger has flown 100 miles in 37 minutes, but has in effect taken 65 minutes to cover 7 miles on the ground. The average speed from town centre to town centre has been only 58.8 m.p.h. Should the journey begin or end in London, the average will be worse, because it takes 40 to 45 minutes to reach the airport. With longer trips the average speed, of course, increases. For a 200-mile journey it works out at 86 m.p.h., for a 300-mile



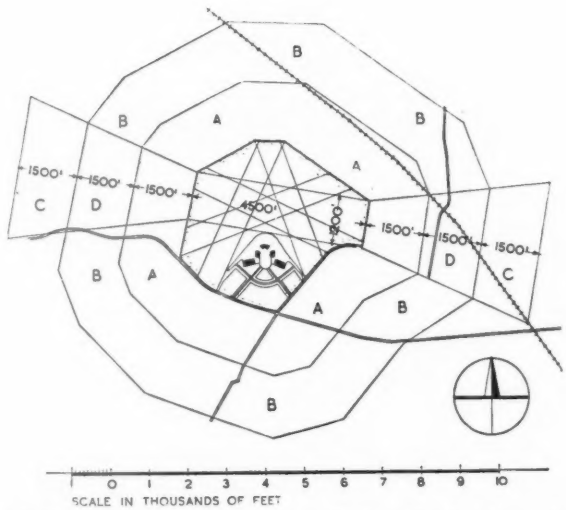
Lay-out plan of Croydon.



Lay-out plan of Hamburg.



Ground floor plan of the main building at Croydon.



Lay-out plan of the new Birmingham airport. Graham R. Dawbarn, Architect. The V-shaped lay-out allows aircraft to land and take off without passing over the buildings.

journey at 101 m.p.h., and for one of 400 miles at 112 m.p.h.

The above indicates how air transport over short distances is handicapped by bad communications between town and airport in competing with railway transport, which in its highest form is exemplified by the L.N.E. Railway Silver Jubilee express, which does the 268 miles between London and Newcastle at an average speed of 67 m.p.h.

The conditions under which civil aerodromes are licensed and classified are laid down in Air Ministry Pamphlet No. 55 (2nd edition, August, 1935), entitled "Licensing and Classification of Civil Aerodromes."

Paragraph 1 of Chapter I states :—

"The location of an aerodrome must be suitable and safe from the aviation point of view."

This states in a few words the whole essentials of aerodrome selection. There are, of course, a number of considerations which are not referred to in the pamphlet. Among them may be mentioned the disadvantage of a site which is low lying and subject to fog. An aerodrome should, if possible, be on the side of the town nearest to the prevailing wind, so that machines need not fly over the town when taking off, and so that, in calm weather, when visibility is likely to be bad, the prevailing drift of the air shall not carry smoke over the aerodrome and intensify haze and fog. The effect of the prevailing westerly drift is particularly noticeable in the Midlands, where in hazy weather the smoke from the big manufacturing centres often seriously impairs flying visibility for many miles across country to leeward.

The question of situation may seem a small one, but can have an important bearing on the value of a site for an all-weather airport. For example, Heston to the west of London is often clear when Croydon is in thick fog. Gatwick airport, outside the London fog belt, is much more fog-free than either Heston or Croydon. It is now being developed as a Continental air terminal, and although it is so far from the city its excellent communications by the Southern Railway electric services should place it at no disadvantage in respect of surface journey-time as compared with the other London airports.

Paragraph 2 of the pamphlet reads :—

"The landing area must be sufficient to allow of an effective runway of at least 300 yds. long by 150 yds. wide for any wind direction."

RUNWAYS

The term "effective runway" means a runway reduced in length by any necessary corrections for the presence of obstructions in the line of the intended take-off or landing.

Corrections are made according to the formula :—

$$D = 10\ H\text{-}d$$

when

D = distance in feet by which the runway is decreased.

H = height of the obstruction in feet above ground level.

d = distance in feet of the obstruction from the perimeter of the landing area.

The dimensions given above for the effective runway which the landing area must provide are the minima necessary for a licence in Class F, the lowest Air Ministry classification. For classification in Class A, the highest category, such as is required for a first-class international airport, the landing area must provide effective runways of 800 yds. or more in length, and at least 200 yds. in width for all wind directions.

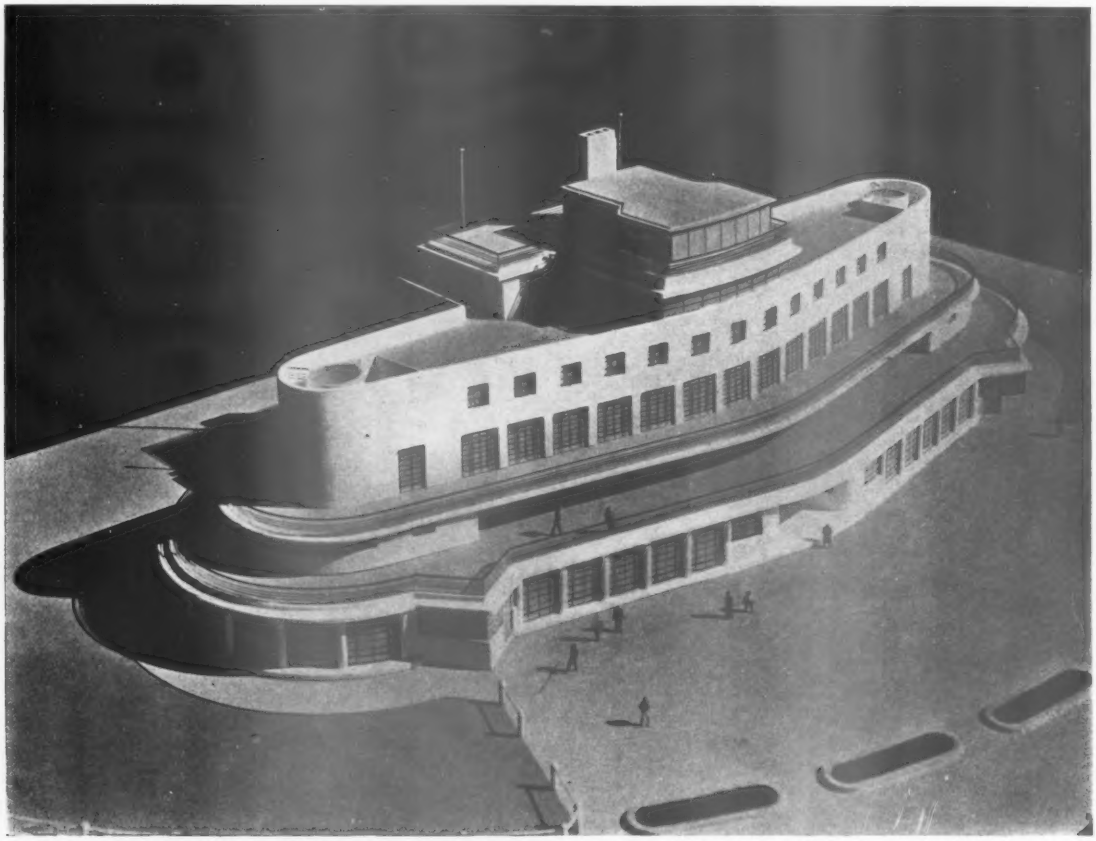
For major airports even larger runways are desirable, and the foreword to the pamphlet says :—

"It is envisaged that, in future, sites intended for development as municipal aerodromes for use by heavy air-line traffic should preferably conform at least to a size affording in three directions runways of 1,000 yds. in length and 200 yds. in width, and in the fourth direction 1,300 yds. in length and 600 yds. in width. These four directions should intersect at angles of 45 degrees.

"It may not, however, be necessary at the outset to prepare the whole of the selected area for landings; but if the probable requirements of future traffic are to be catered for, provision for extensions to the landing area should be made at the outset, and sufficient land capable of development acquired for the purpose, in order that it may ultimately be enlarged to the dimensions stated above when traffic considerations render this necessary."

Major Mealing, Chief Technical Assistant, Civil Aviation Dept., Air Ministry, remarked in a recent paper that the requirements governing dimensions as laid down by the Ministry in chapter 3 of "Licensing and Classification of Civil Aerodromes," must be treated as minimum requirements. He goes on to say that with an eye to the future we must allow 1,400 yds. in the main direction and not less than 1,000 yds. in all others.

In the dimensions cited above it will be noted that the main dimension exceeds the others by a considerable margin, and it is this dimension which determines to a large extent the usefulness of the aerodrome. Amongst other factors, such as the direction of the prevailing wind, existing obstacles,



A model of the terminal building at the Birmingham Airport. Graham R. Dawbarn, Architect.

the bearing of an adjacent town, land communications, and questions of natural drainage, the main dimension is probably by far the most important. Major Mealing remarks in the same paper that "Channel steamers do not run to harbours they can only use eight days out of ten." It will be the ability of an airport to convince prospective operators of its suitability for landings and take-offs in bad weather which will be the making or marring of its commercial success.

At the moment, when there is yet no standard blind approach system in use in this country, it is also necessary to make sure of sites for marker beacons outside the landing area. At Heston, for example, there is a recently completed installation making use of a main beacon about a hundred yards beyond the aerodrome boundary to the west. There is another marker beacon at Osterley Park, about two miles from the eastern boundary of the aerodrome, while a third has been placed 300 yds. away. This lay-out takes advantage of an approach 300 yds. wide, and 1,500 yds. long, unobstructed by anything over a few feet high.

A first-class airport requires a landing area of about 200 acres; for a minor airport, or one which is developing and has not yet to deal with heavy traffic, 100 acres will probably be enough. But unless steps are taken to obtain control of considerably greater areas around the boundaries, factory chimneys, high buildings, and even wireless masts, may be erected in such positions as to impair flying safety, and might conceivably make it completely useless. Land purchased for airport development should, therefore, include sufficient area to give control of building round the landing area. The land so bought can be used for industrial development within the limits which the safeguarding of the airport imposes. Examples may be quoted from the Manchester Ringway Airport site, which includes over 600 acres, and from the Birmingham municipal airport site, which includes over 500 acres.

Blind Landing and its Influence on Layout

The all-important choice of a line for blind landings is an extremely difficult one. It requires a consideration of obstacles and the possibility of future obstacles beyond the bounds of the aerodrome itself, and the study of local meterological conditions. It must be remembered that bad visibility is not necessarily associated with lack of wind—fog forms only one source. Low cloud, rain, and snow have also to be reckoned with. Aircraft under normal conditions land dead into wind, and whilst it is the ability of the modern transport machine to land slightly out of wind, which makes the American lay-out possible, this latitude must not be relied on beyond perhaps 10 degrees on either side. It follows, that the fog, or blind-landing line, which is often realized as a white chalk line 2 ft. wide flush with the surface of the aerodrome, by which a pilot orientates himself during a take-off, must run up and down the line of the prevailing wind.

SURFACE

In paragraphs 3 and 4 the Air Ministry pamphlet lays down the requirements for the surface and gradient of aerodromes :—

"3. (*a*) The surface of an aerodrome must be even and smooth enough to allow a motor-car to be driven over it at 20 miles per hour without inconvenience to the occupants.

"(*b*) The surface is to be composed of either turf or some artificial or natural substance strong and firm enough to withstand without permanent damage a pressure of two and a half tons per square foot. Any culvert or bridge within the landing area is to be capable of taking without permanent damage to the surface an impact load of five tons per square foot.

"(*c*) The landing area must be well drained and be practicable for the operation of aircraft under ordinary weather conditions.

"(*d*) The surface must be free from molehills, rabbit holes, ridge and furrow, wheel ruts or any impediment of any nature whatsoever which might cause damage to any sort of aircraft.

"(*e*) Grass on the surface must not be allowed to grow long. At no time may the length of the grass be such as to endanger even the lightest type of aircraft.

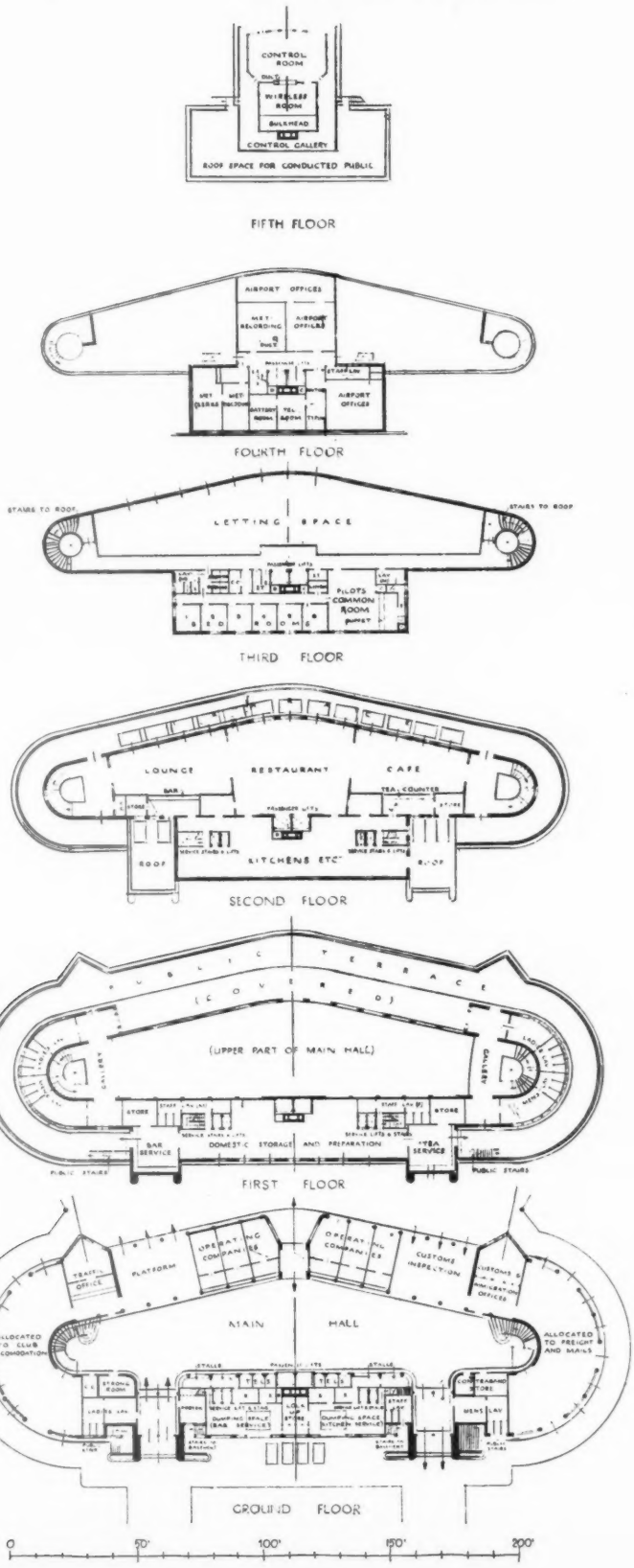
"4. The overall gradient of the landing area is not to exceed 1 in 50. The actual gradient of any particular undulation is not to exceed 1 in 40.

OBSTRUCTIONS

"5. Whatever may be the direction of the wind, it must always be possible for aircraft to approach the landing area in a normal manner, unhampered by any obstacle or obstruction. The definition of an obstruction for the purpose of this paragraph is as follows :—

"Any object beyond the perimeter and within half a mile of the aerodrome which subtends a vertical angle of more than

Floor plans of the terminal building at the new Birmingham Airport: these plans may be amended slightly, but provide for administration and control, airline traffic and the general public.



5° 30′ measured from the nearest point on the perimeter.

"The presence of overhead electric cables within one mile of any aerodrome is highly undesirable, and may make it necessary for the licence to be withheld or special conditions to be attached to it."

The method suggested above for judging the smoothness of the aerodrome surface may seem to be rather unscientific, but in practice it gives very fair results, and the variation of springing in different makes of cars is insufficient to make this test ineffective.

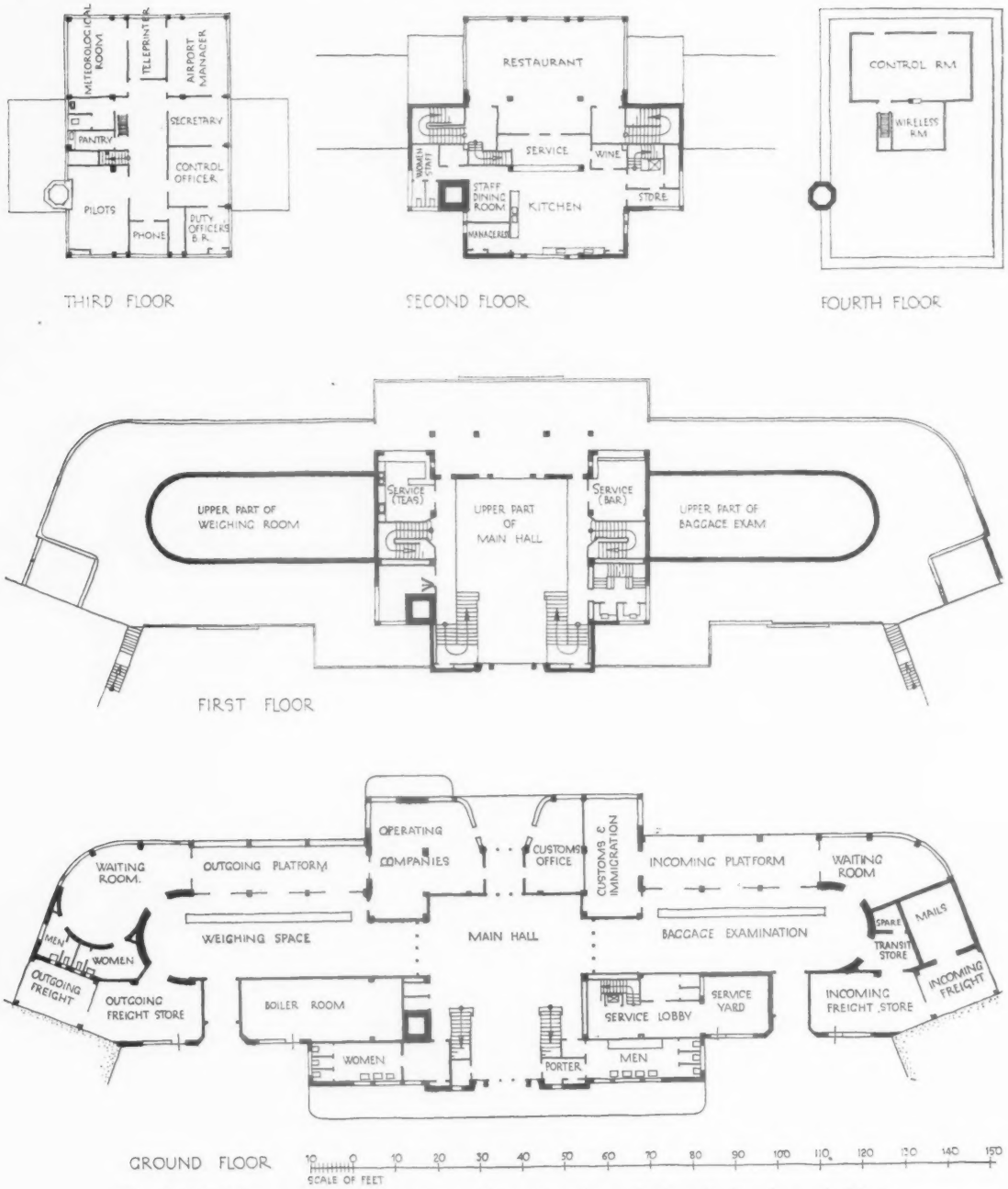
The actual surface is of more importance. In Europe, and in Great Britain particularly, we are fortunate in being able to use turf-surfaced aerodromes, for our climate and soil are suited to the growth of excellent grass. The exact opposite is the case in most other parts of the world, where conditions of climate and soil make it impossible to cultivate a satisfactory grass surface, so that a system of prepared runways of concrete, tarmac or oil-dressed natural earth has to be used. Such systems have been particularly developed in the U.S.A.

The importance of doing away with any unnecessary manœuvring of aeroplanes on the ground is a point not easily appreciated by the layman but of very real importance to the aircraft owner. Not only is this operation difficult, but it is also expensive both in fuel cost and depreciation caused by the wear and tear on the aircraft. One designer said recently that allowance for ground stresses, as distinct from landing stresses, probably added between 10 per cent. and 15 per cent. to the weight of an aeroplane. The tail wheel now largely supersedes the tail skid, brakes are universal, and the ability to use the outer engines independently on multi-engined craft lessens the difficulty. Against these advantages, however, must be placed the very much increased, and apparently increasing, size of the modern air liner.

Hitherto in this country grass-surfaced aerodromes have stood up well to the demands made upon them. Their durability will naturally depend on drainage and subsoil conditions, but there must be a limit to the amount of traffic which any grass surface can stand. Now that tail skids which tear up the turf are almost universally being replaced by wheels, the physical wear and tear of each landing and take-off may be less, but traffic is steadily increasing and machines are tending to increase in weight. In 1933, taking no account of privately-owned machines and special charters, 4,816 machines engaged in regular air traffic arrived at Croydon and 4,826 departed. For 1934 the figures were 6,826 arrivals and 6,835 departures. The figures show a considerable increase which is likely to have been maintained during 1935 and they point to the possibility that in the future we may have to provide prepared runways for aerodromes bearing heavy traffic.

In the Information Sheet included in this issue are shown a number of theoretical lay-outs. Ideally an aerodrome should allow of landing and taking-off in any direction, but if the landing area has to be provided with a prepared surface this will seldom be practicable and prepared strips may be laid down to give 8-way or in certain circumstances 4-way landing.

These prepared surfaces should be resilient and free from dust and cheap to lay down and maintain. Various treatments such as concrete, rolled-in cinders and asphalt,



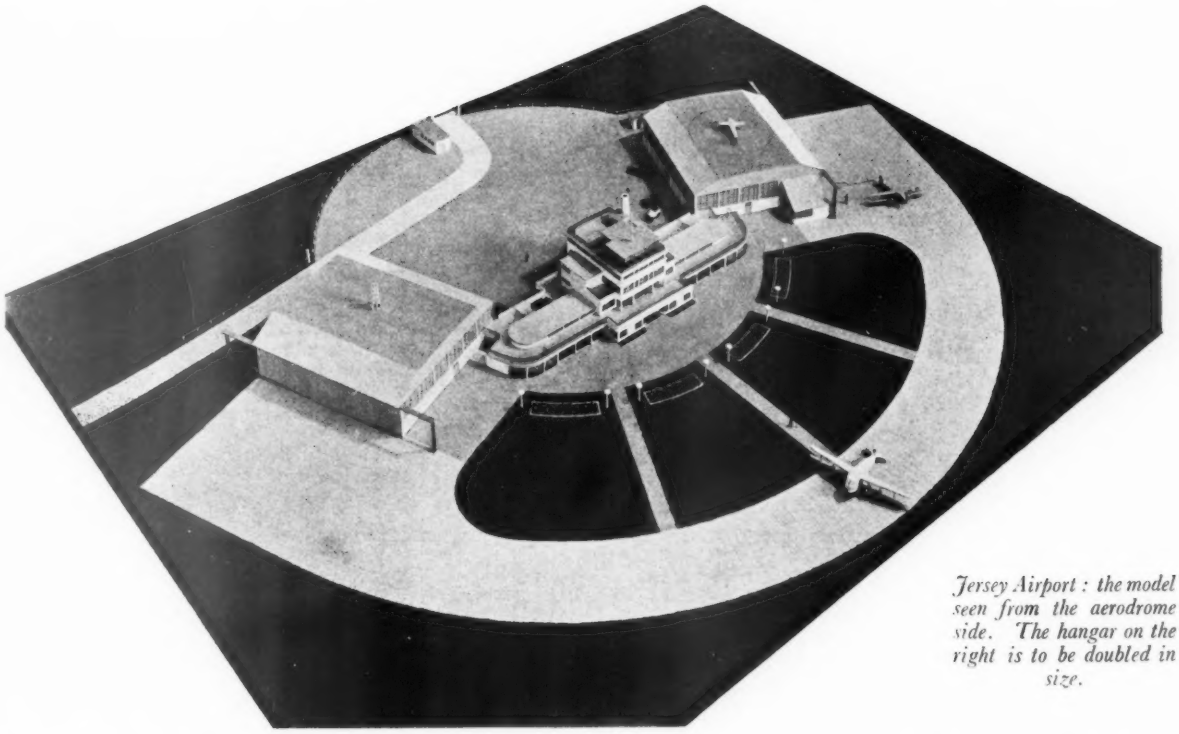
Terminal building at Jersey Airport, now under construction. Graham R. Dawbarn, Architect.

have been used in America. In some sandy districts crude oil rolled-in has given satisfactory results. Obviously the matter of drainage is highly important and if the remainder of the landing area is grass surfaced the junction between the grass and the prepared runway must be carefully treated to prevent the surface bordering the runways becoming a quagmire in wet weather. Incidentally, it may be mentioned that grass takes some time to grow, depending a good deal on the time of year at which it is sown. Good seed from a reputable firm is always worth while.

Here in England the maintenance of the grass along the edges of concrete aprons has presented a difficult problem. Aeroplanes are continually passing from grass to concrete and vice versa. The grass surface next the concrete is soon destroyed in wet weather and an extending patch of mud is produced. This trouble might be partly met by providing wide fan-shaped aprons giving a large choice of approach angles for taxying machines. Wear and tear will thus be distributed and grass which has deteriorated can be railed off until it has recovered without obstructing access to the apron.

As regards the airport buildings, in planning for immediate and future requirements one is on less secure ground than when considering the landing area. We know the present minimum requirements of the modern commercial aeroplane for landing and taking off and we can judge with fair certainty that these requirements are unlikely to alter very much one way or the other in the next few years, although ultimately they may do so. Anyhow, if the landing area is of ample size future developments in aircraft will be sufficiently taken care of.

Whatever the traffic through an airport a minimum landing space must be provided, but passenger and administrative accommodation is another matter. Air transport in England today is in a highly fluid state of development. Croydon, where traffic has grown beyond all expectations, may be quoted as an example. When the present airport was built during the years 1926-1928 the Air Ministry was severely criticized for building on so large a scale to meet developments which might never materialize. Actually it did not build large enough and the possibility that one day the great new building might prove too small does not seem to have been dreamt of.



Jersey Airport: the model seen from the aerodrome side. The hangar on the right is to be doubled in size.

Actually at the present moment the Croydon buildings are crammed to overflowing. Already alterations have had to be made to give increased facilities for passport and customs examination, office accommodation is inadequate and another hangar will soon be needed. Figures have already been quoted previously showing the increase in the number of machines arriving and departing and at first sight these seem likely to continue to increase. But there are a number of factors which may alter the situation in the future. New airports are being developed to serve London, amongst them Gatwick, which is being reconstructed to serve as a continental terminal. British Airways will use it as their continental terminal instead of Stapleford Abbots and, as it is outside the London fog belt, other air lines will probably make use of it also, as congestion at Croydon increases. There are also the Gravesend and Heston airports. One can imagine traffic increasing and congestion becoming so serious that traffic has to be zoned. Perhaps Gravesend might serve the eastern route to the Continent, e.g. to Holland, North Germany and Scandinavia; Croydon serving Central Europe, Switzerland and long-distance routes; Gatwick serving the Paris route and services to Spain, Portugal and beyond, while Heston might be reserved as the London terminal for services operating within the British Isles.

Such an arrangement is, of course, purely imaginary, but some form of traffic zoning will certainly be necessary before long. Such an arrangement might produce considerable contraction in the traffic using Croydon, with consequent easing of the strain on its accommodation. These considerations would indicate that in the present fluid state of air transport costly and permanent building schemes should be avoided. The whole lay-out should be one which will allow for ample expansion in case of need with the minimum of disturbance to the daily routine of the airport while additions are in progress. Ideally the buildings should be on the principle of the sectional bookcase, capable of being enlarged by the addition of standardized units which will fit into the general scheme of the terminal building.

At the present time Croydon is particularly up against the expansion problem, for the main building does not lend itself to expansion. It is built massively and permanently with no possibility of extensions in harmony with the general scheme of the airport without considerable rearrangement and disturbance of other buildings.

There are four chief considerations in planning the accommodation of the terminal building of any airport. Obviously the routes operated and the number of services using the port must influence these, but, assuming a first-class airport dealing with overseas traffic, accommodations must be provided for the following :—

(*a*) Administration, aerodrome control, wireless, meteorological office, administrative offices; (*b*) Government services, Customs, immigration officials, C.I.D., bonded stores; (*c*) operating companies, administrative and managerial offices, booking-offices, parcels offices; (*d*) the public waiting-rooms, bookstalls, buffet or restaurant for passengers, and also arrangements for people to watch flying and for seeing off and meeting their friends travelling by air.

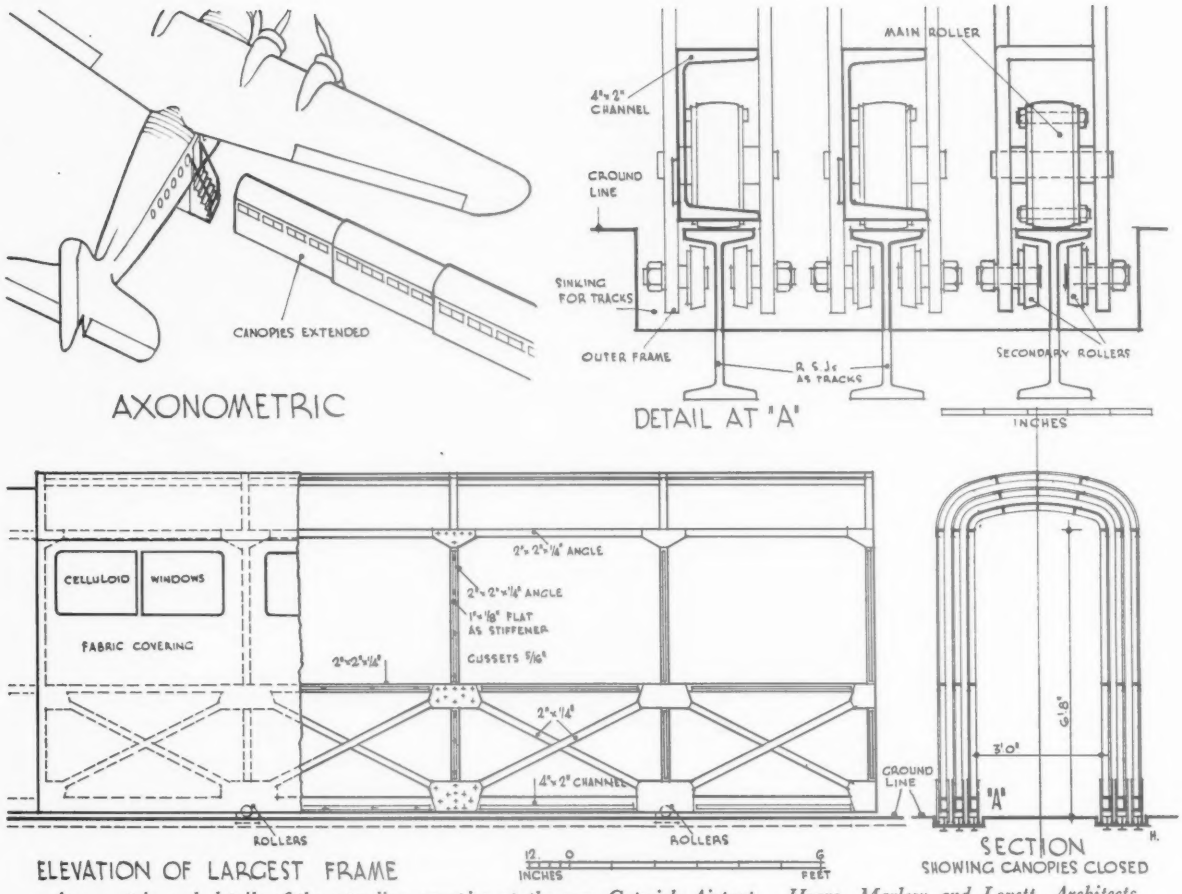
CONTROL ROOM

The most important part of the administration of a modern airport is the control tower, whence air traffic arriving and departing and for some distance along the air routes is controlled; it is, in fact, the nerve centre of the whole organization. It is essential that the control officer should be able to see the entire landing area and have an all-round view, unobstructed by buildings, of the approaches to the airport. The tower should be kept as low as possible consistent with the provision of an adequate view and, though this is not essential, it is usually most conveniently placed above the main building.

The control room should have a look-out gallery all round it, or at least be given a full view in all directions through large windows. Provision must be made for radio telegraphy and telephony rooms because today radio is an integral part of all air line operation. These rooms should be sound-proofed and placed so that the very closest touch can be maintained between operators and control officer. At Croydon, for instance, they actually adjoin the control room and messages can be passed directly between them. The meteorological office should be placed so as to maintain close touch with the control, and this consideration also applies to the airport manager's office. The latter should also be arranged to have a full view of the landing area.

DOCKING PROBLEMS

Directly connected with this is one of the major problems of the aerodrome officer—the protection of the passenger and the control of the inquisitive. It has, as yet, hardly been considered in this country, but in America a space called the "bull pen," consisting of a fenced lawn in front of the station is widely used, often in conjunction with a collapsible covered way on a light steel framework running on tracks. At Speke provision is made for taxying the aeroplane under a permanent canopy, but there is no means of protecting the passenger from the slip stream from the aeroplane propeller. It is questionable whether in future the canopies will enclose a sufficiently large space to take the rapidly growing aircraft. At Gatwick particular attention has been given to these points, in fact it may be said that the entire plan of the station has been dictated by them. The station is circular on plan, with six short projecting arms radiating at equal

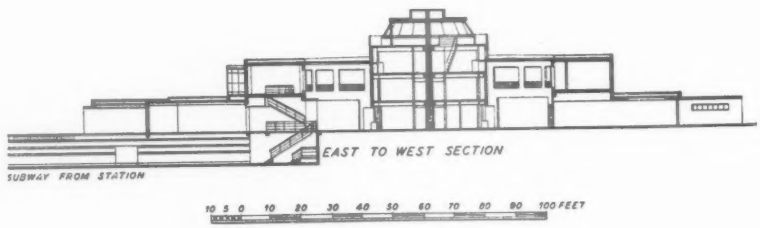


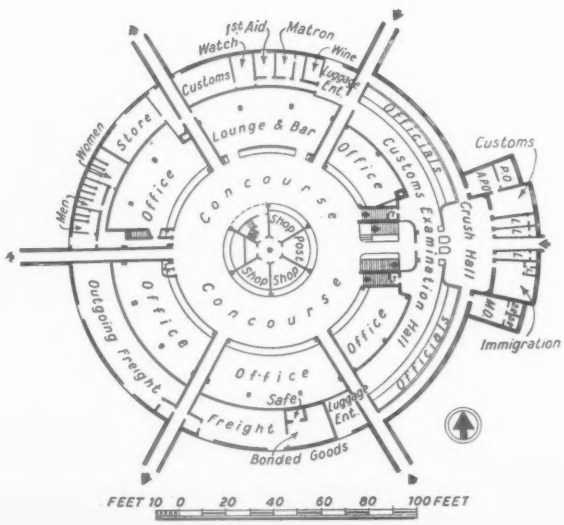
Axonometric and details of the extending canopies at the new Gatwick Airport. Hoare, Marlow and Lovett, Architects.

ntervals from a central concourse, and fitted with telescopic covered ways. After the machine has taxied into position in an anti-clockwise direction, the appropriate covered way is run out, and the passengers proceed to or from the aircraft, fully protected from the slip stream and the elements. This system is ideal for machines whose bottom wing is of sufficient height to clear the canopies, but would presumably not be suitable for low wing monoplanes. One is driven to the conclusion that an underground passage leading to a collapsible hood is the only solution to fit all types, although this itself is open to criticism on the grounds that many invalids travel by air, and would object to the steps involved.

Imperial Airways now do a lot of the manœuvring of their machines at Croydon with small motor tractors, and there are motor tractors on the market which have been designed to combine this advantage with that of a mobile refuelling plant.

As regards Government services the Customs arrangements at an airport are very similar, though as yet on a smaller scale, to those at any seaport. Passengers' passports are examined by immigration officials as soon as they enter the airport building from the aeroplane, and they then pass to the Customs examination room, where their baggage has been deposited by the traffic hands. The essential points are to provide rapid transit to the Customs halls for both passengers and baggage, and sufficient space for the examination to be carried out with the minimum of delay. Passengers must be





Right, ground floor plan of Gatwick; above is a section through the main concourse. The control tower windows are sloped inwards to prevent reflections from boundary lights.

kept apart from other members of the public until the customs examination is completed.

Freight is treated in the same way as at seaports. The goods are moved into bonded stores under the supervision of the customs officials, and after being cleared are released for removal. Offices must be provided for the customs, immigration and C.I.D. officials stationed at the port. These should be conveniently placed in regard to the passport and customs examination hall. Passengers should pass directly from the customs examination to the motor coaches, railway station or private vehicles by which they will leave the airport. These considerations, of course, apply to important international airports; at minor ports dealing only with internal traffic customs accommodation can be dispensed with.

Office accommodation must be provided for the operating companies using an airport, and also booking and reception offices for passengers and parcels. The extent of the office accommodation provided must to a large extent depend on the position which the airport occupies in relation to the main air routes. Obviously, a terminal port will require more accommodation than one which is merely a calling point on one or more of the air routes. Such offices are most conveniently arranged round a central concourse or waiting hall. As has been pointed out above, air transport is still in a very fluid state of development, and the demands for office accommodation are likely to fluctuate with the rise and fall of new transport companies and the variations in the routes operated and the volume of traffic. Hence office accommodation should be capable of being easily rearranged, subdivided or enlarged.

Flexibility is unquestionably the thing which the airport owner should desire most in this world. Visualise an aerodrome in which the position of surface communication in the form of road and railway dictates the position of the passenger building. Due to the presence of the main flight path or topographical features, the dimensions of the ground plan may be limited. The removal of the control tower and fire-engine sheds, which do not demand direct communication with road or rail, to a position where they will not restrict the possible expansion of the passenger building, may provide the solution of an otherwise difficult problem.

The writers recently had an interview with one responsible for the administration of an airport handling large quantities of traffic from an out-of-date building. He was able to demonstrate very forcibly by practical instances how essential it is to be able to plan and re-plan, to be able to install telephones, and yet more telephones, in a building of this type. Later in the day we turned aside to look at a brand-new aerodrome lay-out intended to deal with traffic on a comparable scale. It was so designed that it will be impossible to add one square foot to the more important rooms, and of a type of construction making difficult any rearrangement of the subdivisions. In addition, it seemed doubtful if the control tower had a completely unobstructed view of a rather awkward-shaped aerodrome. Its very position seemed to sterilize what might otherwise have been useful ground.

PUBLIC

Often far too little attention has been paid to the comfort of passengers, and the general public visiting the aerodrome has been regarded as a nuisance deserving scant consideration. The main concourse or waiting hall is the central collection and distribution point for passengers. It is logical that the ticket offices and weighing machines of the operating companies should be placed here, and that it should be provided with post and telegraph offices and telephones, bureau de change, tobacco and newspaper kiosks, and lavatories. There should be sufficient comfortable seating, certainly superior to that of the average first class waiting room on the railways, and if possible the hall should have a view of the landing area.

Lounge at Shoreham Airport. H. Stavers Tiltman, Architect.

The restaurant is an important consideration, for although the more important air lines serve adequate meals on their machines, both visitors and travellers require an efficient and comfortable restaurant on the ground. This should be in the main building, and should face the landing area. Whether let out to an independent catering firm or run by the airport management, it should form a valuable source of revenue. Croydon is not well arranged in this direction, for there is only a small and inadequate buffet in the airport building itself. The aerodrome hotel is detached from the main building, and does not give a good view of the landing area because it is set back from the line of the airport buildings. In addition, it stands directly on the main Brighton road, and so is often overcrowded by motorists and others, to the discomfort of any air-line passengers who may wish to use it. At the smaller airports, such as Heston or Brighton, Hove and Worthing, the restaurant is well situated in the main building, following the general practice at the principal airports abroad.

Car parks should have a definite place in the lay-out of every aerodrome, large or small. They are non-existent or completely inadequate at most aerodromes in this country. The general public and those employed at the aerodrome should be allotted separate parks, and at commercial airports a separate space should be reserved for motor coaches. Naturally, the areas of these parks must depend on the importance of the airport and the traffic with which it is expected to deal. There are many passengers and owners of private aeroplanes who come and go on short journeys, perhaps for a week-end, who dislike the idea of leaving their private cars unattended on a public parking-place overnight in all weathers. All aerodromes should have covered garage accommodation and a garage business selling housing, service and petrol and oil might be run as a subsidiary source of revenue.

Hangars are essential to any aerodrome. Their number and size, of course, depend on the position of the airport on the air routes and the type of machines in operation. Their function is to house aircraft when not in use, and more particularly to provide shelter for overhauling them and their engines. Possibly, in course of time, the need for housing machines between flights may become of less importance. The commercial flying-boat is moored out for months on end, and is only docked for major overhauls, and the same practice may develop for dealing with future large land machines.

But at present, in the British climate at any rate, machines must be placed in hangars so that good working conditions may be maintained for those who have to service them. The essentials of the modern hangar are as follows :—

(1) It must be large enough to house the largest machines using the airport, and aircraft should be able to be moved in and out with the minimum of manœuvring, whether by hand or power.

(2) The doors should be full width and should open and close easily.

(3) It should be possible to remove any machine without disturbing others.

(4) It should be well heated and lit, for much of the work on machines will be done in bad weather and at night.

(5) The roof should be amply high to admit the tallest machines, with room for easy inspection of the top surfaces. Hoisting gear should be provided for changing engines. At Heston this gear has a lifting capacity of 2 tons.

(6) Overall height should be as low as possible consistent with (5).

The largest hangar in this country is the recently-completed central repair hangar at Heston. This hangar has a floor area of 32,450 sq. ft., completely free from columns and supports. The main doorway has an opening 200 ft. wide and 30 ft. high, free from any obstruction. The various workshops and stores are arranged round the three sides of the hangar, and first-aid rooms,

The workshop hangar at Heston Airport. Graham R. Dawbarn, Architect.

staff rooms and secretarial offices are provided. At the back of the hangar, with a separate entrance, are the offices of Airwork, Ltd., the owners of the airport. This hangar is, of course, intended for a repair shop, and it has been designed to take the largest air liners now operating.

The trend of aircraft design must obviously affect hangar design also. At present there is a very noticeable tendency for the monoplane to supplant the biplane in all branches of flying. Monoplanes as they exist today require less headroom than biplanes of the same carrying capacity, and only the very largest biplanes such as the Short "Scylla" and Handley Page 42 "Heracles," whose heights are 29 ft. 6 in. and 27 ft., respectively, demand the headroom provided by the Heston hangar. Both these types are now obsolescent.

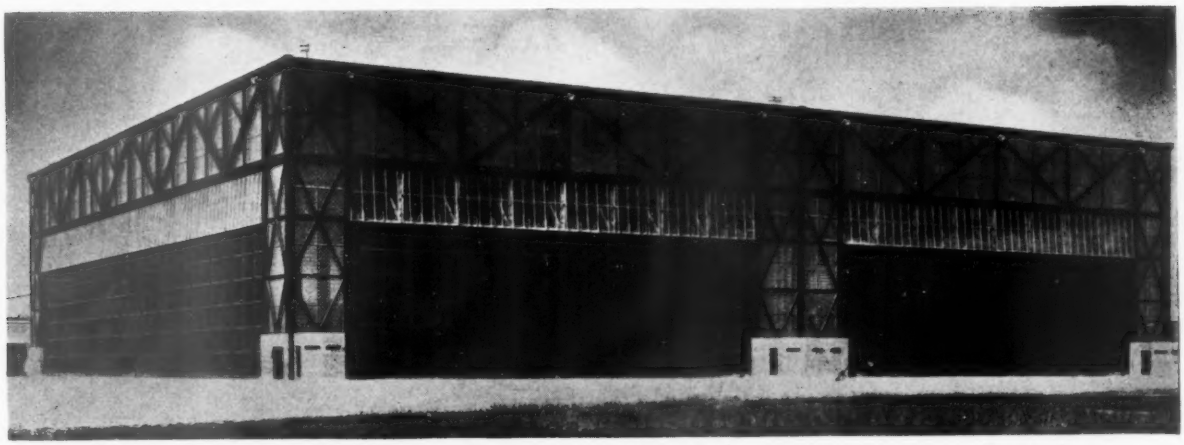
The table below gives the dimensions of the principal air liners operating in Europe at the present time :—

In laying out hangars, the simplest arrangement is to face them to open directly onto the aerodrome but unless a large frontage is available each hangar will have to be deep, and this will make it difficult to remove machines which may be stowed at the back. Another door at the back would solve the difficulty, but then machines will have to go some distance round to reach the landing area, which is uneconomical.

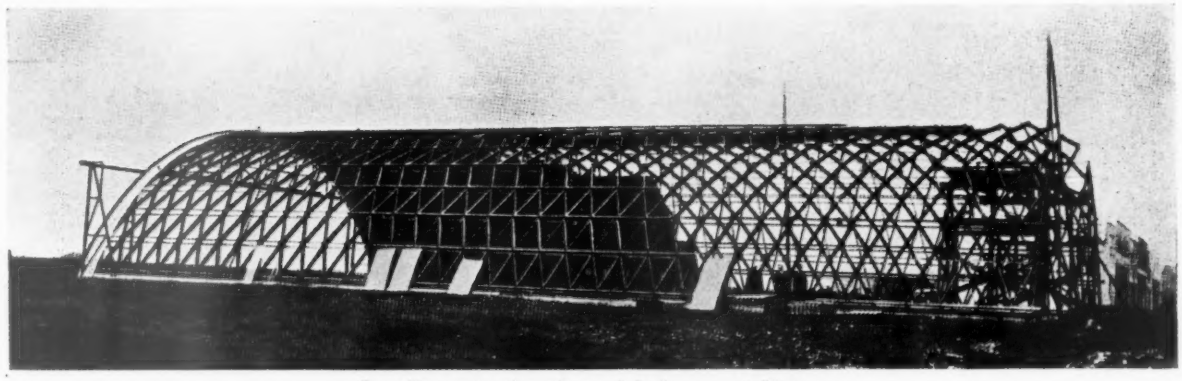
A better method is to have hangars of moderate depth with doors at each end facing each other across tarmac gangways of ample width for manœuvring the largest machines which the hangars can contain. Such an arrangement is common at Royal Air Force aerodromes. At Croydon some of the hangars face directly onto the landing area, and some face at right angles onto gangways. All have doors at the front only. Hangars must have workshops and offices. These can be conveniently placed along the

Type and Number of Passengers excluding Crew	Span	Length	Height
Biplanes			
Handley Page 42 (38 passengers)	130 0	89 9	27 0
Short "Scylla" (39 passengers)	113 0	86 3	29 6
De Havilland 86 (16 passengers)	64 6	46 1¼	13 0
Monoplanes			
Fokker F.XX (12 passengers)	90 0	54 9	15 7
Fokker F.XXII (22 passengers)	108 0	78 8	19 8
Douglas D.C.2 (14 passengers)	85 0	61 11¾	16 3¾
Monoplanes—contd. Fokker F.XXXVI (32 passengers)	98 4	72 2	16 1
Avro 642 (16 passengers)	71 3	54 6	11 6
Junkers Ju 52/3m (17 passengers)	96 9	62 0	14 10
Junkers G.38 (34 passengers)	144 4	75 6	22 6
Wibault Penhoet (10 passengers)	74 1	55 9	18 9
Savoia Marchetti S-73 P (18 passengers)	78 8½	57 2½	15 0

A detail of the hangar illustrated above, showing the roof structure and the arrangement of the sliding doors.



Steel aeroplane hangar at Munich. The doors are counter-balanced and swing upwards, leaving a clear opening.



Lamella construction of one of the hangars at Heston.

walls if the hangars have doors at both ends, or along the back wall if they face onto the landing area. Fire protection is of prime importance in view of the highly inflammable nature of aircraft and their contents. Automatic sprayers should be installed to operate downwards from the roof and upwards from the floor, and there should be an ample supply of foam-producing apparatus. The whole airport should be linked by an efficient fire-alarm system.

While on the subject of fire, housing for the airport fire-engine and ambulance must not be forgotten. Speed is the essence of success in dealing with crash fires and accidents, and the fire brigade and ambulance stations should face directly onto the landing area, the most probable scene of such occurrences.

Fire engine and ambulance should be together, and they should be in instantaneous communication with the control officer, who is likely to see an accident from the control tower before anyone else on the aerodrome. The arrangement at Manchester Airport, where the fire engine and ambulance are housed directly below the control tower, is admirable.

Fuel supply is one of the questions which has not yet been definitely solved. It has been customary to supply fuel from underground storage tanks by overhead delivery arms to small aircraft, and by hose from underground pits to the larger machines. The big air liners carry a large quantity of petrol; for example, the Handley Page 42 has a capacity of 500 gallons, and at important ports very large quantities are involved. At a crowded airport the minimum of delay and movement is desirable, and so the practice is growing of bringing fuel to the machine in mobile motor tanks instead of taking the machine to fixed fuelling points. These mobile re-fuelling units vary in size from 350 gallons capacity to 1,000 gallons capacity or more. Such units are for aerodrome use only, and often the tank lorries of the petrol companies refuel machines direct. If mobile units are employed, they should have separate garage accommodation. Bulk petrol and oil storage in a handy position will still be needed, but the complication of underground pipe lines will be avoided.

Night flying is now becoming a regular feature of air line operation, and must do so if air is to compete with surface transport. Airports must be efficiently lit for night flying in a manner approved by the Air Ministry. Night-flying equipment is not yet standardized, but the latest system recently installed at Croydon is likely to form the prototype for most of the airports on the Empire routes. Briefly, it consists of a red neon flashing beacon mounted on the southernmost hangar which can be seen in clear weather for over 60 miles. Although visible at such a distance, it is not dazzling at close range, and gives a distinctive red glow in mist or haze. The boundary of the aerodrome is picked out with orange boundary lights mounted on posts 2½ ft. high, 100 yds. apart. They have a weak link in their construction, so that if a machine collides with them they give way and the machine is not damaged. They operate at low voltage, so that there is no danger of fire or shock. The illuminated wind direction indicator swings automatically with the wind, and so shows the pilot the correct direction for landing. There are eight floodlights, under the control of the officer in the control tower, placed at intervals round the landing area. In accordance with the wind direction for landing, two, or possibly three, of these are switched on. Each delivers about 1,000,000 candle power, spreads the light through about 150 degrees and lights an area of about 4½ million sq. ft. These floodlights give ample light for landing the fastest air liners.

Air transport development is still highly fluid, and there can be no question of standardizing the layout of aerodrome buildings at this stage. Each site must be judged on its merits and an arrangement chosen which will, as far as it is possible to foresee, give scope for meeting future requirements. It is highly desirable that buildings should be concentrated as much as possible; to spread them round the edges of the landing area causes obstruction and a great deal of delay and wear and tear in taxying machines from place to place. The purely rectangular layout with buildings arranged along the side or sides of the landing area, though perhaps the simplest method, may result in an inconveniently long frontage if any considerable expansion is required.

A better arrangement, which has been adopted at certain airports in America, places the buildings and hangars in blocks leading away at right angles from the aerodrome, with the control tower and administrative building on the landing area at the head of the block. Hangars are faced sideways on to tarmac aprons which lead on to the aerodrome. Given sufficient

Steel hangar at Mildenhall, with externally sliding doors.

The seaplane station and aerodrome at Lübeck-Travemunde, in the Baltic.

depth, such an arrangement economizes in frontage, and if expansion is needed the hangar blocks can be duplicated or triplicated in parallel. Such lay-outs are being used at Detroit and Indianapolis.

More popular is the broad arrow lay-out which is used at several American airports and in this country at Heston. In this lay-out the buildings are arranged in the shape of a broad arrowhead jutting out into the landing area with the terminal building and control tower forming the point. The hangars can be arranged in continuation of the arms of the arrowhead, slanting away from but facing on to the landing area, and such an arrangement gives scope for extension without obstruction to flying or undue dispersion. The terminal building is accessible and centrally placed and can be designed so that of the two faces giving on to the landing area one can be used as an arrival platform and the other for departures. Thus arriving and departing passengers can be kept apart.

Gatwick airport, now under construction to serve continental traffic, follows an entirely different plan, no doubt largely influenced by the peculiarities of the site. The airport buildings are sited in a deep bay running out of the main landing area and bounded by the Southern Railway and a public road, so that the buildings do not

SCHEDULE OF GENERAL AERODROME FACILITIES

	Aerodrome Class I	Aerodrome Class II	Aerodrome Class III
Medical Requirements ..	*See* Appendix II†	*See* Appendix III†	*See* Appendix III†
Crash Equipment, since amended.	*See* Appendix II†	*See* Appendix III†	*See* Appendix III†
Hangar Accommodation ..	At least one hangar capable of taking aircraft with wing span up to 100 feet and with 30 feet of head room.	At least one hangar capable of taking aircraft with wing span up to 50 feet and with 15 feet of head room.	——
Fuel and Lubricants ..	Fuel pumps and tanks with a total capacity of at least 5,000 gallons; proportionate supply of lubricants.	Fuel pumps and tanks with a capacity of at least 2,000 gallons; proportionate supply of lubricants.	Fuel and lubricants procurable locally by arrangement.
Repair Facilities	Adequate machine tools for simple overhauls to aircraft or engines of any type.	Floor space under cover where repairs to aircraft and engines could be carried out.	——
	Forge, welding, copper and tinsmiths' plant.	Appropriate hand tools to enable Ground Engineer to carry out running repairs.	——
	Carpenters' and fabric workers' shops.	——	——
	Adequate hand tools for use by aerodrome technical staff.		
Picketing out Aircraft ..	Arrangements for securing aircraft (of all types) in the open for any wind direction.	Arrangements for securing at least one medium-sized aircraft in the open in any wind direction.	Screw pickets and lashings usually available.
Passenger Accommodation ..	Waiting-room and lavatory accommodation adequately appointed and heated when necessary.	Waiting-room and lavatory accommodation.	——
	Good-class restaurant	——	——
Passenger Facilities ..	Motor transport available on spot or within easy call by telephone.	A motor vehicle generally available if called for by telephone.	——
	Post Office Telephone	Post Office Telephone.	Post Office Telephone.
Stores and Equipment ..	Adequate chocks, trestles, stepladders, etc., and small stores in general use on aircraft and aero engines.	Chocks, trestles, stepladders and general aerodrome equipment available for use. No organisation need be guaranteed for the provision of stores or spare parts.	——
	Landing compass or other facilities for swinging compasses.	——	——
	Items appertaining to specific makes of aircraft and aero engines need not actually be held, but there must be reasonable facilities for obtaining requirements by telephone or telegraph.	——	——
Staff	Adequate and competent staff, including ground engineer or engineers qualified in categories "A," "B," "C" and "D" to man all facilities enumerated above.	Ground engineer qualified in categories "A" and "C" generally available or within call by telephone.	Part-time caretaker who may be available to render assistance.
	Aerodrome party to handle and service aircraft and attend to the requirements of passengers.	Labour generally available or within call by telephone to handle and service aircraft on the aerodrome.	

NOTE.—*Wireless communications* are not essential for purposes of classification: the Air Ministry should be consulted.
Also the provision of *Meteorological information* will not be taken into account in the classification of an aerodrome; but the Air Ministry should be consulted as regards the character and extent of the information that can be made available.

SCHEDULE OF NIGHT FLYING EQUIPMENT

	Aerodrome Class I	Aerodrome Class II	Aerodrome Class III
Aerodrome Beacon ..	Of a pattern and a character approved by the Air Ministry.	Of a pattern and a character approved by the Air Ministry.	——
Boundary Lights	As approved by Air Ministry with regard to numbers and specification.	As approved by Air Ministry with regard to numbers and specification.	As approved by Air Ministry with regard to numbers and specification.
Obstruction Lights ..	As approved by Air Ministry with regard to numbers and specification.	As approved by Air Ministry with regard to numbers and specification.	As approved by Air Ministry with regard to numbers and specification.
Landing Flares	Flares of a pattern approved by the Air Ministry.	Flares of a pattern approved by the Air Ministry.	Flares of a pattern approved by the Air Ministry.
Floodlight	Of a type approved by the Air Ministry	——	——
Illuminated Wind Indicator	Of a type approved by the Air Ministry	——	——

† *Appendix contains schedule of medical dressings, first-aid drugs, simple surgical instruments, etc. The above table has been compiled from Air Ministry publications.*

obtrude in any way on the landing area Round the edge of this bay, backing onto the railway and the road, are placed the hangars, and in the centre of the bay is a circular terminal building rather like an enlarged Martello tower. It is surrounded by concentric concrete tracks and there are two others leading out onto the main aerodrome. The terminal building is to be connected to the airport railway station by subway, and the lay-out has been chosen with rail transport of passengers to and from London as a primary consideration.

By means of covered gangways radiating from it the circular terminal building will allow a number of machines to load and unload simultaneously and undoubtedly will have a large passenger capacity. But the lay-out may be criticized on the ground that it does not lend itself readily to expansion.

CONSTRUCTIONAL OPPORTUNITIES

Constructional methods making use of weight-carrying external walls have engendered habits of thought which are singularly inapplicable to the present purpose. Associated with these methods is the jig-saw puzzle planning so typical of this country during its first years of commercial aviation.

The type of construction put forward by Paul Nelson in his project for the Cité Hospitallière de Lille is to the point. Stanchions are set back from a non-structural wall face in the le Corbusier tradition. The wall face is divided into identical rectangles to be filled in with interchangeable glazing and insulated waterproofed panels. By this means Nelson gives to a construction designed to house an organization whose function is thoroughly understood, a degree of flexibility even more appropriate to airport buildings. Add to this scheme some type of floor or floor finish through which ducts may be easily run and re-run, and the conception of a building appears which will meet the requirements of the aerodrome officer referred to above.

APPROACH TO THE BUILDING PROBLEM

The designer is faced with admitting that the building must be of a frankly temporary disposition and nature, or of backing himself to produce a more permanent fabric following on an intelligent reading of the programme. Once he has chosen the latter approach to the subject, even a casual inspection of almost all the existing work will show that the problem has yet to undergo that searching analysis which has been applied to other forms of public building.

CIRCULATION

Speed, which influences every other consideration to do with aircraft, must also dictate the internal circulation of the station. The assumption must be that the passenger is in a hurry, and his movements must be controlled from arrival to embarkation and vice versa. The large concourse, surrounded by similar recessed bays, some of which are devoted to transport companies' offices, others to newspaper stalls, post offices, etc., and others still providing the exits, does not altogether seem to fill the bill. The new convert to air transport wanders rather nervously into it all, possibly excited at the thought of the flight, and tries to guess where he should go, on which side the aerodrome is, whether he is weighed before he faces the passport authorities, where the devil he buys an air-sickness cure, and so on.

It will be interesting to see if the station under construction at Gatwick joins one or two others in this country in inducing a Thurber-like look on the faces of its newest clients. In contrast to the hustle of the passengers portion will be the Restaurant Terraces, where one may relax and watch the ever-fascinating sight of an aeroplane landing. It is to be hoped that advantage will be taken of the expert views expressed at the recent Aerodrome Owners' Conference held in London. Dwellers in the more far-sighted towns may then find themselves within easy reach of a large open space with a well-ordered lay-out of buildings. Templehof, Berlin, springs to mind. A unique aerodrome within 15 minutes of the heart of the city, its dignified, unpretentious building has become a minor social centre, and a background not unworthy of the aircraft.

ARCHITECT AND AIRPLANE DESIGNER

Aviation in this country, as expressed in its buildings, is in strong contrast to aviation as expressed by its aeroplanes. "The aeroplane indicts," said Corbusier in 1935—the latest of numberless remarks in the same tenor, the first of which was uttered at the Paris Aviation Exhibition in 1920—

"It indicts the city."

"It indicts those who control the city". . but it indicts even more the aerodrome architect.

Consider a de Havilland "Rapide," or "Comet," an Airspeed "Envoy," or a "Douglas." Look, too, at Sailplanes, to which power-driven aircraft design tends to bear an ever closer resemblance. This is the stuff to put the contemporary architect on his mettle. It is certainly true that no one without a very complete technical equipment can hope to arrive at a successful solution of the problems which the airplane of to-day provides.

SELECTED REFERENCES FOR AERODROME SUPPLEMENT

Airport Development. By Nigel Norman. London: Royal Aeronautical Society. 5s.

L'Aménagement des Aérodromes. By Fernand Béron and Hubert Touya. Paris: La Technique des Travaux. July 1934 et seq.

Some Aerodrome Buildings. Work by Graham R. Dawbarn. R.I.B.A. Journal, April 4, 1936.

Aerodrome Buildings. Paper by John Dower. R.I.B.A. Journal. April 30, 1932. (Also available as a reprint).

The Aeroplane. February 5, 1936. Special Aerodrome Number.

The Licensing and Classification of Civil Aerodromes. Air Ministry Pamphlet No. 55. (Subject to periodical revision.)

Jane's All the World's Aircraft. London: Sampson Low, Marston & Co. Price £2 2s.

SOCIETIES AND INSTITUTIONS

CAMBRIDGE CHAPTER OF ARCHITECTS

At the annual meeting of the Cambridge Chapter of Architects, the following officers were elected for the year 1936-1937: Executive Committee: Chairman, Mr. H. C. Hughes, M.A., F.R.I.B.A.; vice-chairman, Mr. S. E. Unwin, A.R.I.B.A.; hon. secretary, Mr. H. H. Parker, L.R.I.B.A.; and hon. treasurer, Mr. I. T. Sifton, A.R.I.B.A. Committee: Messrs. Theodore Fyfe, M.A., F.R.I.B.A., R. D. Robson, A.R.I.B.A., Norman T. Myers, F.R.I.B.A., D. Denton Smith (Associate Member), and Major C. F. Skipper, F.R.I.B.A., F.R.SAN.I. Mr. C. J. R. Wilson was re-elected hon. auditor.

EXHIBITION OF ARCHITECTS' WORKING DRAWINGS

An exhibition of Architects' Working Drawings will be held at the R.I.B.A. from Tuesday, April 28, to Tuesday, May 5, inclusive. The exhibition will be open daily between the hours of 10 a.m. and 8 p.m. (Saturday, 5 p.m.). It will include drawings lent by: Professor L. B. Budden and Mr. J. E. Marshall, FF.R.I.B.A. (Liverpool School of Architecture); Mr. C. Cowles-Voysey, F.R.I.B.A. (Cambridge Municipal Offices); Mr. Hubert Lidbetter, F.R.I.B.A. (Birmingham Meeting House); and Messrs. Erich Mendelsohn & Serge Chermayeff, F.R.I.B.A. (The Pavilion, Bexhill).

A special Students' Evening will be held at the exhibition on Tuesday, April 28, at 8 p.m. All students are cordially invited to attend. It is hoped that the architects (or their representatives) who have lent exhibits will be present in order to explain the drawings to the students. Refreshments will be provided, and no cards of admission are required.

HOUSING

The establishment of social centres at housing schemes is encouraged by the Department of Health for Scotland. The value of these centres is illustrated by the good work that is being done at Hamilton-hill Housing Scheme, Glasgow, where a social centre has been established for about 8 years. An inspector of the Department reports that the centre caters admirably for the recreational, social and cultural needs of the tenants and is very popular among them.

The building comprises a hall capable of seating about 200 people, a billiard room, a superintendent's office, a kitchen and various other rooms used by male members for reading, and by women members for meetings. Membership is limited to tenants. The Department points out that, with so many local authorities now realising the advantages of grouping their schemes, the provision of Social Centres has become a more feasible proposition, particularly as their cost may be charged to the Local Authority's Housing Account. It adds: "Little imagination is required to appreciate how such institutions appeal to people who have hitherto been denied the opportunity of enjoying social amenities, and how, under proper organisation, they foster communal life and beget a changed outlook on life among members."

ANNOUNCEMENTS

Mr. R. G. Vergette, A.R.I.B.A., has been appointed chief architectural assistant on the permanent staff of the County Architect's Department, Breconshire County Council. Mr. Vergette had been temporary senior architectural assistant in the Department for about twelve months.

Mr. Hazen Size, A.R.I.B.A., has moved his offices to No. 6 Cavendish Square, London, W.1. Telephone No.: Langham 2926-7.

THE WEEK'S BUILDING NEWS

LONDON & DISTRICTS (15 MILES RADIUS)

CHELSEA. *Flats.* Mr. Gordon Jeeves has prepared plans for the erection of a large block of flats on the site of 42 Cheyne Walk, Chelsea.

HARROW. *Cinema.* The U.D.C. has now approved amended plans by Mr. J. Owen Bond, F.R.I.B.A., for the erection of a cinema at the corner of Station Road and Bonnersfield Lane.

HARROW. *Cinema.* Mr. F. E. Bromige is the architect in connection with the new Grosvenor cinema proposed to be erected in Alexandra Avenue, Rayner's Lane.

HILLINGDON. *Hospital Extensions.* Plans have now been approved by the Uxbridge U.D.C. for a new ward block, operating theatre suite, extension to nurses' home, and mortuary, at the Hillingdon County Hospital, for the Middlesex C.C.

HORNCHURCH. *School.* The Essex Education Committee has approved plans for the erection of a high school for girls at Hornchurch at a cost of £47,296.

ICKENHAM. *Church.* A new church is to be erected for the Congregational Union at Swakeleys Road.

RUISLIP. *Lido.* The Grand Union Canal Company are to provide a lido at the reservoir at Ruislip at an estimated cost of £12,000.

SOUTHGATE. *Houses, etc.* Plans passed by the Corporation: 18 houses, Sussex Way, Cockfosters, for Mr. G. Turner; 54 houses, Ash Grove, for Mr. G. W. Newman; 25 houses, Sussex Way, Cockfosters, for Mr. W. H. Richards; six flats, Avenue Road, for Messrs. F. Gilbert & Co.; two houses, Houndsden Road, for Mr. H. E. Tufton; six houses, Westpole Avenue, for Mr. C. E. Ward; nine houses, Houndsden Road, for Messrs. H. Curnew and Son; 36 houses, Websleigh estate, for Messrs. Wates (Streatham), Ltd.; 30 houses, Telford Road, for Mr. Bryant Hobbs; 32 houses, Morton Way, for Mr. H. A. Nash.

STAINES. *Flats, etc.* The U.D.C. has agreed to the erection of 68 flats and 33 garages at Penton Road, by the Penton Development Co.

SUNBURY. *Estate Development.* Mr. F. Sutherland, architect, Guiseley, Leeds, has prepared plans for Mrs. C. Hunter, for the development of Mill Field, Windmill Road. Plans have been approved subject to agreement regarding the drainage of the estate.

SUNBURY. *Houses.* The U.D.C. has given permission to Messrs. Dodge and Reid, architects, Brentford, for the development of the west side of Green Street, by the Parkwood Estates and Building Co., Ltd.

UXBRIDGE. *Offices, etc.* The Middlesex C.C. proposes shortly to develop property known as "Dragonfield," in the High Street, as local county offices. It is now proposed by the U.D.C. to take advantage of this and seek the permission of the County Authorities to allow the county architect to act for them in the preparation of plans for the erection of a civic hall, on a site adjoining, and treat both schemes as one.

UXBRIDGE. *Houses.* Mr. H. B. Silver is to develop further the Hillingdon Place estate by the erection of 20 houses in road No. 6.

UXBRIDGE. *Sub-stations.* The U.D.C. has now approved plans submitted by the London Passenger Transport Board for the erection of trolley bus substations at Hillingdon Road and Turnpike Road, Uxbridge, and Lang Wheel Works, Uxbridge Road, Hillingdon.

SOUTHERN COUNTIES

CAVERSHAM. *Estate Development.* The Ministry of Health has allowed the appeal made by Messrs. Mitchell Bros. in connection with the proposed development of the Balmore Estate, subject to the Council approving plans of houses to be erected.

CHICHESTER. *Cinema.* Plans have now been approved for the reconstruction of the Plaza Cinema. The architect is Mr. Andrew Mather, Leicester Square Chambers, W.C.2.

GUILDFORD. *Flats.* Morris Estates, Ltd., have prepared a scheme for the erection of 42 flats on the Beechcroft site, Epsom Road, Guildford.

GUILDFORD. *Store, Houses, etc.* Plans passed by the Corporation: Store, Walnut Tree Close, for Messrs. Friary, Holroyd and Healy's Breweries, Ltd.; 50 houses, Bannisters Farm, for Messrs. Dennis Bros.; two houses, New Inn Lane, for Mr. C. Grover; riding school, Epsom Road, for Mrs. A. J. Lee; six houses, Manor Farm estate, for Mr. C. T. Corps; two shops and houses, Worpleston Road, for Mr. K. Smith; extensions, Stoke Hotel, for Hodgsons Kingston Brewery Co., Ltd.

HAVANT. *Housing.* The U.D.C. has approved the development by Mr. H. E. Hickman of a site at Eastoke Avenue. Mr. C. W. Wilkins, of Havant, is the architect.

RUISLIP. *Church.* A site has been purchased through the London Diocesan Fund for the erection of a permanent church in the near future.

TENTERDEN. *Houses.* The R.D.C. proposes to erect 50 more houses in the district. The Council's architect is Major Marchant.

SOUTH WESTERN COUNTIES

BARNSTAPLE. *Cinema.* It is proposed to erect a new cinema in Boutport Street for Mr. A. E. Carder. The architect is Mr. Hurley Robinson.

BARNSTAPLE. *Cinema.* Messrs. Orphoot, Whiting and Lindsay, have prepared plans for M. Prince for the proposed erection of a cinema in the Strand.

PLYMOUTH. *Houses, etc.* Plans passed by the Corporation: 73 houses, Cemel's Head estate, for St. Aubyn Estates, Ltd.; three houses, Old Laira Road, for Mr. J. Blatchford; four houses, St. Budeaux Churchway, for Davis Estates; 12 bungalows, Poole Park Road, for Mr. W. Williams; two bungalows, Weston Park Road, for Mr. E. Davey; two houses, Merrivale Road, for Mr. F. Westcott; alterations and additions, Bedford Street, for Messrs. Vickery & Co., Ltd.; alterations and additions, Fountain Inn, Frankfort Street, for Messrs. Ind, Coope and Allsopp, Ltd.; alterations, Tweedside works, Stonehouse, for Messrs. Blight and White; three houses, Peverell Park Road, for Mr. A. E. Lethbridge; alterations and additions, Royal Sailors Club, Morice Street, for Club Committee; alterations, showrooms and offices, Millbay Road, for Western Counties Co-operative Association; alterations and additions, 56 Coburg Street, for Messrs. Stephens and Rosdon, Ltd.; licensed premises, 103, Exeter Street, for Mrs. J. Mitchell; shop and billiard hall, Fore Street, and Lamberth Street, Devonport, for Montague Burton Estates, Ltd.

MIDLAND COUNTIES

BIRMINGHAM. *Fire Station.* The Birmingham Corporation has acquired a site in Stud Lane, Stetchford, for the erection of a fire station.

BIRMINGHAM. *Houses.* The Lamchester Housing Trust has acquired a further 37 acres on the Mill Pond estate, Birmingham, for the erection of about 477 houses.

BIRMINGHAM. *Houses, etc.* The Corporation has approved a scheme for the development of the Lea Hall estate at a total cost of £1,211,310 for houses and £330,000 for cost of roads, land, etc. Meanwhile, tenders are to be obtained for the erection of the first section comprising 869 houses.

TUNSTALL. *Houses, etc.* Plans passed at Tunstall: Two houses, Sunnyside Avenue, for Messrs. Ray and Powell; two houses, High Street, for Mr. S. Jolley; three houses, Biddulph Road, for Mr. T. B. Cartlidge; 86 houses, Turnhurst Road, for Mr. C. Sutton; reconstruction, Palace cinema, Cleveland Street, for Mr. W. Hitchen.

NORTHERN COUNTIES

BIRKENHEAD. *Houses and Flats.* The Corporation has approved plans by the borough engineer for the erection of 24 houses in Borough Road, and 143 houses and 20 flats in Corporation Road.

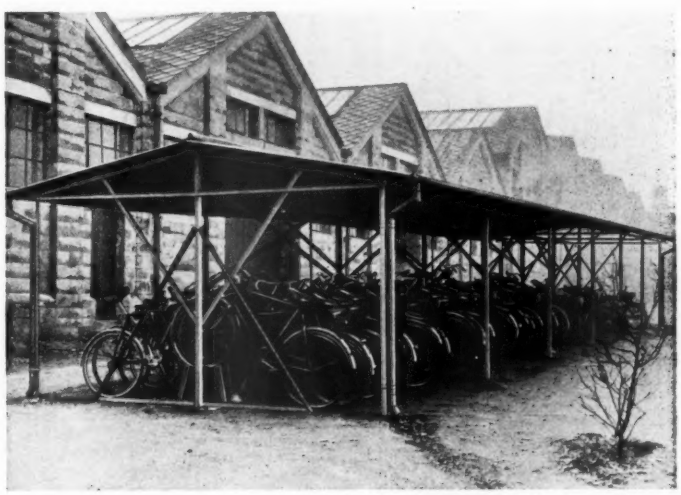
LEEDS. *Schools.* The Education Committee has obtained sites on the Sandford housing estate for the erection of two senior schools.

LEEDS. *Library.* The Corporation has approved plans, by Mr. F. L. Charlton, for the erection of a branch library at Sheepscar.

MANSFIELD. *Shops and Houses, etc.* Plans passed by the Corporation: Two shops and houses, Little Barn Lane, for Mr. C. H. Hill; three shops, Nottingham Road, for Mr. Frank Hardy; two houses, Forest Road, for Messrs. F. Cook and Son; two houses, Big Barn Lane, for Mr. S. F. Peet; additions, Nags Head P.H., West Gate, for Messrs. J. Shipstone and Sons, Ltd.

MANSFIELD. *Houses.* The Corporation is to erect 63 houses by direct labour on the cleared areas, at a cost of about £19,000.

Continued on page xlviii.



The Cycle Park installation at Croydon Airport (Constructors, Ltd.).

G

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	II
			s. d.	s. d.
A_1	ABERDARE ...	S. Wales & M.	1 5½	1 1¼
A	Aberdeen ...	Scotland	1 6½	1 2
A_1	Abergavenny ...	S. Wales & M.	1 6	1 1½
A_3	Abingdon ...	S. Counties	1 5	1 0¾
A	Accrington ...	N.W. Counties	1 6½	1 2
A_3	Addlestone ...	S. Counties	1 5	1 0¾
A	Adlington ...	N.W. Counties	1 6½	1 2
A	Airdrie ...	Scotland	*1 6½	1 2
C	Aldeburgh ...	E. Counties	1 2½	11
A	Altrincham ...	N.W. Counties	1 6½	1 2
B_3	Appleby ...	N.W. Counties	1 3	11¼
A	Ashton-under-Lyne	N.W. Counties	1 6½	1 2
B_1	Aylesbury ...	S. Counties	1 4	1 0
B_1	BANBURY ...	S. Counties	1 4	1 0
B_1	Bangor ...	N.W. Counties	1 4	1 0
A_3	Barnard Castle	N.E. Coast	1 5	1 0¾
A	Barnsley ...	Yorkshire	1 6½	1 2
B	Barnstaple ...	S.W. Counties	1 4½	1 0½
A	Barrow ...	N.W. Counties	1 6½	1 2
A	Barry	S. Wales & M.	1 6½	1 2
B_1	Basingstoke ...	S.W. Counties	1 4	1 0
A_2	Bath	S.W. Counties	1 5½	1 1¼
A	Batley ...	Yorkshire	1 6½	1 2
A_2	Bedford ...	E. Counties	1 5½	1 1¼
A_2	Berwick-on-Tweed	N.E. Coast	1 5½	1 1¼
A_2	Bewdley ...	Mid. Counties	1 5½	1 1¼
B_3	Bicester ...	S. Counties	1 3	11½
	Birkenhead ...	N.W. Counties	*1 7½	1 2⅜
A	Birmingham ...	Mid. Counties	1 6½	1 2
A_1	Bishop Auckland	N.E. Coast	1 6	1 1½
A	Blackburn ...	N.W. Counties	1 6½	1 2
A	Blackpool ...	N.W. Counties	1 6½	1 2
A	Blyth	N.E. Coast	1 6½	1 2
B_1	Bognor ...	S. Counties	1 4	1 0
A	Bolton ...	N.W. Counties	1 6½	1 2
A_3	Boston ...	Mid. Counties	1 5	1 0¾
A_2	Bournemouth...	S. Counties	1 5½	1 1¼
B_2	Bovey Tracey	S.W. Counties	1 3½	11¾
A	Bradford ...	Yorkshire	1 6½	1 2
A_1	Brentwood ...	E. Counties	1 6	1 1½
A	Bridgend ...	S. Wales & M.	1 6½	1 2
B	Bridgwater ...	S.W. Counties	1 4½	1 0½
A_1	Bridlington ...	Yorkshire	1 6	1 1½
A	Brighouse ...	Yorkshire	1 6½	1 2
A_2	Brighton ...	S. Counties	1 5½	1 1¼
A	Bristol ...	S.W. Counties	1 6½	1 2
B	Brixham ...	S.W. Counties	1 3	11¾
A	Bromsgrove ...	Mid. Counties	1 5½	1 1¼
B	Bromyard ...	Mid. Counties	1 3	11¾
A	Burnley ...	N.W. Counties	1 6½	1 2
A	Burslem ...	Mid. Counties	1 6½	1 2
A	Burton-on-Trent	Mid. Counties	1 6½	1 2
A	Bury	N.W. Counties	1 6½	1 2
A	Buxton ...	N.W. Counties	1 6	1 1½
A_1	CAMBRIDGE	E. Counties	1 6	1 1½
B_1	Canterbury ...	S. Counties	1 4	1 0
A	Cardiff ...	S. Wales & M.	1 6½	1 2
A	Carlisle ...	N.W. Counties	1 6½	1 2
B	Carmarthen ...	S. Wales & M.	1 4½	1 0½
B	Carnarvon ...	N.W. Counties	1 4½	1 0½
A	Carnforth ...	N.W. Counties	1 6½	1 2
A	Castleford ...	Yorkshire	1 6½	1 2
A_3	Chatham ...	S. Counties	1 5	1 0¾
A	Chelmsford ...	E. Counties	1 5	1 0¾
A	Cheltenham ...	S.W. Counties	1 5	1 0¾
A	Chester ...	N.W. Counties	1 6½	1 2
A	Chesterfield ...	Mid. Counties	1 6½	1 2
B_1	Chichester ...	S. Counties	1 4	1 0
A	Chorley ...	N.W. Counties	1 6½	1 2
B_1	Cirencester ...	S. Counties	1 4	1 0
A	Clitheroe ...	N.W. Counties	1 6½	1 2
A	Clydebank ...	Scotland	1 6½	1 2
A	Coalville ...	Mid. Counties	1 6½	1 2
A_2	Colchester ...	E. Counties	1 5½	1 1¼
A	Colne	N.W. Counties	1 6	1 1½
A_2	Colwyn Bay ...	N.W. Counties	1 5½	1 1¼
A_1	Consett ...	N.E. Coast	1 6	1 1½
A_2	Conway ...	N.W. Counties	1 5½	1 1¼
A	Coventry ...	Mid. Counties	1 6½	1 2
A_2	Crewe	N.W. Counties	1 5½	1 1¼
A	Cumberland ...	N.W. Counties	1 5	1 0¾
A	DARLINGTON	N.E. Coast	1 6½	1 2
A	Darwen ...	N.W. Counties	1 6½	1 2
B	Deal	S. Counties	1 4	1 0
A_2	Denbigh ...	N.W. Counties	1 5	1 0¾
A	Derby	Mid. Counties	1 6½	1 2
A	Dewsbury ...	Yorkshire	1 6½	1 2
B	Didcot	S. Counties	1 4½	1 0½
A	Doncaster ...	Yorkshire	1 6½	1 2
B_1	Dorchester ...	S.W. Counties	1 4	1 0
A	Driffield ...	Yorkshire	1 5	1 0¾
A_2	Droitwich ...	Mid. Counties	1 5½	1 1¼
A	Dudley ...	Mid. Counties	1 6½	1 2
A_2	Dumfries ...	Scotland	1 6	1 1¼
A	Dundee ...	Scotland	1 6½	1 2
A	Durham ...	N.E. Coast	1 6½	1 2
A_2	EASTBOURNE	S. Counties	1 5½	1 1¼
A_2	Ebbw Vale ...	S. Wales & M.	1 6	1 1½
A	Edinburgh ...	Scotland	1 6½	1 2
A_1	Glamorgan-shire, Rhondda Valley District	S. Wales & M.	1 6	1 1½
A_2	Exeter ...	S.W. Counties	*1 5½	1 1¼
B	Exmouth ...	S.W. Counties	1 4½	1 0½
A_3	FELIXSTOWE	E. Counties	1 5	1 0¾
A	Filey	Yorkshire	1 5	1 0¾
A	Fleetwood ...	N.W. Counties	1 6½	1 2
B_1	Folkestone ...	S. Counties	1 4	1 0
A	Frodsham ...	N.W. Counties	1 6½	1 2
B_2	Frome ...	S.W. Counties	1 3½	11¾
A	GATESHEAD	N.E. Coast	1 6½	1 2
B	Gillingham ...	S. Counties	1 4½	1 0½
A	Glasgow ...	Scotland	1 7	1 2½
A_2	Gloucester ...	S.W. Counties	1 5½	1 1¼
A_2	Goole ...	Yorkshire	1 5½	1 1¼
A_2	Gosport ...	S. Counties	1 5½	1 1¼
A_3	Grantham ...	Mid. Counties	1 5	1 0¾
A_1	Gravesend ...	S. Counties	1 6	1 1½
A	Greenock ...	Scotland	*1 6½	1 2
A	Grimsby ...	Yorkshire	1 6½	1 2
B	Guildford ...	S. Counties	1 4½	1 0½
A	HALIFAX ...	Yorkshire	1 6½	1 2
A	Hanley ...	Mid. Counties	1 6½	1 2
A	Harrogate ...	Yorkshire	1 6½	1 2
A	Hartlepools ...	N.E. Coast	1 6½	1 2
B	Harwich ...	E. Counties	1 4½	1 0½
B_1	Hastings ...	S. Counties	1 4	1 0
A	Hatfield ...	S. Counties	1 5½	1 1¼
B	Hereford ...	S.W. Counties	1 4½	1 0½
A_2	Hertford ...	E. Counties	1 5½	1 1¼
A	Heysham ...	N.W. Counties	1 6½	1 2
A	Howden ...	N.E. Coast	1 6½	1 2
A	Huddersfield ...	Yorkshire	1 6½	1 2
A	Hull	Yorkshire	1 6½	1 2
A	ILKLEY ...	Yorkshire	1 6½	1 2
A	Immingham ...	Mid. Counties	1 6½	1 2
A_2	Ipswich ...	E. Counties	1 5½	1 1¼
B_2	Isle of Wight ...	S. Counties	1 4½	1 0½
A	JARROW ...	N.E. Coast	1 6½	1 2
A	KEIGHLEY ...	Yorkshire	1 6½	1 2
A_3	Kendal ...	N.W. Counties	1 5	1 0¾
A_3	Keswick ...	N.W. Counties	1 5	1 0¾
A_1	Kettering ...	Mid. Counties	1 6	1 1½
A_2	Kidderminster	Mid. Counties	1 5½	1 1¼
B_1	King's Lynn ...	E. Counties	1 4	1 0
A	LANCASTER ...	N.W. Counties	1 6½	1 2
A_1	Leamington ...	Mid. Counties	1 6	1 1½
A	Leeds	Yorkshire	1 6½	1 2
A	Leek	Mid. Counties	1 6½	1 2
A	Leicester ...	Mid. Counties	1 6½	1 2
A	Leigh	N.W. Counties	1 6½	1 2
B	Lewes	S. Counties	1 3	11½
A_2	Lichfield ...	Mid. Counties	1 5½	1 1¼
A	Lincoln ...	Mid. Counties	1 6½	1 2
	Liverpool ...	N.W. Counties	*1 8	1 3
A_2	Llandudno ...	N.W. Counties	1 5½	1 1¼
A	Llanelly ...	S. Wales & M.	1 6½	1 2
	London (12-miles radius)		1 8	1 3
	Do. (12-15 miles radius)		1 7½	1 2⅜
A	Long Eaton ...	Mid. Counties	1 6½	1 2
A	Loughborough	Mid. Counties	1 6½	1 2
A_1	Luton	E. Counties	1 6	1 1½
A	Lytham ...	N.W. Counties	1 6½	1 2
A_1	MACCLESFIELD	N.W. Counties	1 6	1 1½
A_3	Maidstone ...	S. Counties	1 5	1 0¾
A_3	Malvern ...	Mid. Counties	1 5	1 0¾
A	Manchester ...	N.W. Counties	1 6½	1 2
A	Mansfield ...	Mid. Counties	1 6½	1 2
B_1	Margate ...	S. Counties	1 4	1 0
A	Matlock ...	Mid. Counties	1 5	1 0¾
A_1	Merthyr ...	S. Wales & M.	1 6	1 1½
A	Middlesbrough	N.E. Coast	1 6½	1 2
A_2	Middlewich ...	N.W. Counties	1 5½	1 1¼
B_2	Minehead ...	S.W. Counties	1 3½	11¾
B_2	Monmouth ... & S. and E. Glamorganshire	S. Wales & M.	1 3½	11¾
A	Morecambe ...	N.W. Counties	1 6½	1 2
A_2	NANTWICH ...	N.W. Counties	1 5½	1 1¼
A	Neath	S. Wales & M.	1 6½	1 2
A	Nelson ...	N.W. Counties	1 6½	1 2
A	Newcastle ...	N.E. Coast	1 6½	1 2
A	Newport ...	S. Wales & M.	1 6½	1 2
A	Normanton ...	Yorkshire	1 6½	1 2
A	Northampton	Mid. Counties	1 6½	1 2
A	North Shields...	N.E. Coast	1 6½	1 2
A	North Staffs ...	Mid. Counties	1 6½	1 2
A_1	Norwich ...	E. Counties	1 6	1 1½
A	Nottingham ...	Mid. Counties	1 6½	1 2
A	Nuneaton ...	Mid. Counties	1 6½	1 2
A	OAKHAM ...	Mid. Counties	1 5	1 0¾
A	Oldham ...	N.W. Counties	1 6½	1 2
A_3	Oswestry ...	N.W. Counties	1 5	1 0¾
A_1	Oxford ...	S. Counties	1 6	1 1½
A	PAISLEY ...	Scotland	*1 6½	1 2
B_3	Pembroke ...	S. Wales & M.	1 3	11½
A	Perth	Scotland	*1 6½	1 2
A_1	Peterborough	E. Counties	1 6	1 1½
A	Plymouth ...	S.W. Counties	*1 6½	1 2
A	Pontefract ...	Yorkshire	1 6½	1 2
A_1	Pontypridd ...	S. Wales & M.	1 6	1 1½
A_2	Portsmouth ...	S. Counties	1 5½	1 1¼
A	Preston ...	N.W. Counties	1 6½	1 2
A	QUEENSFERRY	N.W. Counties	1 6½	1 2
A_2	READING ...	S. Counties	1 5½	1 1¼
B	Reigate ...	S. Counties	1 4½	1 0½
A	Retford ...	Mid. Counties	1 5	1 0¾
A_1	Rhondda Valley	S. Wales & M.	1 6	1 1½
A	Ripon	Yorkshire	1 5	1 0¾
A	Rochdale ...	N.W. Counties	1 6½	1 2
B	Rochester ...	S. Counties	1 4½	1 0½
A_1	Ruabon ...	N.W. Counties	1 6	1 1½
A	Rugby	Mid. Counties	1 6½	1 2
A_2	Rugeley ...	Mid. Counties	1 5½	1 1¼
A	Runcorn ...	N.W. Counties	1 6½	1 2
A_1	ST. ALBANS ...	E. Counties	1 6	1 1½
A	St. Helens ...	N.W. Counties	1 6½	1 2
B_3	Salisbury ...	S.W. Counties	1 3½	11¾
A_1	Scarborough ...	Yorkshire	1 6	1 1½
A	Scunthorpe ...	Mid. Counties	1 6½	1 2
A	Sheffield ...	Yorkshire	1 6½	1 2
A	Shipley ...	Yorkshire	1 6½	1 2
A_2	Shrewsbury ...	Mid. Counties	1 5½	1 1¼
A_1	Skipton ...	Yorkshire	1 5½	1 1½
A_2	Slough ...	S. Counties	1 5½	1 1¼
A_1	Solihull ...	Mid. Counties	1 6	1 1½
A_2	Southampton ...	S. Counties	1 5½	1 1¼
A_1	Southend-on-Sea	E. Counties	1 6	1 1½
A	Southport ...	N.W. Counties	1 6½	1 2
A	S. Shields ...	N.E. Coast	1 6½	1 2
A_1	Stafford ...	Mid. Counties	1 6	1 1½
A	Stirling ...	Scotland	1 7	1 2½
A	Stockport ...	N.W. Counties	1 6½	1 2
A	Stockton-on-Tees	N.E. Coast	1 6½	1 2
A	Stoke-on-Trent	Mid. Counties	1 6½	1 2
B	Stroud ...	S.W. Counties	1 4½	1 0½
A	Sunderland ...	N.E. Coast	1 6½	1 2
A	Swansea ...	S. Wales & M.	1 6½	1 2
A	Swindon ...	S.W. Counties	1 5	1 0¾
A_1	TAMWORTH ...	N.W. Counties	1 6	1 1½
B	Taunton ...	S.W. Counties	1 4½	1 0½
A	Teesside Dist....	N.E. Counties	1 6½	1 2
A_2	Teignmouth ...	S.W. Coast	1 5½	1 1¼
A	Todmorden ...	Yorkshire	1 6½	1 2
A_1	Torquay ...	S.W. Counties	1 6	1 1½
B_2	Truro	S.W. Counties	1 3½	11¾
A_3	Tunbridge Wells	S. Counties	1 5	1 0¾
A	Tunstall ...	Mid. Counties	1 6½	1 2
A	Tyne District	N.E. Coast	1 6½	1 2
A	WAKEFIELD	Yorkshire	1 6½	1 2
A	Walsall ...	Mid. Counties	1 6½	1 2
A	Warrington ...	N.W. Counties	1 6½	1 2
A_1	Warwick ...	Mid. Counties	1 6	1 1½
A_1	Wellingborough	Mid. Counties	1 6	1 1½
A	West Bromwich	Mid. Counties	1 6½	1 2
A_2	Weston-s.-Mare	W. Counties	1 5½	1 1¼
A_2	Whitby ...	Yorkshire	1 5½	1 1¼
A	Widnes ...	N.W. Counties	1 6½	1 2
A	Wigan ...	N.W. Counties	1 6½	1 2
B	Winchester ...	S. Counties	1 4½	1 0½
A_2	Windsor ...	S. Counties	1 5½	1 0¾
A	Wolverhampton	Mid. Counties	1 6½	1 2
A_2	Worcester ...	Mid. Counties	1 5½	1 1¼
A_3	Worksop ...	Yorkshire	1 5	1 0¾
A_1	Wrexham ...	N.W. Counties	1 6	1 1½
A	Wycombe ...	S. Counties	1 5	1 0¾
B	YARMOUTH ...	E. Counties	1 4½	1 0½
B	Yeovil ...	S.W. Counties	1 4½	1 0½
A	York	Yorkshire	1 6½	1 2¾

* 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.

CURRENT PRICES

The wages are the standard Union rates of wages payable in London at the time of publication. The prices given below are for materials of good quality and include delivery to site in Central London area, unless otherwise stated. For delivery outside this area, adjustment should be made for the cost of transport. Though every care has been taken in its compilation, it is impossible to guarantee the accuracy of the list, and readers are advised to have the figures confirmed by trade inquiry. The whole of the information given is copyright.

WAGES

		s.	d.
Bricklayer	per hour	1	8
Carpenter	,,	1	8
Joiner	,,	1	8
Machinist	,,	1	8
Mason (Banker)	,,	1	8
,, (Fixer)	,,	1	9
Plumber	,,	1	8
Painter	,,	1	7
Paperhanger	,,	1	7
Glazier	,,	1	7
Slater	,,	1	8
Scaffolder	,,	1	4
Timberman	,,	1	4
Navvy	,,	1	3
General Labourer	,,	1	3
Lorryman	,,	1	5½
Crane Driver	,,	1	7
Watchman	per week	2	10	0

MATERIALS

EXCAVATOR AND CONCRETOR

		£	s.	d.
Grey Stone Lime	per ton	2	2	0
Blue Lias Lime	,,	1	16	6
Hydrated Lime	,,	3	0	9
Portland Cement, in 4 ton lots (d/d site, including Paper Bags)	,,	1	19	0
Rapid Hardening Cement, in 4-ton lots (d/d site, including Paper Bags)	,,	2	5	0
White Portland Cement, in 1-ton lots	,,	8	15	0
Thames Ballast	per Y.C.		6	6
¾" Crushed Ballast	,,		7	0
Building Sand	,,		7	6
Washed Sand	,,		8	6
2" Broken Brick	,,		8	0
¾" ,, ,,	,,		10	3
Pan Breeze	,,		6	6
Coke Breeze	,,		8	9

DRAINLAYER

BEST STONEWARE DRAIN PIPES AND FITTINGS

		4" s.	4" d.	6" s.	6" d.
Straight Pipes	per F.R.	0	9	1	1
Bends	each	1	9	2	6
Taper Bends	,,	3	6	5	3
Rest Bends	,,	4	3	6	3
Single Junctions	,,	3	6	5	3
Double	,,	4	9	6	6
Straight channels	per F.R.	1	6	2	6
¾" Channel bends	each	2	9	4	0
Channel junctions	,,	4	6	6	6
Channel tapers	,,	2	9	4	0
Yard gullies	,,	6	9	8	9
Interceptors	,,	16	0	19	6
IRON DRAINS :					
Iron drain pipe	per F.R.	1	6	2	6
Bends	each	5	0	10	6
Inspection bends	,,	9	0	15	0
Single junctions	,,	8	9	18	0
Double junctions	,,	13	6	30	0
Lead Wool	lb.		6		—
Gaskin	,,		5		—

BRICKLAYER

		£	s.	d.
Fletton	per M.	2	15	0
Grooved do.	,,	2	17	0
Phorpres bricks	,,	2	15	0
,, Cellular bricks	,,	2	15	0
Stocks, 1st quality	,,	4	11	0
,, 2nd ,,	,,	4	2	6
Blue Bricks, Pressed	,,	8	17	6
,, Wirecuts	,,	7	17	6
,, Brindles	,,	7	0	0
,, Bullnose	,,	9	0	0
Red Sand-faced Facings	,,	6	18	6
Red Rubbers for Arches	,,	12	0	0
Multicoloured Facings	,,	7	10	0
Luton Facings	,,	7	10	0
Phorpres White Facings	,,	3	17	3
,, Rustic Facings	,,	3	10	6
Midhurst White Facings	,,	5	0	0
Glazed Bricks, Ivory, White or Salt glazed, 1st quality :				
Stretchers	,,	21	0	0
Headers	,,	20	10	0
Bullnose	,,	27	10	0
Double Stretchers	,,	29	10	0
Double Headers	,,	26	10	0
Glazed Second Quality, *Less*	,,	1	0	0
,, Buffs and Creams, *Add*	,,	2	0	0
,, Other Colours	,,	5	10	0
2" Breeze Partition Blocks	per Y.S.	1	7	
2½" ,, ,, ,,	,,	1	10	
3" ,, ,, ,,	,,	2	1	
4" ,, ,, ,,	,,	2	6	

MASON

The following d/d F.O.R. at Nine Elms :		s.	d.
Portland stone, Whitbed	F.C.		4½
,, ,, Basebed	,,	4	7½
Bath stone	,,	2	10
York stone	,,	6	6
,, ,, Sawn templates	,,	7	6
,, ,, Paving, 2"	F.S.	1	8
,, ,, ,, 3"	,,	2	6

SLATER AND TILER

First quality Bangor or Portmadoc slates d/d F.O.R. London station :

		£	s.	d.
24" × 12" Duchesses	per M.	28	17	6
22" × 12" Marchionesses	,,	24	10	0
20" × 10" Countesses	,,	19	5	0
18" × 10" Viscountesses	,,	15	10	0
18" × 9" Ladies	,,	13	17	6
Westmorland green (random sizes)	per ton	8	10	0
Old Delabole slates d/d in full truck loads to Nine Elms Station :				
20" × 10" medium grey per 1,000 (actual)		21	11	6
,, ,, green ,, ,,		24	7	4
Best machine roofing tiles	,,	4	5	0
Best hand-made do.	,,	4	17	6
Hips and valleys	each			9
,, hand-made	,,			9½
Nails, compo	lb.		1	4
,, copper	,,		1	6

CARPENTER AND JOINER

		s.	d.
Good carcassing timber	F.C.	2	2
Birch	as 1" F.S.		9
Deal, Joiner's	,, ,,		5
,, ,, 2nds	,, ,,		4
Mahogany, Honduras	,, ,,	1	3
,, African	,, ,,	1	1
,, Cuban	,, ,,	2	6
Oak, plain American	,, ,,	1	0
,, Figured ,,	,, ,,	1	3
,, plain Japanese	,, ,,	1	2
,, Figured ,,	,, ,,	1	5
,, Austrian wainscot	,, ,,	1	6
,, English	,, ,,	1	11
Pine, Yellow	,, ,,	1	0
,, Oregon	,, ,,		4
,, British Columbian	,, ,,		4
Teak, Moulmein	,, ,,	1	3
,, Burma	,, ,,	1	2
Walnut, American	,, ,,	2	3
,, French	,, ,,	2	3
Whitewood, American	,, ,,	1	1
Deal floorings, ¾"	Sq.	18	6
,, 1"	,,	1	1	6
,, 1¼"	,,	1	2	0
,, 1½"	,,	1	5	0
,, 1¾"	,,	1	10	0
Deal matchings, ¾"	,,		14	0
,, 1"	,,		15	6
Rough boarding, ¾"	,,	1	4	0
,, 1"	,,		16	0
,, 1¼"	,,		18	0
,, 1½"	,,	1	6	0

Plywood, per ft. sup.

Thickness	¼" A d.	¼" B d.	¼" BB d.	⅜" A d.	⅜" B d.	⅜" BB d.	½" A d.	½" B d.	½" BB d.	⅝" A d.	⅝" B d.	⅝" BB d.
Qualities												
Birch 60 × 48	4	2½	2	5	3	2¾	7	5	4	8	6	5
Cheap Alder	–	2	1½	–	3½	2	–	–	–	–	–	–
Oregon Pine	–	2½	–	3	2¾	–	4	3½	–	5	4½	–
Gaboon												
Mahogany	4	3¼	–	5	4½	–	7	6¼	–	8	7	–
Figured Oak	6½	5	–	7½	5¾	–	10	8	–	1/–	9	–

		d.
Scotch glue	lb.	8

SMITH AND FOUNDER

Tubes and Fittings

(The following are the standard list prices, from which should be deducted the various percentages as set forth below.)

		¼"	⅜"	½"	¾"	1"	1¼"	2"
Tubes, 2'–14' long	per ft. run	4	5½	9½	1/1	1/10		
Pieces, 12"–23" long	each	10	1/1	1/11	2/8	4/9		
,, 3"–11¾" long	,,	7	9	1/3	1/8	3/–		
Long screws, 12"–23½" long	,,	11	1/3	2/2	2/10	5/3		
,, ,, 3" M–1¼" long	,,	8	10	1/5	1/11	3/6		
Bends	,,	8	11	1/7½	2/7½	5/2		
Springs not socketed	,,	5	7	1/1½	1/11½	3/11		
Socket unions	,,	2/–	3/–	5/6	6/9	10/–		
Elbows, square	,,	10	1/1	1/6	2/2	4/3		
Tees	,,	1/–	1/3	1/10	2/6	5/1		
Crosses	,,	2/2	2/9	4/1	5/6	10/6		
Plain sockets and nipples	,,	3	4	6	8	1/3		
Diminished sockets	,,	4	6	9	1/–	2/–		
Flanges	,,	9	1/–	1/4	1/9	2/9		
Caps	,,	3½	5	8	1/–	2/–		
Backnuts	,,	2	3	5	6	1/1		
Iron main cocks	,,	1/6	2/3	4/2	5/4	11/6		
,, with brass plugs	,,	—	4/–	7/6	10/–	21/–		

Discounts :

TUBES.	Per cent.		Per cent.
Gas	65	Galvanized gas	52½
Water	61½	,, water	47½
Steam	57½	,, steam	42½
FITTINGS.			
Gas	57½	Galvanized gas	47½
Water	52½	,, water	42½
Steam	47½	,, steam	37½

	s.	d.
Rolled steel joists cut to length per cwt.	12	9
Mild steel reinforcing rods, ¾" ,,	10	6
,, ,, ½" ,,	10	3
,, ,, ⅜" ,,	10	0

SMITH AND FOUNDER—*continued*

		s.	d.
Mild steel reinforcing rods, ¾"	cwt.	9	6
,, ,, ½"	,,	9	6
,, ,, 1"	,,	9	6
,, ,, 1¼"	,,	9	6
,, ,, 1½"	,,	9	6

		¾" s.	¾" d.	4" s.	4" d.
Cast-iron rain-water pipes of ordinary thickness metal	F.R.		8		10
Shoes	each	2	0	3	0
Anti-splash shoes	,,	4	6	8	0
Boots	,,	3	0	4	0
Bends	,,	2	7	3	9
,, with access door	,,		—	6	3
Heads	,,	4	0	5	0
Swan-necks up to 9" offsets	,,	3	9	6	0
Plinth bends, 4½" to 6"	,,	3	9	5	3
Half-round rain-water gutters of ordinary thickness metal	F.R.		5		6
Stop ends	each		6		6
Angles	,,	1	7	1	11
Obtuse angles	,,	2	0	2	6
Outlets	,,	1	9	2	3

PLUMBER

		s.	d.
Lead, milled sheets	cwt.	24	6
,, drawn pipes	,,	24	6
,, soil pipe	,,	30	0
,, scrap	,,	16	0
Solder, plumbers'	lb.		9½
,, fine do.	,,	1	0
Copper, sheet	,,		8½
,, tubes	,,		11

L.C.C. soil and waste pipes :		3"	4"	6"
Plain cast	F.R.	1 0	1 2	2 6
Coated	,,	1 1	1 3	2 8
Galvanized	,,	2 0	2 6	4 6
Holderbats	each	3 10	4 0	4 9
Bends	,,	3 9	5 3	10 3
Shoes	,,	2 10	4 4	9 6
Heads	,,	4 8	8 5	12 9

PLASTERER

		£	s.	d.
Lime, chalk	per ton	2	5	0
Plaster, Coarse	,,	2	10	0
,, fine	,,	4	15	0
Hydrated lime	,,	3	0	9
Sirapite	,,	3	6	0
Keene's cement	,,	5	0	0
Gothite Plaster	,,	3	6	0
Pioneer Plaster	,,	3	6	0
Thistle plaster	,,	3	6	0
Sand, washed	Y.C.		11	6
Hair	lb.			6
Laths, sawn	bundle		2	4
,, rent	,,		3	9
Lath nails	lb.			3

GLAZIER

		s.	d.	s.	d.
Sheet glass, 21 oz., squares n/e 2 ft.	s. F.S.				2½
,, ,, 26 oz. ,, ,,	,,				3
Flemish, Arctic, Figures (white)*	,,				7
Blazoned glasses	,,			2	6
Reeded : Cross Reeded	,,				11
Cathedral glass, white, double-rolled, plain, hammered, rimpled, waterwite	,,				6
Crown sheet glass (n/e 12" × 10")	,,			2	0
Flashed opals (white and coloured)	,,	1	0 and	2	0
⅛" rough cast ; rolled plate	,,				5½
¼" wired cast ; wired rolled	,,				9½
¼" Georgian wired cast	,,				11
¼" Polished plate, n/e 1 ft.	,,	†10 to		‡1	1
,, ,, 2	,,	†1	2 ,,	‡1	4
,, ,, 4	,,	†2	3 ,,	‡2	6
,, ,, 8	,,	†2	9 ,,	‡3	2
,, ,, 20	,,	†3	1 ,,	‡3	9
,, ,, 45	,,	†3	3 ,,	‡4	0
,, ,, 100	,,	†4	0 ,,	‡4	10
Vita glass, sheet, n/e 1 ft.	,,				1
,, ,, ,, 2 ft.	,,				1	3
,, ,, ,, over 2 ft.	,,				1	9
,, ,, plate, n/e 1 ft.	,,				1	6
,, ,, ,, 2 ft.	,,				3	0
,, ,, ,, 5 ft.	,,				4	0
,, ,, ,, 7 ft.	,,				5	0
,, ,, ,, 15 ft.	,,				6	0
,, ,, ,, over 15 ft.	,,				7	6
"Calorex" sheet 21 oz., and 32 oz.	,,	2	6 and	3	6
,, rough cast ¼" and ⅜"	,,			8½ ,, 1	0
Putty, linseed oil	lb.				3

* *Colours, 1d. F.S. extra.*
† *Ordinary glazing quality.* ‡ *Selected glazing quality.*

PAINTER

		£	s.	d.
White lead in 1 cwt. casks	cwt.	2	8	6
Linseed oil	gall.		2	3
Boiled oil	,,		2	9
Turpentine	,,		4	1½
Patent knotting	,,		14	0
Distemper, washable	cwt.	2	6	0
,, ordinary	,,	2	0	0
Whitening	,,		4	0
Size, double	firkin		3	0
Copal varnish	gall.		13	0
Flat varnish	,,		14	0
Outside varnish	,,		16	0
White enamel	,,	1	15	0
Ready mixed paint	,,		13	6
Brunswick black	,,		7	6

CURRENT PRICES FOR MEASURED WORK

The following prices are for work to new buildings of average size, executed under normal conditions in the London area. They include establishment charges and profit. While every care has been taken in its compilation, no responsibility can be accepted for the accuracy of the list. The whole of the information given is copyright.

EXCAVATOR AND CONCRETOR

		£ s. d.
Digging over surface n/e 12″ deep and cart away	Y.S.	2 9
,, to reduce levels n/e 5′ 0″ deep and cart away	Y.C.	8 6
,, to form basement n/e 5′ 0″ and cart away	,,	9 0
,, ,, 10′ 0″ deep and cart away	,,	9 6
,, ,, 15′ 0″ deep and cart away	,,	10 0
If in stiff clay	add ,,	6
If in underpinning	,,	4 0
Planking and strutting to sides of excavation	F.S.	1 0
,, ,, to pier holes	,,	5
,, ,, to trenches	,,	5
,, ,, extra, only if left in	,,	3
Hardcore, filled in and rammed	Y.C.	10 0
Portland cement concrete in foundations (6–1)	,,	1 6 0
,, ,, (4-2-1)	,,	1 12 6
,, ,, underpinning	,,	1 16 0
Finishing surface of concrete, space face	Y.S.	7

DRAINLAYER

		4″ s. d.	6″ s. d.
Stoneware drains, laid complete (digging and concrete to be priced separately)	F.R.	1 6	2 3
Extra, only for bends	Each	2 8	3 9
,, ,, junctions	,,	3 9	4 6
Gullies and gratings	,,	16 6	18 0
Cast iron drains, and laying and jointing	F.R.	4 9	6 9
Extra, only for bends	Each	10 6	15 6

BRICKLAYER

		£ s. d.
Brickwork, Flettons in lime mortar	Per Rod	26 10 0
,, ,, in cement	,,	27 12 6
,, Stocks in cement	,,	34 0 0
,, Blues in cement	,,	50 0 0
Extra only for circular on plan	,,	2 0 0
,, backing to masonry	,,	1 10 0
,, raising on old walls	,,	2 0 0
,, underpinning	,,	5 10 0
Fair Face and pointing internally	F.S.	1½
Extra over fletton brickwork for picked stock facings and pointing	,,	8
,, ,, ,, red brick facings and pointing	,,	11
,, ,, ,, blue brick facings and pointing	,,	1 4
,, ,, ,, glazed brick facings and pointing	,,	3 6
Tuck pointing	,,	7
Weather pointing in cement	,,	3
Slate dampcourse	,,	10
Vertical dampcourse	,,	1 1

ASPHALTER

		s. d.
½″ Horizontal dampcourse	Y.S.	4 9
½″ Vertical dampcourse	,,	7 9
½″ paving or flat	,,	6 3
1″ paving or flat	,,	7 6
1″ × 6″ skirting	F.R.	1 0
Angle fillet	,,	2½
Rounded angle	,,	2½
Cesspools	Each	5 6

MASON

		£ s. d.
Portland stone, including all labours hoisting, fixing and cleaning down, complete	F.C.	17 9
Bath stone and do., all as last	,,	13 6
Artificial stone and do.	,,	13 0
York stone templates, fixed complete	,,	10 6
,, thresholds	,,	13 6
,, sills	,,	1 0 6

SLATER AND TILER

		£ s. d.
Slating, Bangor or equal to a 3″ lap, and fixing with compo nails, 20″ × 10″	Sqr.	3 10 0
Do., 18″ × 9″	,,	3 7 0
Do., 24″ × 12″	,,	3 17 0
Westmorland slating, laid with diminished courses	,,	6 0 0
Tiling, best hand-made sand-faced, laid to a 4″ gauge, nailed every fourth course	,,	3 0 0
Do., all as last, but of machine-made tiles	,,	2 16 0
20″ × 10″ medium Old Delabole slating, laid to a 3″ lap (grey)	,,	2 16 0
,, ,, ,, ,, ,, ,, (green)	,,	4 15 0

CARPENTER AND JOINER

		£ s. d.
Flat boarded centering to concrete floors, including all strutting	Sqr.	2 2 6
Shuttering to sides and soffits of beams	F.S.	7
,, to stanchions	,,	7
,, to staircases	,,	1 6
Fir and fixing in wall plates, lintols, etc.	F.C.	3 9
Fir framed in floors	,,	4 6
,, ,, roofs	,,	6 6
,, ,, trusses	,,	7 6
,, ,, partitions	,,	8 6
¾″ deal sawn boarding and fixing to joists	Sqr.	1 14 6
1″ ,, ,, ,, ,, ,,	,,	1 17 6
1¼″ ,, ,, ,, ,, ,,	,,	2 3 0
¾″ × 2″ fir battening for Countess slating	,,	9 6
Do., for 4″ gauge tiling	,,	12 0
Stout feather-edged tilting fillet	F.R.	4½
Patent inodorous felt, 1 ply	Y.S.	2 3
,, ,, ,, 2 ,,	,,	2 9
,, ,, ,, 3 ,,	,,	3 3
Stout herringbone strutting to 9″ joists	F.R.	10½
1″ deal gutter boards and bearers	F.S.	1 2
1¼″ ,, ,, ,,	,,	1 6
2″ deal wrought rounded roll	F.R.	8
1″ deal grooved and tongued flooring, laid complete, including cleaning off	Sqr.	2 1 0
1¼″ do.	,,	2 10 0
1½″ do.	,,	2 17 0
1″ deal moulded skirting, fixed on, and including grounds plugged to wall	F.S.	1 6
1½″ do.	,,	1 9

CARPENTER AND JOINER—*continued*

		s. d.
1½″ deal moulded sashes of average size	F.S.	1 9½
2″ ,, ,, ,, ,, ,,	,,	1 11½
1½″ deal cased frames double hung, of 6″ × 3″ oak sills, 1¼″ pulley stiles, 1¼″ heads, 1″ inside and outside linings, ⅝″ parting beads, and with brass faced axle pulleys, etc., fixed complete	,,	3 7
2″ ,, ,, ,, ,, ,,	,,	3 10
Extra only for moulded horns	Each	6
1½″ deal four-panel square, both sides, door	F.S.	2 0
2″ ,, ,, ,, ,, ,,	,,	2 8
1½″ ,, but moulded both sides	,,	2 4
2″ ,, ,, ,, ,, ,,	,,	3 0
4″ × 3″ deal, rebated and moulded frames	F.R.	1 0
4½″ × 3½″ ,, ,, ,, ,,	,,	1 4
1½″ deal tongued and moulded window board, on and including deal bearers	F.S.	1 9
1½″ deal treads, 1″ risers in staircases, and tongued and grooved together on and including strong fir carriages	,,	2 6
1½″ deal moulded wall strings	,,	2 1
1½″ ,, outer strings	,,	2 4
Ends of treads and risers housed to string	Each	1 9
3″ × 2″ deal moulded handrail	F.R.	1 3
1″ × 1″ deal balusters and housing each end	Each	2 0
1½″ × 1½″ ,, ,, ,,	,,	2 9
3″ × 3″ deal wrought framed newels	F.R.	1 3
Extra only for newel caps	Each	6 0
Do., pendants	,,	6 0

SMITH AND FOUNDER

		£ s. d.
Rolled steel joists, cut to length, and hoisting and fixing in position	Per cwt.	16 6
Riveted plate or compound girders, and hoisting and fixing in position	,,	1 0 6
Do., stanchions with riveted caps and bases and do.	,,	19 6
Mild steel bar reinforcement, ½″ and up, bent and fixed complete	,,	17 6
Corrugated iron sheeting fixed to wood framing, including all bolts and nuts 20 g.	F.S.	11
Wrot-iron caulked and cambered chimney bars	Per cwt.	1 10 6

PLUMBER

		½″ s. d.	¾″ s. d.	1″ s. d.	1¼″ s. d.	2″ s. d.	4″ s. d.
Lead service pipe and fixing with pipe hooks	F.R.	10	1 0	1 3	2 0	2 10	—
Do. soil pipe and fixing with cast lead tacks	,,	—	—	—	—	—	5 6
Extra, only to bends	Each	—	—	—	—	2 0	6 9
Do. to stop ends	,,	6⅓	8	9	11	1 0	—
Boiler screws and unions	,,	3 3	3 9	5 0	8 0	—	—
Lead traps	,,	—	—	—	6 3	8 9	—
Screw down bib valves	,,	6 9	9 6	11 0	—	—	—
Do. stop cocks	,,	7 0	9 6	12 6	—	—	—

		£ s. d.
4″ cast-iron ½-rd. gutter and fixing	F.R.	1 6
Extra, only stop ends	Each	1 0
Do. angles	,,	1 6
Do. outlets	,,	2 9
4″ dia. cast-iron rain-water pipe and fixing with ears cast on	F.R.	1 8
Extra, only for shoes	Each	1 3
Do. for plain heads	,,	5 6

PLASTERER AND TILING

		s. d.
Expanded metal lathing, small mesh	Y.S.	2 0
Do. in n/w to beams, stanchions, etc.	,,	2 9
Lathing with sawn laths to ceilings	,,	1 3
½″ screeding in Portland cement and sand or tiling, wood block floor, etc.	,,	1 5
Do. vertical	,,	1 7
Rough render on walls	,,	1 2½
Render, float and set in lime and hair	,,	1 9
Render and set in Sirapite	,,	1 11
Render, backing in cement and sand, and set in Keene's cement	,,	2 9
Extra, only if on lathing	,,	4
Keene's cement, angle and arris	F.R.	6
Arris	,,	1½
Rounded angle, small	,,	3
Plain cornices in plaster, including dubbing out, per 1″ girth	,,	1½
1″ granolithic pavings	Y.S.	3 6
1½″ ,, ,,	,,	4 6
6″ × 6″ white glazed wall tiling and fixing on prepared screed	,,	17 6
9″ × 3″ ,, ,, ,, ,,	,,	1 2 6
Extra, only for small quadrant angle	F.R.	8

GLAZIER

		s. d.
21 oz. sheet glass and glazing with putty	F.S.	6½
26 oz. do. and do.	,,	7¾
Flemish, Arctic Figured (white) and glazing with putty	,,	1 1
Cathedral glass and do.	,,	1 2
Glazing only, British polished plate	,,	7
Extra, only if in beds	,,	2
Washleather	F.R.	4

PAINTER

		s. d.
Clearcolle and whiten ceilings	Y.S.	6
Do. and distemper walls	,,	9
Do. with washable distemper	,,	1 1
Knot, stop, prime and paint four coats of oil colour on plain surfaces	,,	3 3
Do. on woodwork	,,	3 6
Do. on steelwork	,,	3 0
Do. and brush grain and twice varnish	,,	5 6
Stain and twice varnish woodwork	,,	2 11
Stain and wax-polish woodwork	,,	4 6
French polishing	F.S.	1 2
Stripping off old paper	Piece	2 0
Hanging ordinary paper	from ,,	2 9

BUILDING NEWS—*Continued from page 605.*

YORK. *Cinema, etc.* Plans passed by the Corporation: Cinema, Piccadilly, for Associated British Cinemas, Ltd.; pavilion, Leeman Road, for L.N.E.R. Swimming Club; additions, Crown Hotel, Holgate Road, for Messrs. J. J. Hunt, Ltd.; additions, Cattle Market Inn, and Nag's Head Inn, for Tadcaster Tower Brewery Co., Ltd.; additions, 23 Colliergate, for Messrs. Bleasdeles, Ltd.; six houses, Leslie Avenue, for Mr. T. Gledhill; two houses, Forest Way, for Messrs. T. and M. Caffrey; two houses, Scarcroft Road, for Mr. F. B. Brisby; four houses, White House Drive, for Messrs. R. J. Pulleyn and Sons; six houses, Cowan Avenue, for Mr. J. Foster; two houses, Trentholme Drive, for Mr. T. F. Clark; six houses, Holly Bank estate, for Holly Bank Estate Co.; two houses, Avenue Terrace, for Messrs. H. Coleman and Sons, Ltd.; 38 houses, Nunthorpe Court estate, for Mr. H. Williamson.

BUILDING CONTRACTS OPEN

Unless the contrary is expressly stated, all deposits required for bills of quantities, etc., are returned on receipt of bona-fide tenders. The words "Fair Wages Clause," inserted in certain paragraphs, signify that persons tendering must conform to a fair wages clause in the contract, which requires them to pay the rates of wages current in the district. Application for plans and particulars should be made to the address given at the end of each entry.—ED., *A.J.*

CARLISLE: TRANSFORMER STATION

April 17.—Erection of a transformer station at Upperby, for the T.C. The City Engineer, 18 Fisher Street, Carlisle.

DROITWICH: HOUSES

April 20.—On the Holloway Estate, for the T.C.:—(*a*) Erection of 80 houses and (*b*) construction of roads, sewers and storm-water drains. R. E. Hulse, Borough Engineer, Town Hall, Droitwich. Deposit £2 2s.

BRINSLEY: HOUSES

April 20.—Erection of 34 non-parlour type houses, in pairs, together with drainage, paths, fences, etc., in the parish of Brinsley, for the Basford R.D.C. J. J. Ellis, Engineer, Surveyor and Housing Architect, Rock House, Stockhill Lane, Basford, Nottingham. Deposit £2 2s.

BRIGHTON: OFFICES

April 21.—Weights and measures office in Telegraph Street, for the T.C. The Borough Engineer, Town Hall, Brighton. Deposit £2 2s.

LUTON: HOUSES

April 23.—36 houses on the Stopsley and Hart Hill housing estates, for the T.C. The Borough Treasurer, Upper George Street, Luton. Deposit £3 3s.

WALTHAMSTOW: COLLEGE

April 24.—Technical College and engineering workshops in Forest Road, Walthamstow, for the Essex E.C. J. Stuart, County Architect, County Hall, Chelmsford. Deposit £3 3s.

ACKTON: ADDITIONS

April 25.—Additions to the administrative block at Ackton Hospital, near Pontefract, for the Normanton and District Joint Isolation Hospital Committee. R. A. Easdale and Sons, Chartered Architects and Surveyors, County Chambers, Castleford.

MILL HILL: BURIAL GROUND

April 29.—For the Paddington B.C.:—New burial ground—erection of buildings, etc., comprising chapel, superintendent's lodge and office, entrance gates and walls, lavatories and contingent works, at Milespit Hill and Dole Street, Mill Hill, Hendon, N.W.7. The Borough Treasurer, Town Hall, Paddington, W.2. Deposit £1 1s.

HASTINGS: HOUSES

May 1.—95 houses on the Hollington housing site, for the T.C. S. Little, Borough Engineer, 37 Wellington Square, Hastings. Deposit £2 2s.

MANCHESTER: HOUSES

May 4.—Erection of 204 houses in Stanton Street, Clayton, for the T.C. The Housing Director, Town Hall, Manchester. Deposit £2 2s.

LIVERPOOL: SCHOOL

April 20.—For the following, for the T.C.:—(*a*) Erection of a new infants' school at Broad Square, Norris Green; and/or (*b*) extension of the Gilmour Council School, Heath Road, Garston; (*c*) for alterations, etc., at Walton Road Junior Instruction Centre, Liverpool. The Land Steward and Surveyor, Municipal Buildings, Liverpool. Deposit £2 2s.

STAVELEY: HOUSES

April 21.—44 houses and 22 bungalows at Staveley, near Chesterfield, for the U.D.C. The Engineer and Surveyor, Council Offices, Staveley. Deposit £1 1s.

LIVERPOOL: FLATS

April 22.—67 flats, Upper Stanhope Street, for the T.C. The Director of Housing, Blackburn Chambers, Dale Street, Kingsway, Liverpool. Deposit £2 2s.

LUTON: NURSES' ANNEXE

April 23.—Nurses' annexe at the Isolation Hospital, Spittlesea, Kimpton Road, for the T.C. J. W. Tomlinson, Borough Engineer, 12 Upper George Street, Luton. Deposit £3 3s.

LUTON: SHOPS, ETC.

April 23.—Erection of engineering shops, laboratories, etc., on the premises of the Modern School for Boys, Park Square, Luton, for the Bedfordshire E.C. The County Surveyor, County Architectural Department, Shire Hall, Bedford. Deposit £1 1s.

SALFORD: EXTENSION

April 23.—Extension of the Barr Hill Open-air School, Pendleton, for the T.C. The Director of Education, Education Office, Salford, 3. Deposit £1 1s.

SHEFFIELD: COTTAGES, ETC.

April 27.—Erection of the following buildings at Lodge Moor Hospital, for the T.C.:—(1) Night nurses' home, (2) 12 attendants' cottages, (3) additional office accommodation. W. G. Davies, City Architect, Town Hall, Sheffield. Deposit £2 for each scheme.

TROWBRIDGE: HOUSES, ETC.

May 5.—For (*a*) erection and construction of 112 two-story houses and 12 bungalows, (*b*) new sewers and roads on the Longfield rehousing site, Mortimer Street, for the U.D.C. G. W. J. Clark, Engineer and Surveyor, Town Hall, Trowbridge. Deposit £2.

LONDON (WOOD GREEN): EXTENSION

May 14.—Extension and modernisation of Western Road baths for the T.C. The Borough Engineer and Surveyor, Town Hall, Wood Green, N.22. Deposit £2 2s.

TENDERS ACCEPTED

Extensions to be carried out at the factory of Barratt Co., Ltd., Mayes Road, Wood Green, N.22: Humphreys, Ltd., of Knightsbridge, S.W.7. (Plans by Archibald Leitch and Partners.)

New branch premises to be established at High Street, Putney, S.W.15, for British Home Stores, Ltd., Abbey House, Baker Street, N.W.1: H. Fairweather & Co., of 7 John Street, Bedford Row, W.C.1. (Plans by Albert L. Farman.)

New junior girls' school in Court Lane, for the Portsmouth E.C.: John Hunt, Ltd., of South Wharf, Cleveland Road, Gosport. (Plans by the City Architect, Mr. Adrien J. Sharp.)

Building scheme No. 8 of the Arbourthorne Estate development scheme, comprising erection of 148 non-parlour type houses, for the Sheffield Corporation: Reeves, Charlesworth, Ltd., of Holme Lane, Sheffield, 6, at £23,122, for 74; and W. Malthouse, Ltd., of 51, Rosedale Road, Sheffield, 11, at £22,547, for similar number. (Plans by the City Architect, W. G. Davies.)

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NOTE · The weights given on this sheet are for lead pipes and not ternary alloy. For weights commonly manufactured see reverse hereof.

SOIL PIPES, WASTE PIPES AND VENTILATING PIPES :

LONDON COUNTY COUNCIL.

Internal Diameter	1¼"	1½"	2"	2½"	3"	3½"	4"	4½"	5"	6"
Min. weight in lbs. per yd.	6·25	7·5	10.	12·5	15.	19·5	22·5	29.	41.	57.

BRITISH STANDARD SPECIFICATION.

Internal Diameter.	1¼".	1½".	2".	2½".	3".	3½".	4".	4½".	5".	6".
Min. weight in lbs. per yd.	7.	9.	12.	14·4.	17·1.	20.	22·8	29·1.	41.	57.

FLUSHING PIPES AND WARNING PIPES :

METROPOLITAN WATER BOARD.

Internal Diameter.	⅜".	½".	¾".	1".	1¼".	1½".	2".
Min. weight lbs. per yd.	2.	3.	5.	7.	9.	12.	16.

MINISTRY OF HEALTH.

Internal Diameter.	¾".	1".	1¼".	1½".	2".
Min. weight lbs per yd.	5.	7.	9.	11.	14.

BRITISH STANDARD SPECIFIC[TN]

Internal Diameter.	½".	¾".	1".	1¼".	1½".	2".
Min. weight lbs. per yd.	3.	5.	7.	9.	12.	16.

COLD WATER SUPPLY AND DISTRIBUTING PIPES :

BRITISH WATERWORKS ASSOC[TN]

Internal Diameter.	⅜".	½".	¾".	1".	1¼".	1½".	2".
Minimum weight in lbs. per yd.							
Light.	4.	5.	8.	11.	14.	18.	24.
Medium.	5.	7.	12.	16.	21.	27.	33.
Heavy.	5·5.	9.	16.	21.	28.	36.	48.

BRITISH STANDARD SPECIFICATION.

Internal Diameter.	⅜".	½".	¾".	1".	1¼".	1½".	2".
Minimum weight in lbs. per yd. for pressures not exceeding 110 feet head of water.	4·5.	6.	9.	12·5.	16.	20.	28.
Pressures exceeding 110 but not exceeding 250 feet head of water.	5.	7.	11.	16.	21.	27.	38.
Pressures exceeding 250 but not exceeding 400 feet head of water.	6.	9.	15.	21.	28.	35.	48.

COLD WATER SUPPLY PIPES :

METROPOLITAN WATER BOARD.

Internal Diam.	⅜".	½".	¾".	1".	1¼".	1½".	2".	2½".	3".
Min. weight lbs. per yd. for pressures not exceeding 250 feet head of water.	5.	7.	11.	16.	21.	27.	38.	59.	85.
Pressures exceeding 250 but not exceeding 400 feet head of water.	6.	9.	15.	21.	28.	35.	48.	-	-

MINISTRY OF HEALTH.

Internal Diameter.	⅜".	½".	¾".	1".	1¼".	1½".	2".
Minimum weight lbs. per yd. for pressures not exceeding 110 feet head of water.	4.	6.	9.	12.	16.	18.	24.
Pressures exceeding 110 but not exceeding 250 feet head of water.	5.	7.	12.	16.	21.	27.	33.
Pressures exceeding 250 feet head of water.	5·5.	9.	16.	21.	28.	36.	48.

COLD WATER DISTRIBUTING PIPES :

METROPOLITAN WATER BOARD.

Internal Diameter.	⅜".	½".	¾".	1".	1¼".	1½".	2".	2½".	3".
Minimum weight in lbs. per yd.	4.	5.	8.	11.	14.	18.	24.	38.	54.

MINISTRY OF HEALTH.

Internal Diameter.	⅜".	½".	¾".	1".	1¼".	1½".	2".	2½".	3".
Minimum weight in lbs. per yd.	4.	5.	8.	11.	14.	18.	24.	-	-

HOT WATER DISTRIBUTING PIPES :

METROPOLITAN WATER BOARD.

Internal Diameter.	⅜".	½".	¾".	1".	1¼".	1½".	2".	2½".	3".
Minimum weight in lbs. per yd.	4·5.	6.	9.	12·5.	16.	20.	28.	44.	63.

MINISTRY OF HEALTH.

Internal Diameter.	⅜".	½".	¾".	1".	1¼".	1½".	2".	2½	3".
Minimum weight in lbs. per yd.	4.	6.	9.	12.	16.	18.	24.	-	-

Information from the Lead Sheet & Pipe Development Council.

INFORMATION SHEET · WEIGHTS OF LEAD PIPE AS REQUIRED BY VARIOUS AUTHORITIES · No. 19.

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

Supplement to THE ARCHITECTS' JOURNAL for April 16, 1936

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INFORMATION SHEET

• 340 •

PLUMBING

Subject :

The tables given on this Sheet set out the sizes of pipe recommended or required for various purposes by the more important Authorities.

Commercial Sizes :

The following list of sizes is a selected list only, compiled from the larger ranges made by various manufacturers.

Pipe Sizes

It should be noted that manufacturers produce the sizes required by the demand, and the demand varies with different parts of the country. It follows, therefore, that the range produced by the larger makers comprises many hundreds of sizes.

Lengths of Lead Pipe :

Lead pipes—up to 1" diam. : usually in coils of 60 feet or 2 cwts.

—from 1" to 2" diam. usually in coils of 36 feet or lengths of 12 feet.

—of more than 2" diam. : usually in lengths of 10 feet or 12 feet.

Information from : The Lead Sheet and Pipe Development Council

Address : Golden Cross House, Duncannon Street, W.C.2

Telephone : Whitehall 3715

Sizes of Lead Pipes

Internal Diam. in Inches	External Diam. in Inches	Weight per Yard in Lbs.
⅛	·191	·25
3/16	·282	·5313
¼	·323	·5
and in various sizes up to :		
¼	·354	·75
¼	·480	2·0
¼	·570	3·0
¼	·640	4·0
¼	...	6·0
5/16	·374	·5
and in various sizes up to :		
5/16	·535	2·25
⅜	·439	·625
and in various sizes up to :		
⅜	·631	3·0
⅜	·7	4·0
⅜	·768	5·0
⅜	·826	6·0
⅜	...	12·0
7/16	·505	·75
and in various sizes up to :		
7/16	·60	2·0
½	·587	1·125
and in various sizes up to :		
½	·738	3·5
½	·77	4·0
½	·79	4·5
½	·815	5·0
½	·84	5·5
½	·865	6·0
½	·925	7·0
½	·981	8·0
½	1·28	9·0
and in various sizes up to :		
½	...	18·0
9/16	...	4·5
⅝	·704	1·25
and in various sizes up to :		
⅝	·881	4·5
⅝	·9	5·0
⅝	·953	6·0
⅝	1·0	7·0
⅝	1·08	9·0
and in various sizes up to :		
⅝	...	12·0
¾	·89	2·75
and in various sizes up to :		
¾	·97	4·0
¾	·99	5·0
¾	1·03	6·0
¾	1·07	7·0
¾	1·11	8·0
¾	1·168	9·0
¾	1·21	10·0
¾	1·245	11·0
¾	1·275	12·0
and in various sizes up to :		
¾	1·5	20·0
⅞	1·04	4·0
and in various sizes up to :		
⅞	1·56	20·0
1	1·15	3·75
and in various sizes up to :		
1	1·24	6·0
1	1·277	7·0
1	1·29	8·0
1	1·33	9·0
1	1·36	10·0
1	1·39	11·0
1	1·441	12·0
1	1·47	14·0
1	1·53	16·0
and in various sizes up to :		
1	1·74	24·0
1⅛	...	8·0
and in various sizes up to :		
1⅛	...	15·0
1¼	1·44	6·0
1¼	1·47	7·0
1¼	1·51	8·0
1¼	1·535	9·0
1¼	1·55	10·0
1¼	1·58	11·0
1¼	1·605	12·0
1¼	1·63	13·0
1¼	1·66	14·0
1¼	1·68	15·0
1¼	1·71	16·0
1¼	...	28·0
1½	1·721	8·0
1½	·734	9·0
1½	1·77	10·0
1½	1·78	11·0
1½	1·826	12·0
1½	1·85	14·0
1½	1·89	16·0
1½	1·93	18·0
1½	1·99	21·0
and in various sizes up to :		
1½	2·24	33·0
1¾	2·0	13·0
1¾	2·08	15·0
and in various sizes up to :		
1¾	2·35	30·0
2	2·18	9·0
and in various sizes up to :		
2	2·25	12·0
2	2·27	14·0
2	2·31	16·0
2	2·35	18·0
2	2·39	21·0
2	2·44	24·0
2	2·52	28·0
2	2·54	30·0
and in various sizes up to :		
2	...	50·0
2¼	...	13·5
and in various sizes up to :		
2¼	2·9	40·0
2½	...	11·0
and in various sizes up to :		
2½	3·2	48·0
2¾	2·98	16·0
and in various sizes up to :		
2¾	3·43	50·0
3	...	11·0
and in various sizes up to :		
3	3·24	18·0
3	3·47	36·0
3	3·58	45·0
3	...	75·0
3½	...	14·4
and in various sizes up to :		
3½	3·95	40·0
3½	4·01	45·0
3½	4·04	48·0
and in various sizes up to :		
3½	...	64·0
4	...	16·2
and in various sizes up to :		
4	...	18·0
4	4·28	24·0
4	...	27·0
4	4·3	30·0
4	4·48	48·0
and in various sizes up to :		
4	...	90·0
4½	...	18·0
and in various sizes up to :		
4½	5·22	84·0
5	...	22·5
and in various sizes up to :		
5	5·72	91·0
5½	...	27·0
and in various sizes up to :		
5½	6·22	100·0
6	...	27·0
and in various sizes up to :		
6	6·85	130·0
6½	...	70·0
and in various sizes up to :		
6½	...	95·0
7	...	84·0
and in various sizes up to :		
7	...	150·0
7½	...	115·0
8	...	130·0
8½	...	152·0
9	...	180·0
10	...	215·0
11	...	260·0
12	...	320·0

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SIZE, SHAPE, SURFACE AND RUNWAYS OF A FLYING FIELD:

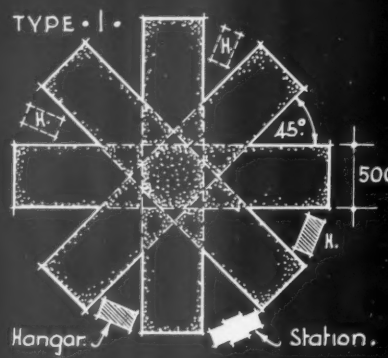
A circular or square field is most economical as it permits landing in all directions, where conditions allow, 2,500 feet in all directions is suggested.

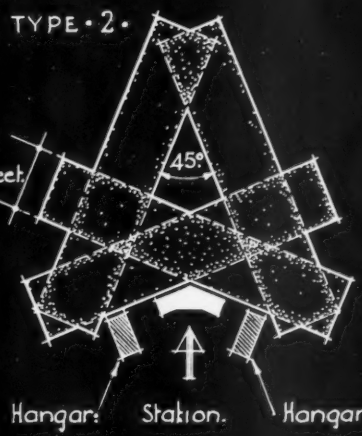
Turf on European flying fields is usually level and firm enough to support 2½ tons per square foot without permanent damage, but surfacing may become necessary. Where so, 8 directions will be required as an aeroplane can land up to 22½° into the wind.

Runways must be 400 feet - 500 feet wide for landing & take-off combined, 100 feet wide for separate tracks at 300 ft. centres. One strip should run in the direction of the prevailing wind.

Economy of artificial surfacing can be effected by various arrangements of runways & elimination of certain directions due to local meteorological conditions. It is suggested that the depature track be hard, and the arrival track more resilient, such as turf.

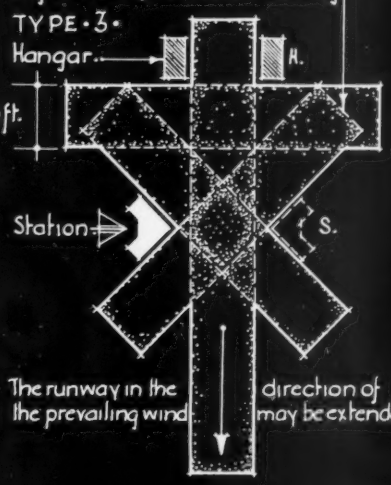
THEORETICAL LAYOUT OF RUNWAYS:

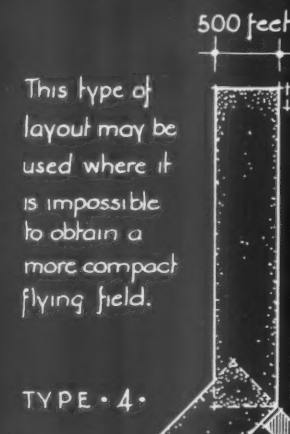


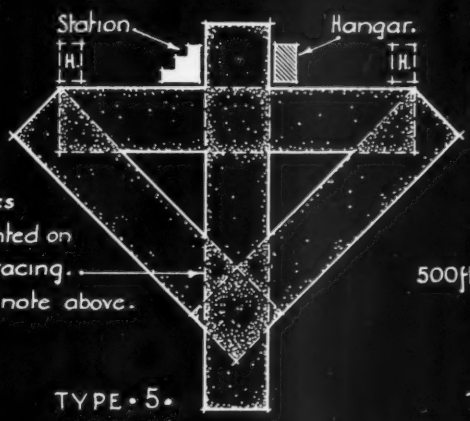


These plans show suggested positions for the Station & the hangar.

Outline of runways painted on surfacing at over-lap to assist landing.







POSITION OF BUILDINGS. Station and Hangars.

These may be placed round the edge of the flying field or in the wedge between runways. Hangars must not obscure any part of the runway and are best placed parallel to the prevailing wind to minimise dust being blown in.

EMPIRE AIR ROUTES.

Length of runways must be varied when Air port is at any considerable altitude. See back of sheet for Classification of Licenced Land Aerodromes for Permanent use.

Altitude ·	2,000	feet,	increase the length by			10% .
"	4,000	"	"	"	"	25% .
"	6,000	"	"	"	"	50% .
"	7,500	"	"	"	"	75% .
"	8,500	"	"	"	"	100% .

INFORMATION SHEET : AERODROMES · THEORETICAL LAYOUTS ·

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

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AERODROMES

This is the first of a series of sheets dealing with the recommendations of various authorities and the general planning of aerodromes.

Aerodromes are classified by the Air Ministry according to size as follows :

Class A :
An aerodrome affording an effective runway of 800 yards or more in length and at least 200 yards in width for all wind directions.

Class B :
An aerodrome affording an effective runway of more than 700 yards but less than 800 yards in length and at least 200 yards in width for all wind directions.

Class C :
An aerodrome affording an effective runway of more than 600 yards but not more than 700 yards in length and at least 200 yards in width for all wind directions.

Class D :
An aerodrome affording an effective runway of more than 500 yards but not more than 600 yards in length and at least 200 yards in width for all wind directions.

Class E :
An aerodrome affording an effective runway of more than 400 yards but not more than 500 yards in length and at least 200 yards in width for all wind directions.

Class F :
An aerodrome affording an effective runway of at least 300 yards in length and at least 150 yards in width for all wind directions.

PATTERN OF RUNWAYS (from "Airport Development," by Nigel Norman, Aeronautical Reprint No. 69) :

The pattern in which runways are laid down does not appear to have been seriously considered at the earlier airports. If eight directions of landing were required, the result is a Union Jack. Where only two intersecting runways were allowed for you might support St. George or St. Andrew. In more recent lay-outs, however, it is evident that the pattern has been carefully studied, and it has been found that a proper arrangement will allow considerable economy in the amount of material required, and at the same time make for greater convenience in operation. A theoretical example may be of interest. Fig. 1a shows diagrammatically four runways 2,500 feet long by 500 feet wide at 45° interval arranged as a symmetrical star. Fig. 4 shows the same pattern which allows for more convenient spacing of the buildings. The control tower and terminal building would obviously be placed in the centre towards the bottom of the figure, while commercial and industrial buildings could be arranged along the sides without interfering with any of the flightways. In addition to allowing a more satisfactory lay-out, reducing taxying and facilitating control, the area of this figure is only 9/10 of that of the star. It is possible to rearrange these runways in an even more economical pattern occupying very little more than 4/5 of the star area, but the resulting figure has not the advantages of the one just illustrated. It will be seen that a modification of this design has been employed at Kansas City, and at the newly-designed Shushan Airport, New Orleans, while the new municipal airport at Pittsburg, possibly the most advanced lay-out in the world, employs a somewhat similar arrangement. The runway pattern will, of course, be subject to variation where meteorological conditions may allow the elimination of a certain number of directions of landing. Examples may be taken from California, where prevailing winds are almost invariably east and west. At Burbank, a particularly fine airport, one runway indicated on the plan has never been constructed, while at Glendale, only a few miles away, only one strip is ever used at all. The new Pittsburg airport, probably illustrates the logical development of the runway aerodrome, since the strips have been so widened as to cover practically the whole area of the port. Each, however, is divided by a clearly marked line along its axis, which is intended to separate the landing from the taking off area.

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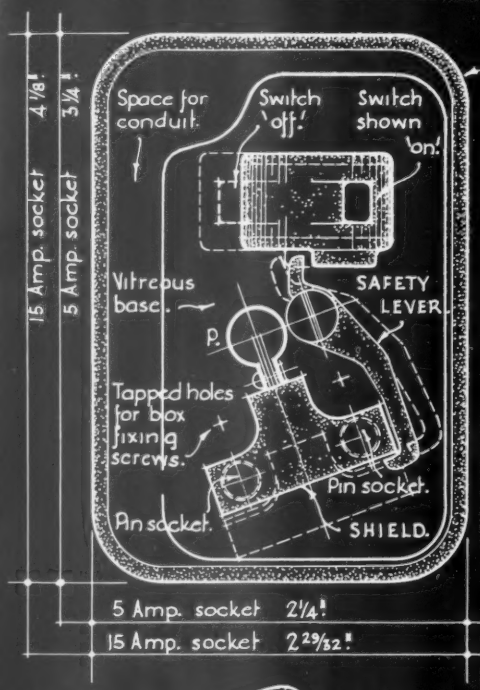
FULL SIZE PLAN & VERTICAL SECTION OF THE • SHUTTERLOCKED • 5 AMP. SAFETY SWITCH SOCKET.

NOTE • Switch sockets are made in 5 and 15 ampere sizes, with 3-pin cable plugs to match.



SURFACE TYPE SOCKET: 3/32" Composition box.

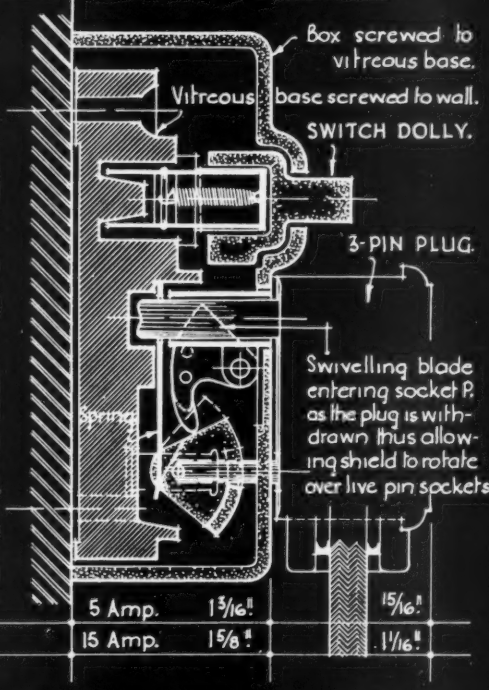
OPERATION:

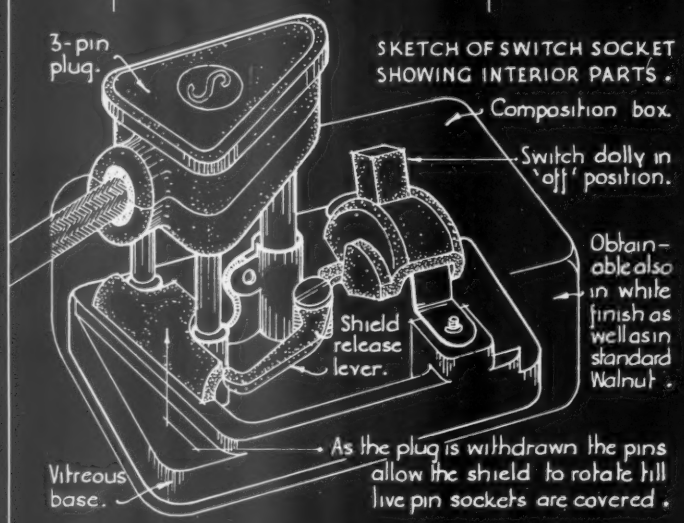
① The shield is shown in automatic position completely covering the live socket tubes as plug is withdrawn.

② Automatic lever safety device locks the shield into position if plug is removed with switch 'on,' as shown.

③ Switching 'off' releases the locked shield (as shown dotted) & permits insertion of plug pin P. to force back the shield and thus expose the live socket tubes.

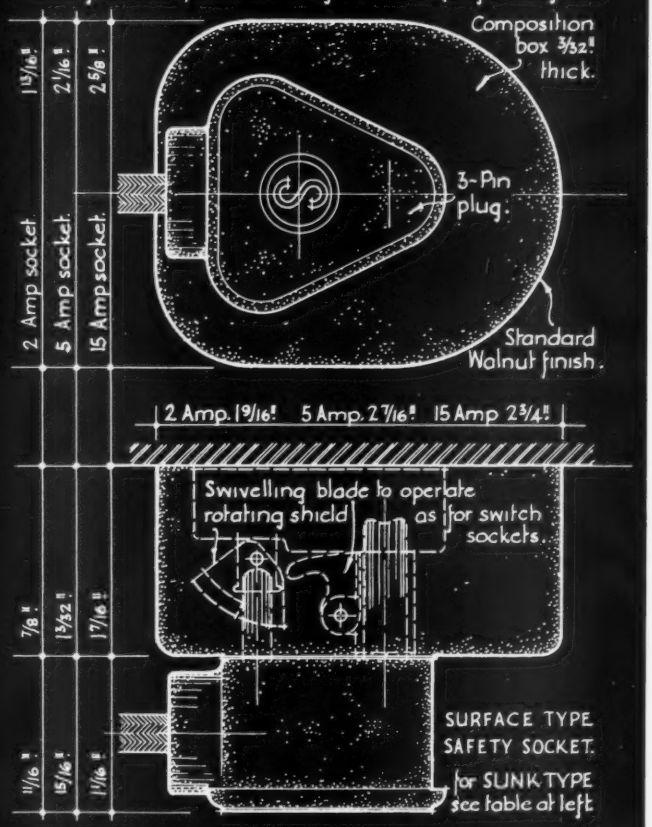
④ Plugs therefor cannot be inserted until switch is turned 'off' & shield unlocked.





FULL SIZE PLAN & SIDE VIEW OF 5 AMP SAFETY SOCKET.

Sizes of 2 & 15 Amp. sockets also given. 3-Pin plugs throughout.



NOTE • Switch sockets and safety sockets complete with plugs but without boxes, i.e. Sunk type, are also obtainable, switch sockets in 5 and 15 amp. and safety sockets in 2, 5 & 15 amp. sizes. Walnut finish is standard throughout.

SIZES OF SUNK TYPE SWITCH SOCKETS.

AMPERES.	SIZE OF SWITCH PLATE.	Projection from wall face: over plate.	over plug.
5.	3 11/32" x 4 19/32"	7/32"	1 5/32"
15.	4 1/4" x 5 11/16"	7/32"	1 9/32"

SIZES OF SUNK TYPE SAFETY SOCKETS.

2.	2 7/8" x 2 7/8"	3/16"	7/8"
5.	3 1/4" x 3 1/4"	7/32"	1 5/32"
15.	4 1/4" x 4 1/4"	7/32"	1 9/32"

Information from Wm. Sanders & Co. (Wednesbury) Ltd.

INFORMATION SHEET: SAFETY SOCKETS AND SWITCH SOCKETS AND PLUGS.

SIR JOHN BURNET TAIT AND LORNE ARCHITECTS ONE MONTAGUE PLACE BEDFORD SQUARE LONDON WC1. Ora. a. Boyne.

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ELECTRICAL EQUIPMENT

Products : Safety Sockets and Plugs.

Shutterlocked Safety Switch Sockets :

These switch sockets, as shown and described on this Sheet, have been especially designed to provide a degree of safety from accidental or unintentional shock which cannot be obtained from the ordinary type of switch socket.

The protective devices incorporated and shown in the details provide :

(*a*) That the switch dolly can be operated whether the plug is in position or not, but no live terminals are ever exposed.

(*b*) That the plug cannot be inserted when the switch is at the "on" position.

(*c*) That if the plug is removed when the switch is at the "on" position the live terminals are automatically covered and the plug cannot be replaced until the switch has been returned to the "off" position.

(*d*) Scissors, knives, pencils, etc., cannot be brought into contact with live terminals.

(*e*) Contact with plug pins cannot be made while they are alive.

B.S.S. & I.E.E. Rules.

All types manufactured conform to the B.S.S. & I.E.E. rules where they apply.

Types and Prices :

Shutterlocked Switch Sockets.
Surface patterns complete with plugs.

	Standard Walnut Finish Each	White Finish Each	List No.
5 amperes	5/3	6/-	LB305/OF 305
15 amperes	8/2	9/6	LB305/OF 305.

Sunk pattern, with plugs but without boxes.

	Each	Each	List No.
5 amperes	6/-	7/8	FG305/OF 305.
15 amperes	8/10	11/1	FG315/OF 315.

Boxes for use with sunk pattern Switch Sockets.

Iron (Tapped ¾" bottom).

	Each	
5 amperes ...	1/-	List No. JS 5.
15 amperes ...	1/5	List No. JS 15.
	Teak. Each	
5 amperes ...	-/10	List No. WS 5.
15 amperes ...	1/3	List No. WS 15.

Safety Sockets and Plugs :

These sockets have been designed on the same principles and for the same objects as the shutterlocked switch sockets and provide that :

(*a*) Live contacts are completely shielded and remain so until the plug pins have actually entered the holes in the cover.

(*b*) In the 5 amp. and 15 amp. sizes the current carrying pins are partly insulated, contact with them is impossible while they are alive.

(*c*) The plug cannot be inserted anywhere but in its correct position.

(*d*) Sockets can be used with any make of 3-pin plug of B.S.S. gauge.

(*e*) All types are wired from the front and may therefore be fixed before wiring.

(*f*) All sunk types are self-adjusting to plaster level, adjustable grid boxes are not therefore required.

Types and Prices :

3-pin Safety Sockets and Plugs.
Surface pattern without Plugs.

	Standard Walnut Finish. Per doz.	White Finish. Per doz.	List No.
2 amperes	16/8	23/4	TA 302.
5 amperes	18/8	25/4	TA 305.
15 amperes	24/8	34/8	TA 315.

Sunk pattern, with face plate but without Plugs.

	Standard Walnut Finish. Per doz.	White Finish. Per doz.	List No.
2 amperes	25/4	32/8	KD 302.
5 amperes	28/-	34/4	KD 305.
15 amperes	38/8	48/8	KD 315.
	3-pin Plugs.		
	Per doz.	Per doz.	
2 amperes	13/-	19/-	OF 302.
5 amperes	14/4	20/4	OF 305.
15 amperes	20/-	28/-	OF 315.

Boxes for use with sunk pattern sockets.

Cast Iron (with one tapped hole, extra holes 4/- per doz.).

	Per doz.	
2 amperes ...	6/-	List No. JJ 2.
5 amperes ...	6/8	List No. JJ 5.
15 amperes ...	14/-	List No. JJ 15.
	Teak. Per doz.	
2 amperes ...	4/8	List No. WW 2.
5 amperes ...	5/-	List No. WW 5.
15 amperes ...	10/-	List No. WW 15.

Information from : William Sanders & Co. (Wednesbury), Ltd.
Address : Falcon Works, Wednesbury, Staffs.
Telephone : Wednesbury 0065-6
London Office : 78 Neal Street, London, W.C.2
Telephone : Temple Bar 8984