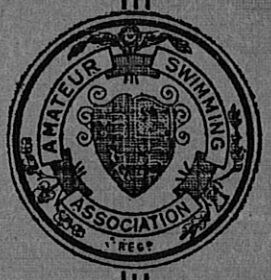
MODERN PUBLIC BATHS

BY

KENNETH M. B. CROSS, M.A., F.R.I.B.A.



ISSUED BY THE

AMATEUR SWIMMING ASSOCIATION

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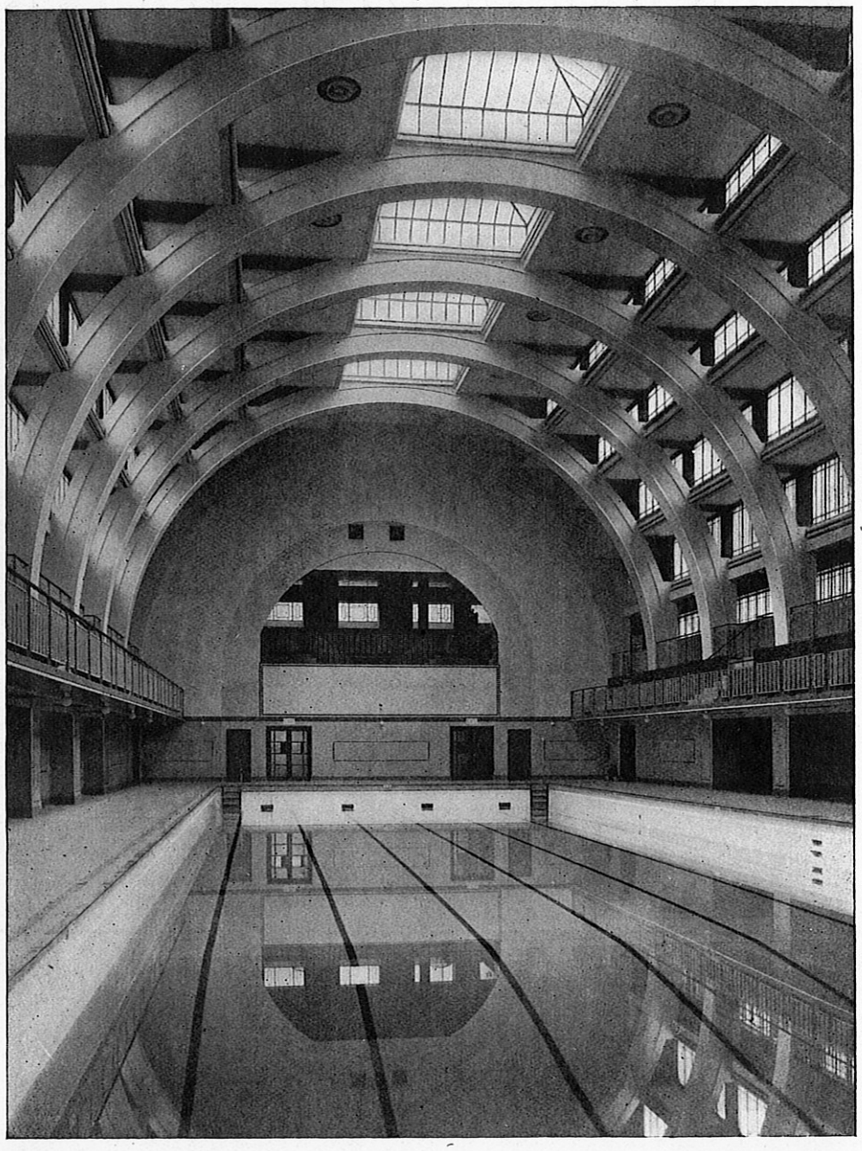

Large Bath, Marylebone Public Baths, London.

Architect, K. M. B. Cross, F.R.I.B.A.

FOREWORD

THE AMATEUR SWIMMING ASSOCIATION, as the recognised body controlling the sport of swimming in England, is frequently appealed to by Local Authorities who are planning new swimming baths and pools, for information and advice respecting the requirements of swimmers, and for constructional data. With the great growth in popularity of this unrivalled physical exercise and sport, and consequent public demand for facilities for learning and practising the art of swimming, these requests for information so increased that, in 1930, the Association came to the conclusion that the publication of a brochure dealing with the subject was warranted. Accordingly, Mr. K. M. B. Cross, M.A., F.R.I.B.A., the well known bath architect, was invited to prepare such a brochure embodying the views of the Association on certain features of planning and construction. This brochure has admittedly proved most helpful to Local Authorities and others interested in the subject, but the many changes in design and equipment during the past seven years necessitate its revision, and accordingly this new edition has been prepared. The Association freely acknowledges its indebtedness to Mr. Cross, who has re-written the brochure and brought it up to date. It is confidently believed that the data given herein will prove helpful to those concerned in planning new swimming baths and pools, and the Association at all times will be willing, on request, to supplement it with any further information in its possession.

In the first edition, the Association stressed the importance of the provision of cleansing rooms for the use of bathers before entering the swimming bath proper, and also the installation of plant for the purification of the swimming bath water. These features are now insisted upon by the Ministry of Health in any scheme for which loan sanction is sought.

The Association now urges the provision of a separate teaching bath for the use of school children and learners in all new public bathing establishments. Such a bath enables organised class teaching of swimming to be carried out without interference by the general public, while the results secured are far more satisfactory.

HAROLD E. FERN,

Hon. Secretary,

Amateur Swimming Association.

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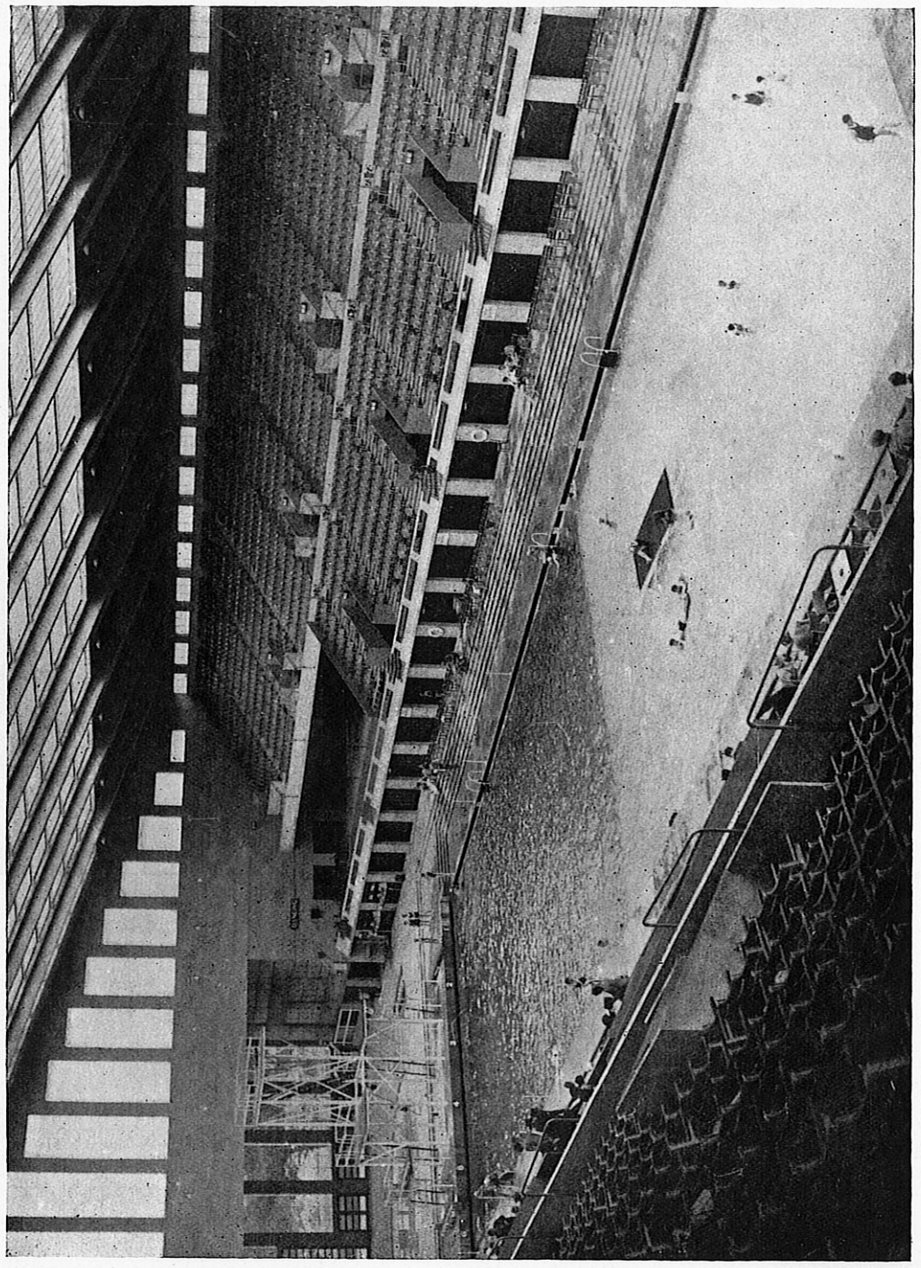


Architect, Sir Owen Williams, K.B.E.

The Empire Pool, Wembley.
Admirable accommodation for spectators.

MODERN PUBLIC BATHS

INTRODUCTION.

It is satisfactory to note that since the publication in 1930 of the Amateur Swimming Association's booklet on Modern Public Baths and Wash-houses very considerable progress has been made in the planning and design of bathing establishments. The great expansion of swimming facilities, the rapid growth of attendances at both public and private swimming baths and the improved standard of swimming are all evidence that the aims of the Association have gained public recognition and support. Many changes have taken place in the design and equipment of swimming baths during the past seven years, and it is accordingly necessary for the booklet to be re-written and brought into conformity with present conditions.

The Government's voluntary scheme for the improvement in the health and physique of the people in this country has been launched by the Prime Minister. The fact that it is a voluntary scheme implies that to be successful it must receive the co-operation of organisations such as the Amateur Swimming Association. For many years this Association, handicapped by limited resources, has been devoting its energies to this purpose, and it continues vigorously to press the claims of swimming, as a natural exercise without equal, in schemes that may be evolved for the improvement in the health and physique of the nation. Public baths establishments should be made public health centres, where physical training and swimming and diving can be practised together with advantage. Already physical training classes are being successfully held at baths establishments, and it is to be hoped that this plan will be greatly extended. Physical exercises alone do not attract the average Englishman, but if taken in conjunction with a competitive exercise such as swimming, they would probably prove to be popular. The efforts of the Association to secure, by the proposed amendment of the Public Health Bill, the more general opening of covered swimming baths in the winter months, as is the case in Scotland, were not successful. On the other hand, the strong representations of the Association were successful in defeating the proposals made to extend the closure period. The Ministry of Health now recommends that Local Authorities should keep their covered swimming baths open during the winter months, and the 1935-36 Report states :—

"Increased facilities for winter swimming should be a very helpful factor in the improvement of the physique of the youth of the country."

It should be recognised that a swimming bath building is primarily designed for swimming and that it is not necessarily suitable for concerts, plays, boxing, dancing and political meetings. From an architectural point of view, the

swimming bath building as such must suffer in some degree, if it has to be designed also to serve as a public hall. As a public hall, on the other hand, it can never be entirely satisfactory. The shape of a swimming bath hall is not usually appropriate for concerts or public speaking, and the presence of the proscenium opening in a swimming bath hall not infrequently interferes with the proper working of the high diving apparatus. Further, whereas, in the case of a public hall, large portions of the walls and ceiling require to be finished with absorbent surfaces for acoustic reasons, the surfaces in a swimming bath hall should be non-absorbent.

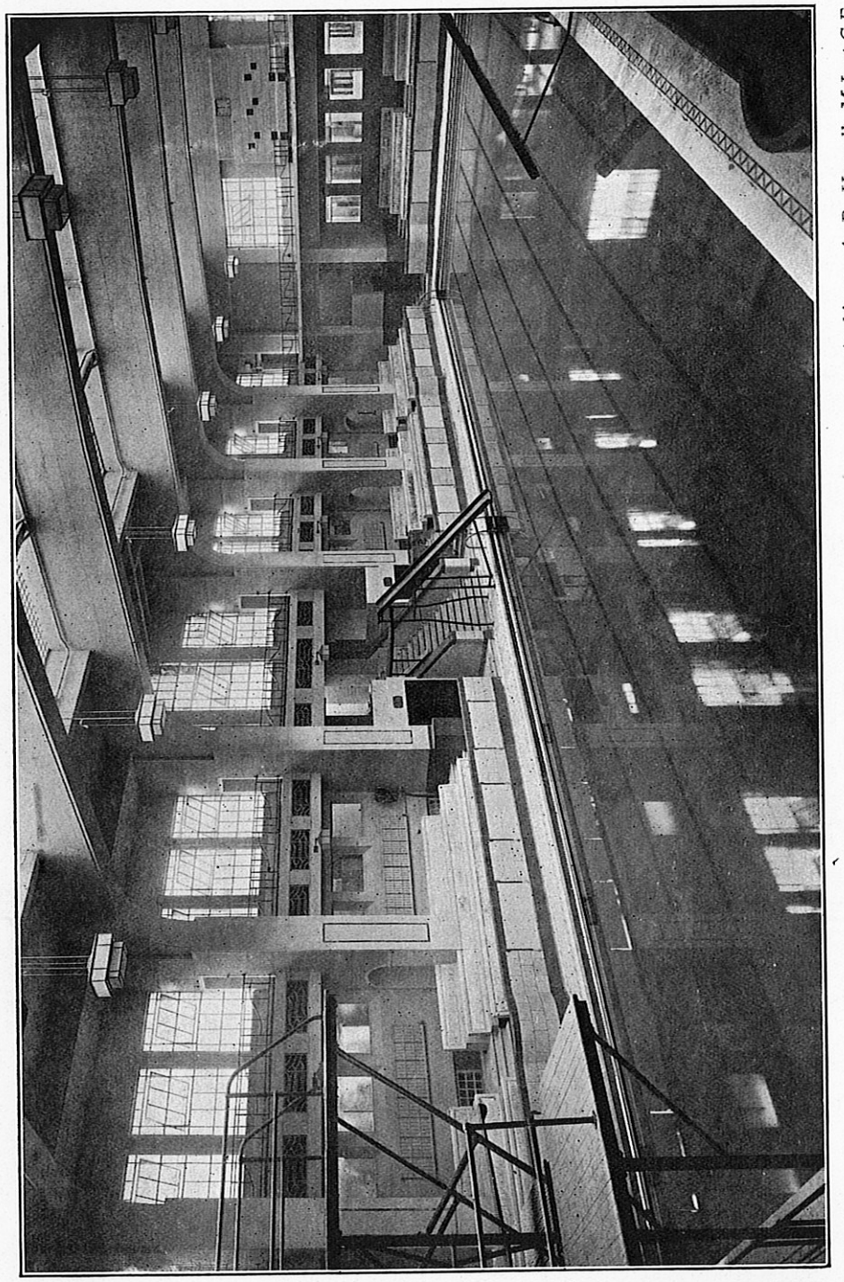
The two requirements are accordingly contradictory, and some kind of compromise has to be effected. If, in addition, the complications in planning brought about by the requirements of the licensing authorities in respect of public halls, which in some instances seriously interfere with the requirements of a well planned public bath building, are considered, promoters will be well advised to hesitate before insisting on a dual-purpose building.

The Ministry of Health's Report for 1936-37 discloses that the loans sanctioned for the construction of public baths and wash-houses, including open-air pools, for the year ended 31st March, 1937, amounted to £790,975. For the three years ended on the same date, the loans sanctioned amounted to £2,589,302. Under the provisions of the Public Health Act, 1936, which came into operation on 31st October, 1937, Local Authorities are permitted to frame bye-laws to secure the maintenance of a proper standard of water purity, for ensuring the cleanliness and adequacy of dressing accommodation, and for regulating the conduct of persons using swimming baths and pools for which a charge is made and which are open to the public. Model bye-laws for this purpose have been prepared by the Ministry of Health and are included herein.

The desirability of teaching swimming in schools cannot be too strongly urged; it is in fact one of the most important aspects of the present swimming situation. It is therefore particularly gratifying to note that the Board of Education is now prepared to consider the sanction of grants for the provision of school swimming baths.

KENNETH M. B. CROSS.

COVERED SWIMMING BATHS



Architect, A. P. Howell, M.Inst.C.E.

Leyton Public Bath,
High Road, Leyton.

COVERED SWIMMING BATHS

One of the most noticeable changes that has recently taken place in a quickly changing world is the increased love of sport and open-air life by great masses of the community. The principal cause of this would appear to be the immense growth of towns, due to the progress of industrialism with its concomitant of factory, office, and shop life. The search for wealth and amusement that are only obtainable in urban surroundings has been followed by a realisation of the vital necessity of maintaining physical health and well-being in conditions that are less favourable than was the case when agriculture was flourishing and the towns were very much smaller than they are to-day. Though much has been done in this country to meet the demands of some millions of people for better and healthier lives, there is evidence that in some instances continental nations are better equipped than we are. Very possibly we have been handicapped by the effects of Victorian legislation, which tended to cause Public Baths to be considered as inseparable from Public Wash-houses and of the same nature as work-houses and asylums, and as such to be classed as buildings of the unavoidable but necessary type. To-day the position is entirely changed and it is primarily as a centre of sport, amusement, and healthy recreation that the swimming bath has become, like its ancient Roman prototype, the informal and pleasurable centre of civic life.

The Site.

Covered-in swimming baths are usually situated in towns, and in planning a new establishment, it is of the greatest importance that sufficient space be allowed for the buildings. Many schemes have been ruined for lack of a little foresight in this respect, and sites have been overloaded with accommodation beyond their proper capacity, resulting in costliness in construction and inefficiency in running. Then, too, it is important that the future needs of the locality should be considered, and if it is likely to be necessary, provision should be made for extending the accommodation in the future. Theoretically the correct procedure would be for sufficient land to be purchased to meet the greatest future needs of the district, and for only that portion of the scheme which was urgently required to be developed initially. The planning of the entire scheme should be undertaken in the first instance but the building might be carried out seriatim, additional blocks being added from time to time as required.

A reasonably level and dry site will be found to be the most economical for swimming baths, as for other buildings. The position of the site in the town, and the width and number of adjoining roadways, are important factors requiring consideration in any large public building. In addition provision must be made for car parking, and 'draw in' space must be provided so that the traffic in thoroughfares is not impeded. Loading and unloading docks must be provided

for goods and plant, etc., and if a public hall is incorporated in the scheme, the method of clearing the building of large numbers of people has to receive attention. In cases where licences for public entertainment, music and dancing, boxing, etc., are required, the building and the site and approaches are considered on their merits, and it has not been found possible to lay down general rules applicable to all conditions. Broadly, the Public Baths should, if only one establishment is proposed, be situated in a central and popular part of the town. As the main purpose of the building is that it should be of the greatest service to the greatest number, it should preferably be on the main thoroughfare rather than hidden away unseen and forgotten in some unfrequented cul-de-sac. An additional reason for planning the bath buildings in a central position has unfortunately recently become apparent. More than one public authority is now considering the use of the public baths as a decontamination centre in case of gas attack. It is to be hoped that this latter provision may not be considered necessary during the coming years, and should this be so, the unassailable argument remains that buildings paid for by the community and offering public service, should be placed in settings worthy of their purpose and of the municipality whose dignity they represent.

yout of ildings.

Efficient and economical control of the working of the establishment is of great importance, and it is accordingly essential that the buildings should be compactly and simply planned, so that each department is readily accessible to the public and by the staff; but it is not only on account of the easy working of the departmental arrangements that straight-forward planning is so desirable. The influence of good planning on building costs does not appear to have been appreciated in some of the large and costly establishments that have been erected in various parts of the country, planned not by architects but by those whose aptitude and training lie in other directions. Good planning is a very highly specialised art, and the essential qualities of simplicity and directness are only attainable as the result of concentrated effort. Indirect planning is expensive both in structural costs and on account of the difficulties that inevitably arise in the layout of the numerous service pipework systems. Bad planning implies costly construction and high maintenance costs: compact and straight-forward planning are essential to the smooth running of the establishment, and the avoidance of unnecessary supervision is attained by speedy and direct access by members of the public to each department.

A typical layout, to be modified by local requirements and circumstances pertaining to the site, would comprise a block of buildings facing the street, including entrance hall, ticket office and administrative offices on the ground floor. Slipper baths might be planned on an upper floor, and the establishment laundry, conveniently located, well ventilated and provided with a towel store, planned near the ticket office, or immediately below it if in the basement, so that

an ample supply of towels and costumes can be maintained in rush hours. Behind this front block the various swimming baths with their dressing rooms might be planned, and the boiler house or heating chamber, with filtration plant room, might be placed at the rear of the site approached by a side roadway.

Drive-in space should be provided in the front of the building so that traffic congestion in the main road is avoided, and a loading dock for supplies, materials, etc., should be provided at the back. If a public wash-house is included in the scheme, and in crowded industrial areas this is often a desirable adjunct, it should be at the rear of the main building, and the entrance to this department should be some distance from the public baths entrance.

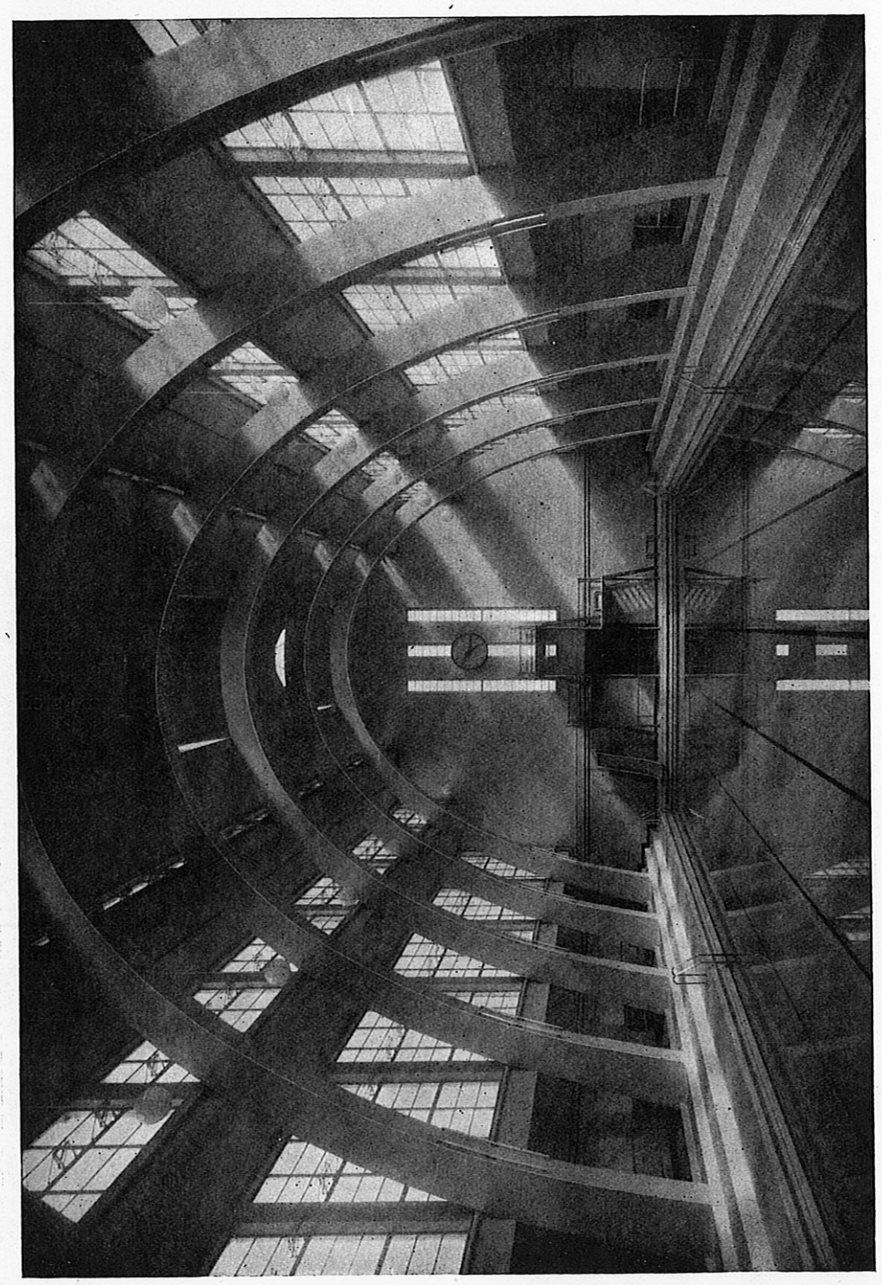
In considering the scheme as a whole, the question of the provision of a car parking space will inevitably arise. Local conditions will determine whether this is to be a part of the baths scheme, or whether general public parking space is available in the vicinity of the baths building.

General description of buildings.

ENTRANCE HALL. The entrance hall should be as spacious as practicable in view of the large numbers it may have to accommodate during the busy months. Separate entrances for men and women are no longer necessary, and the hall should contain as its central feature the ticket office and towel and costume distributing office. The ticket office must contain ample shelving space for towels and costumes, particularly if, as is frequently the case, it is not connected with the Establishment Laundry. Provision is also usually made for mechanical ticket issuing machines, and the ticket office should also be connected by internal telephone to all departments in the building.

The entrance hall should provide easy access to all parts of the building to be used by bathers, either swimmers or slipper bath users. The Superintendent's office should also be near the entrance hall.

DRESSING ROOMS. Men's and Women's dressing rooms in connection with the swimming department should be immediately accessible from the entrance hall, and in designing these dressing rooms, the provision of ample light and ventilation is important. The dressing boxes should be made of teak or terrazzo or similar slab construction, and the doors and other joinery should be of teak. The boxes are usually about 7 feet high, and are fitted with seats, mirrors, trinket shelves, and hooks. A clear space is left between the sides of the boxes and the floor for washing down purposes, and the floor should be laid to fall and have floor channels. The doors are usually of the dwarf door type and can be fitted with indicator bolts. Though valuables should be handed in at the ticket office, it is often found that bathers omit to do this, and if it is proposed that the clothes are to remain in the box whilst the bather is in the swimming



Architect, Ernest Prestwich, F.R.I.B.A.

Northampton Public Bath.

bath, precautions against pilfering must be taken. In some instances it has been found necessary to cover the tops of the boxes with bronze wire mesh. In most modern establishments, arrangements are made to supplement the dressing boxes by the use of lockers or baskets or sterilised bags.

In the first instance the bather, after changing in the dressing box, places his clothes (or asks the attendant to do so) in a metal or wood numbered locker, and either retains a numbered tally to be attached to his wrist or costume, or alternatively hands the key to an attendant, who keeps it on a numbered key rack pending the bather's return. In the latter case, the bather retains a metal disc or token which he hands to the attendant when receiving his key after bathing. Similar procedure is adopted in the case of numbered sterilised paper bags, in which the bather places his clothes, and the bag is hung in a bag room by the attendant pending the bather's return with the appropriate numbered disc. In the case of wire baskets or combined baskets and hangers, the procedure is different. On entering the dressing room, the bather obtains a basket from an attendant at a counter and goes into the nearest available dressing box. After changing, he places his clothes in the basket and hands it to the attendant across the counter, obtaining a numbered disc attached to a rubber band in exchange. On returning from the swimming bath, the bather hands the disc to the attendant behind the counter, who takes the appropriate basket from the rack and hands it to the bather. The latter then goes to the nearest available box and dresses.

By the adoption of any of the above systems, considerable economies in space and in the cost of dressing boxes are effected. The old system, under which the dressing box remained vacant during the whole time the bather was in the swimming bath, was extravagant, and it is calculated that by the use of lockers or baskets or bags, one dressing box can now be used by four or five bathers instead of being reserved for one bather.

A small hand power wringer is a useful adjunct for wringing out bathers' costumes.

Where separate changing rooms are provided for the use of schools in a public baths establishment, it is desirable to provide two dressing rooms, one for boys and one for girls. These should be fitted with fixed seats and should have hat and coat hooks above the seats. Locker seats are difficult to keep clean and fresh. All materials should be as durable as possible, and ledges and climbable projections should be avoided. Floors must be non-slippery and should be laid to fall; impervious dados are desirable, and natural light and ample ventilation are necessary.

Lavatories should be placed in a convenient and even prominent position

adjoining every dressing room. The lavatory accommodation should be proportionate to the maximum number of bathers and may be as follows :—

Men.	1 W.C. and 1 urinal for the first 60 men, and 1 urinal for every additional 40. (Minimum 2 W.C.'s and 3 urinals.)
Women.	1 W.C. to every 40 women. (Minimum 2 W.C.'s)

Cleansing Rooms must be provided in such a position that every bather must pass through the cleansing room before reaching the swimming bath. The cleansing room should contain a large shallow footbath, preferably with warm running water, through which, on account of its size and disposition, the bather is compelled to walk, and it should be fitted with a number of showers either automatically or hand controlled. In the former case, it can be arranged that the shower comes into operation when the bather treads on a slotted mat. Other types of mechanical pedestal foot showers are obtainable, but in connection with all such devices, it should be remembered that mechanism of this kind is subjected to hard use and sometimes proves defective. Probably simple appliances are in many instances more satisfactory. Soap and washing appliances should be supplied in the cleansing room, and it should be regarded as an outrage against social decency for any one to enter the swimming bath hall in an unclean state. The cleansing room must be finished with impervious materials, such as tiles, and the floor of the footbath must be non-slippery. Bathers do not necessarily return from the swimming bath through the cleansing room but by means of one-way doors from the swimming bath hall to the dressing room. Additional showers can be placed in the swimming bath hall in recesses on the bath surround for use after swimming. These are particularly welcome if sea water is used in the bath.

It is of the greatest importance that no one, except the baths attendant and bathers in costume, should walk on the bath surround, and the only means of access for bathers must be through the cleansing room. Dirt, mud and other impurities, conveyed by the boots of members of the public, dirty the pond surround and result in impurities reaching the water. More work is thus imposed on the filtration plant, and the contamination may prove harmful to bathers before the action of the water purification plant can become effective. If owing to special circumstances, the dressing boxes must be within the bath hall, they should be divided from the bathers' promenade by a railing, and a dividing floor channel should be formed in the bath surround. The provision of cleansing accommodation should be regarded as essential.

Dimensions of Swimming Baths.

The size of the principal swimming bath in the establishment is of great importance, and in view of the prevalence of mixed bathing, it is in most instances desirable to provide at least one pond of large dimensions. A smaller

pond for children may be provided in addition, and indeed is strongly advocated. In order to meet the requirements of the Amateur Swimming Association, a pond of a minimum size of 100 feet long and 42 feet wide is necessary. A larger water area is however preferable, and the Association would regard more favourably an area of 120 feet by 48 feet, or 132 feet by 48 feet, or 165 feet by 60 feet for championship contests or aquatic sports. The measurements must be from wall to wall of the swimming bath, and the nosing should be kept flush into the wall.

Distance markings should be inserted along each side of the bath for racing purposes, the most convenient position being on the edge of the bath surround. Guide lines along the floor of the bath for the use of swimmers are no longer considered necessary, as experts now favour the provision of 'lanes' formed by cords stretched along the surface of the water and supported by small corks at regular intervals.

Popular distances for races are 80, 88, 100, 150 and 220 yards or multiples thereof. Should it be found impossible for the size of the pond to be planned to coincide with these distances, the difficulty can usually be overcome by the provision of a finishing pole raised or lowered by means of pulleys, but this can only be regarded as an unsatisfactory makeshift. No Championship of the Amateur Swimming Association is permitted to take place in a covered bath less than 75 feet in length. In regard to water depth, various considerations, some of them conflicting, require attention. In the first place, the shallow end must be safe for non-swimmers and accordingly a depth of 3 feet or 3 feet 6 inches is usual. Should high diving not be proposed, a depth of 8 feet 6 inches may be sufficient at the deep end of the bath. (*See Notes on Construction of Diving Stages on page* 70).

The bath surround laid to fall to a surface water channel, conveniently placed so as to prevent such water from returning to the bath, should be proportionately wide to the size of the bath. A minimum width of 6 feet at each side and at the shallow end should be provided, and at the deep end the width should, if possible, be 12 feet in order to accommodate the high diving apparatus.

Construction of Swimming Baths.

Reinforced concrete is generally used for the construction of the swimming bath; this has superseded the older forms of brick construction prevalent before the Great War. In the design of the reinforced structure, not only have questions of water pressure at varying depths to be taken into consideration, but also the bearing capacity of the soil, and the method of distributing the weight of the bath pond when filled with water. Circumstances will determine whether an asphalt water-proof lining is used as an additional precautionary measure, for theoretically, the reinforced concrete walls and floor of the bath should, if built to specification, be water-tight. If asphalt is employed, the method of fixing the glazed tile or

other similar lining to the walls of the bath has to be carefully considered, as it is unwise to lay tiles direct on to the asphalt. A possible solution is the formation of a thin wall of concrete cast in situ, or concrete blocks or terra cotta blocks on the bath side of the asphalt, upon which a cement screed for the tiled lining can be laid.

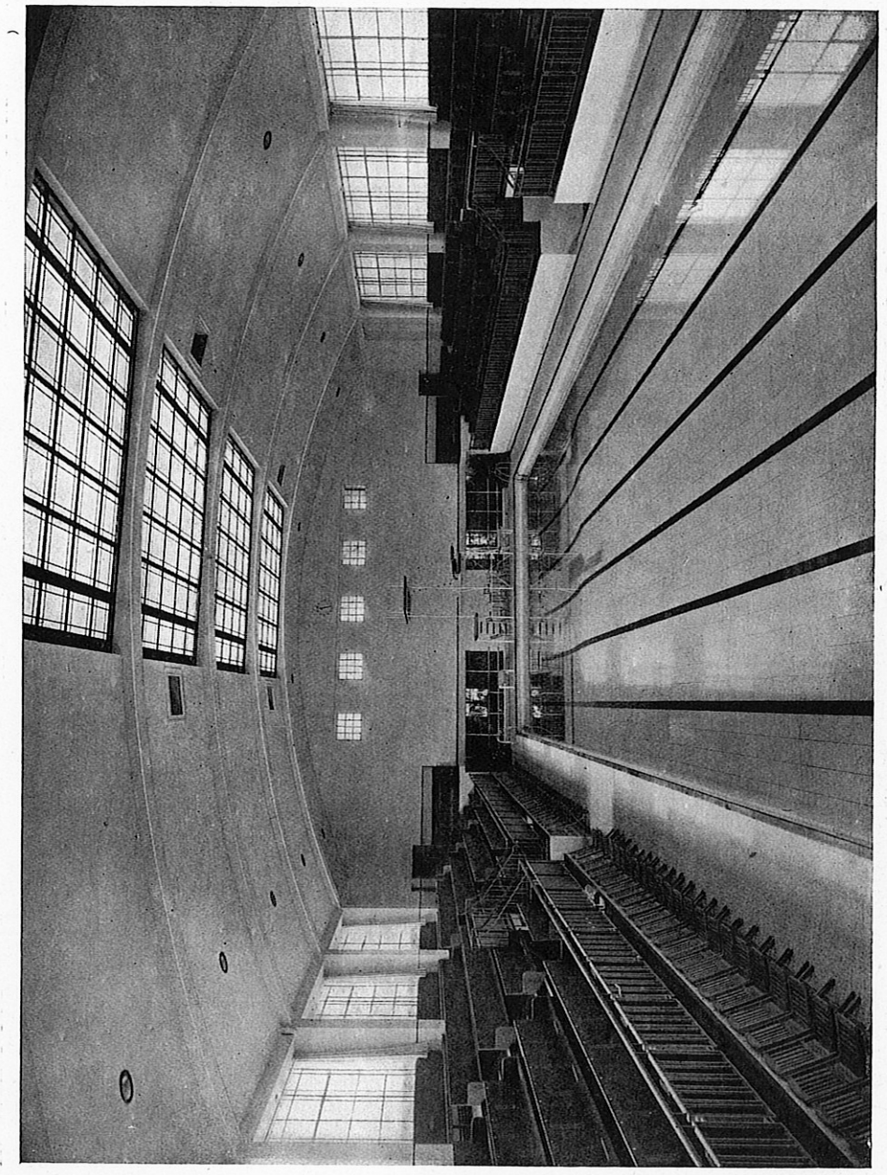
It is structually advantageous for the reinforced concrete walls of the bath to be carried across the space between the wall of the bath and the main wall of the bath hall, so that the bathers' promenade is constructed of the same material as the bath. If asphalt is used for the bath walls, it may be carried across as well in order to obviate possibilities of leakage from the bathers' promenade to the subway for pipes or corridor below.

It is usually desirable for the swimming bath to be lined with heavy white glazed clay tiles jointed in white cement. The brighter the white of the tiles, the cleaner will be the appearance of the water. This point is of special importance when underwater lighting is to be installed, owing to the intensified reflection obtainable from a bright surface. Tiles of various colours for bath lining are attractive in many ways, but they are more suitable for private swimming baths than for those patronised by large numbers of the general public, and which depend for their success on their appearance of spotless cleanliness.

Scum troughs made of fireclay and finished with a glazed surface are usually built in on all four sides of the pond. They serve a dual purpose; their primary object is to take away surface impurities floating on the top of the water. Such impurities are sprayed across the surface of the water by means of a spray rail fitted at one end of the bath. For this purpose, it is only strictly necessary for the scum trough to be fitted at one end of the pond, but inasmuch as the scum trough can be designed to form an effective hand grip for bathers all round the bath, it is usually carried round symmetrically.

If the scum trough is provided all round the bath, the spray rail referred to above, fitted at the shallow end, will be found to be a useful feature for teaching purposes. It need only be used periodically for spraying purposes. Additional rails along a portion of each side of the bath at the shallow end are extremely useful for teaching purposes.

Should it be proposed to discharge the water in the scum trough to the main drain, there will be slight water losses throughout the bathing period. If on the other hand the scum trough waste is taken back to the filtration plant, the latter will have an increased duty, and the strainer boxes will require more frequent cleansing. It is suggested that, should the latter method be adopted,



Architect, K. M. B. Cross, F.R.I.B.A.

Bournemouth Public Bath.

the lip of the scum trough at the deep end of the bath might be formed some two inches lower than the lip of the trough at the other sides, and in this way a continuous flow of surface water to the deep end into the trough and to the filtration plant is induced.

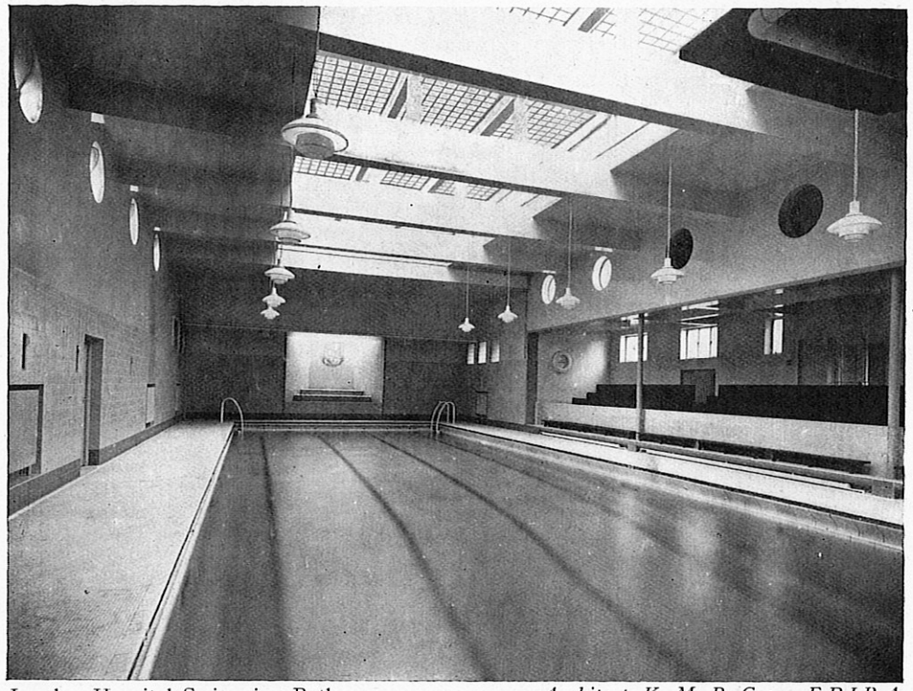
Steps for access and egress to and from the water should be provided at each corner of the bath, and in long baths intermediately. Such steps should be recessed into the sides of the bath so that the swimming area can remain free and unobstructed. The steps should be non-slippery and should be fitted with metal handrails. A minimum width of 6 feet should be allowed for the bathers' promenade, which must be laid to fall to channels and covered with some form of non-slip material. Many experiments have been made with varying degrees of success in the effort to find a permanently satisfactory material for this purpose. Whilst there are various forms of flooring tiles, either containing carborundum or alundum, there are also various forms of tile mosaic either of the pin-head variety or containing alundum.

The wall of the swimming bath hall should be lined with some impervious material, such as glazed tiles or terrazzo, and this lining should be taken up to a height of about 7 feet.

The swimming bath hall should be top lighted and ventilated, though additional lighting can be obtained from side windows if possible. If a sunny aspect is obtainable, wide folding glass windows along one side of the bath hall will provide an attractive feature of the bath. A modified form of mechanical ventilation will also be desirable by the provision of mechanical extract fans in the roof.

Seating for Spectators.

Accommodation for spectators is essential in the more important municipal swimming baths for gala purposes and for use in connection with polo matches and swimming and diving competitions. Moreover, spectators seats may be claimed to be revenue producing with little financial outlay, apart from the initial cost of the seats and the buildings to enclose them. It is of great importance that every spectator should have a clear and unobstructed view of the whole of the water area in the bath. Special attention must therefore be given to the angle of vision obtainable from the eye level of the seated spectator and the edge of the bath in relation to the width of the bath surround. It will be found that what is known as the amphi-theatre system is the most satisfactory solution of the problem. The seats are arranged in tiers which recede at increasing levels from front to back, and easy access to the seats, without of course utilising the bath surround, must be provided. The seats should be constructed of teak. Upholstered seats are unsatisfactory on account of their readiness to absorb moisture, and rubber or similar substances are liable to the formation of condensation on their impervious surfaces.



London Hospital Swimming Bath. *Architect, K. M. B. Cross, F.R.I.B.A.*
The cascade aerator forms a decorative feature at the shallow end, and seating for spectators is planned at one side of the bath.

Should restricted site area make the provision of amphi-theatre seating impossible, overhead galleries may be provided, but these should be set back as far as possible from the bath edge in order to provide a reasonable angle of vision.

Water treatment by means of filtration plant.

Before the Great War, it was customary for swimming baths to be supplied with water on the fill and empty system. The bath was emptied and re-filled say once a week, or alternatively when, in the opinion of someone in authority, it looked sufficiently dirty to warrant the not inconsiderable expense of purchasing 100,000 or 150,000 gallons of clean water from the local water board. This system has now been entirely changed, and the quality of the water now generally found in swimming baths is of an infinitely higher standard than it has ever been in the past.

The possibility of the swimming bath acting as a medium for the spread of infection has received special attention from the Ministry of Health, public authorities, architects and others interested in this most important question.

Town waters, which are perfectly good for drinking purposes, often deteriorate when warmed and kept for some time in a swimming bath, and vegetable growths develop and the water deteriorates in quality and appearance. Accordingly, whether the bath is extensively used or not, it is liable to become polluted, and if it is used by large numbers of bathers, it almost inevitably becomes bacteriologically dirty, though its appearance may be comparatively innocent. In any event, whether the water is scientifically free from bacteriological or other defects or not, it is essential, in the interest of the bathing establishment and of the public, that its appearance shall be fresh and clean. No more effective deterrent to potential bathers than that the water is ' dirty ' can be found.

Under the aegis of the Ministry of Health, every new public bathing establishment which is subject to loan sanction is equipped with apparatus for the continuous purification of the swimming bath water. Somewhat loosely referred to as the system of Filtration, though in fact filtration is only one of the processes employed in purification, the complete system consists of straining, chemical treatment, filtration, aeration, disinfection, re-heating and circulation.

Very broadly a typical filtration plant comprises the following processes :—

The waste outlet is planned at the deep end of the bath at the bottom of the diving well. The water passes through a strainer which is easily removable for cleansing purposes. It then enters the circulating pump, chemical reagents are added mechanically to effect the coagulation of impurities, and the water enters the filter. The coagulated impurities and suspended matter are retained by the filter bed and the water collects at the base of the filter. The impurities in

the filter bed are periodically removed by washing the bed by reversing the water flow after compressed air agitation. The filtering medium, consisting of quartz or Leighton Buzzard sand, is contained in steel shells either circular or, if a range of filters is contiguous, oblong in form.

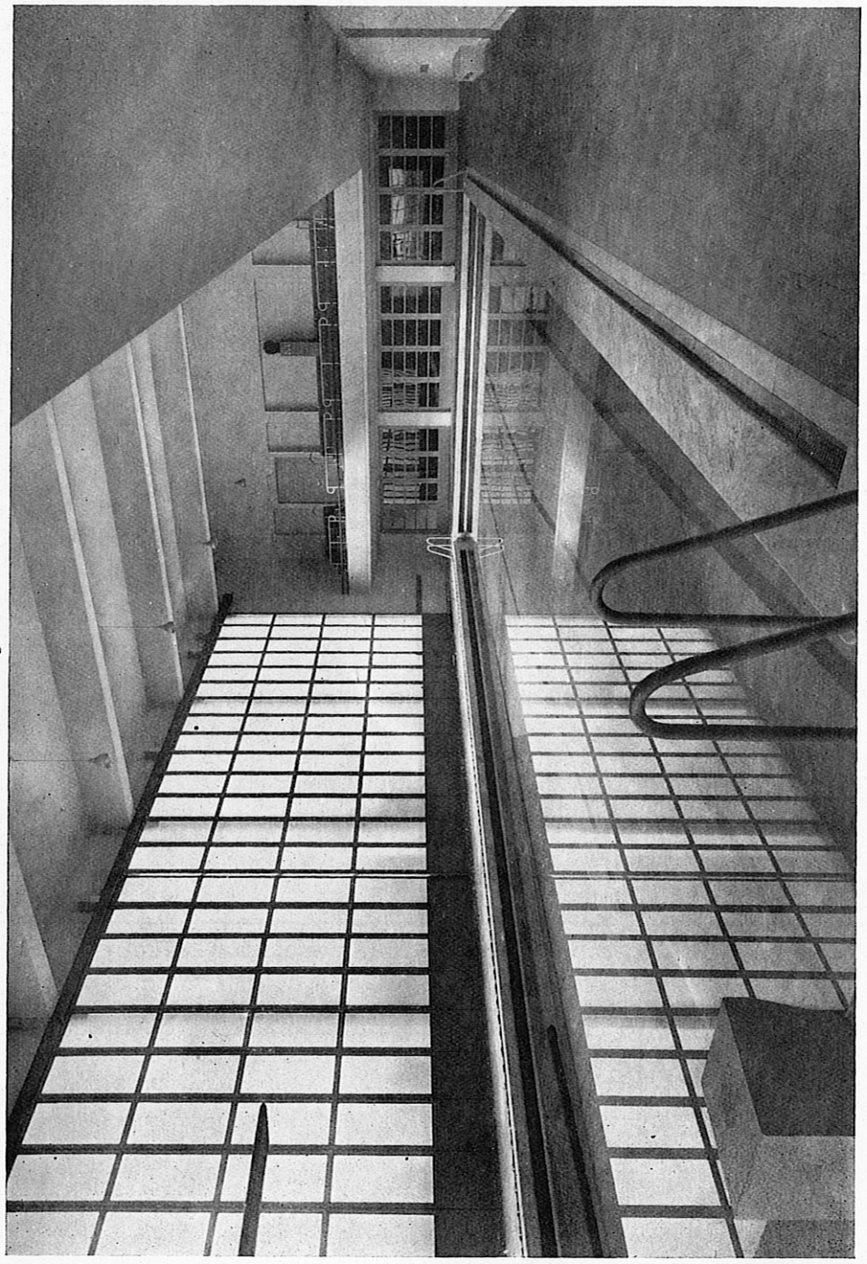
After passing through the outlet pipe from the base of the filter, the water is aerated in order to impart to it an attractive and sparkling appearance after treatment. The next process, disinfection, is usually effected by means of chlorine gas, and this method is claimed to be the cleanest and most effective method of achieving the object in view. The chlorine gas is administered by means of a chlorinator, and the steel chlorine containers are conveniently placed in relation to the plant. Finally, the water is re-heated in a calorifier to the temperature at which it left the swimming bath and re-enters the pond by means of inlet gratings at the shallow end. This process continues during the whole period during which the bath is in use, a continuous circulation being maintained.

The Ministry of Health recommend that the Filtration Plant be so designed that the entire content of the bath shall pass through the plant in a period not exceeding four hours without the rate of filtration being excessive, having regard to the area of the filters. In some instances, where large numbers of bathers are likely to use the bath, the time is reduced to 3½ or even 3 hours. It must be appreciated, however, that such modifications entail the use of large pipes and increase the cost of the installation.

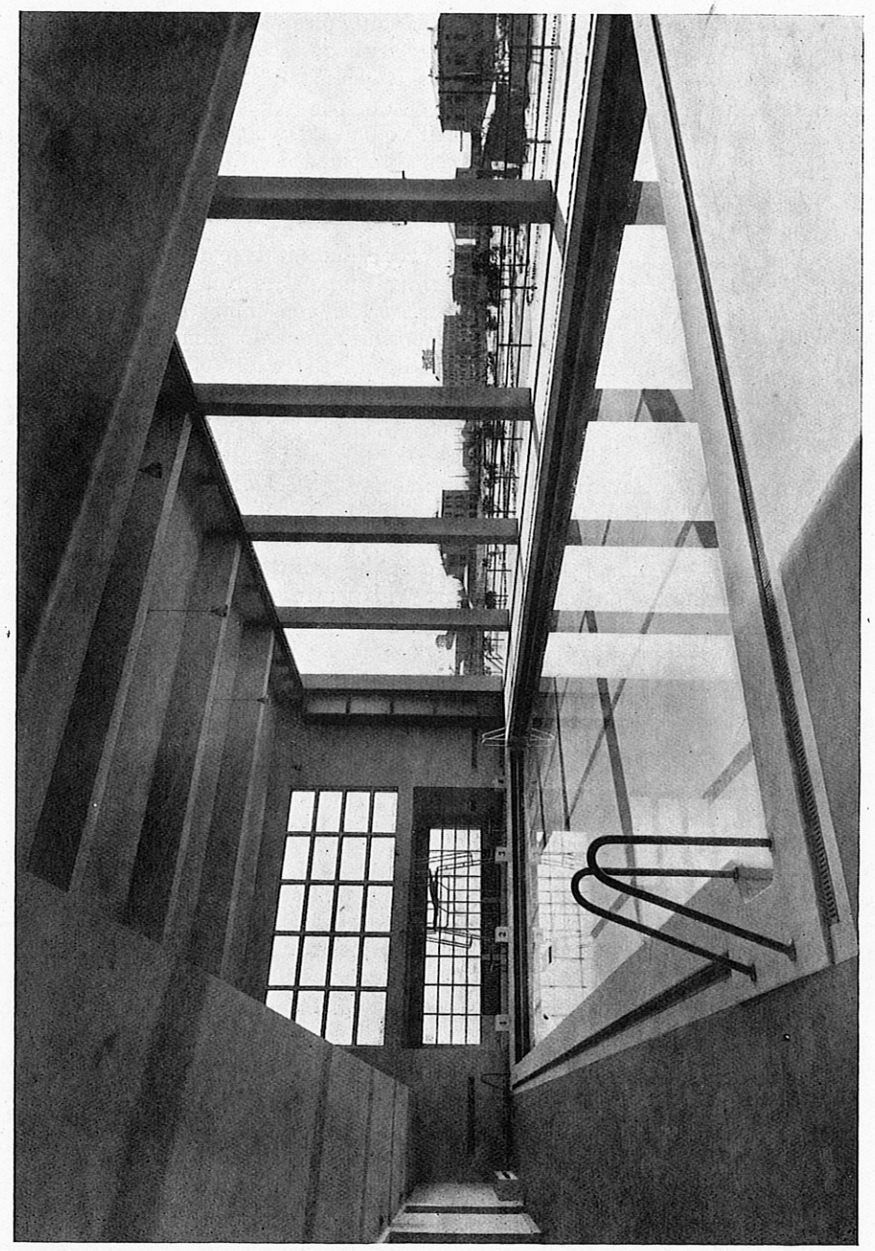
Whilst medical authorities maintain that the system outlined above is the best proved method of water purification, it is an undeniable fact that in many instances complaints have been made concerning the use of chlorine as a method of disinfecting the water. It has been stated that smarting of the eyes or throat irritation are attributable to this cause. On the other hand, it is argued that the system is perfectly sound, and that if the chlorination equipment is properly worked, no unpleasant effects need be anticipated, and there is in fact abundant evidence to support this thesis. It is hoped that an efficient mechanical doser will soon be evolved. The Ministry of Health recommend that the water in a swimming bath shall be chlorinated so as to contain not less than 0.2 or not more than 0.5 parts per million of free chlorine.

There are alternative methods of treatment as substitutes for chlorination, such as the ' Katadyn ' system, which consists of adding extremely small quantities of silver to the water in such a state that it is a highly sterilising agent. Mr. L. St. G. Wilkinson, the Borough Engineer of Wallasey, describes the apparatus as follows :—

" The apparatus comprises an insulated container in which are located 39



Swimming Bath at the Balilla Hostel, Forli, Italy. Movable side closed.



Swimming Bath at the Balilla Hostel, Forli, Italy. Movable side open.

electrodes of pure silver sheets mounted on vulcanite and connected so that alternate plates are anodes and the other cathodes. By means of an electric control panel, a D.C. current at 2 volts is passed through the activator, thus dissipating the silver from the electrodes and passing it in the required active condition into the filtered water, a small volume of which is by-passed through the activator. The quantity of silver dissipated is directly proportioned to the current flow and therefore easily controlled."

Another treatment is by means of ozone, and it is claimed that complete sterilisation and the elimination of harmful impurities can be effected after a few seconds of contact with the water. The consuming or burning of the impurities in the water is by the decomposing action of ozone. The ozonised air is conveyed to an emulser and mixed with the water to be treated. The ozone itself is produced by means of electrical charges through the oxygen in the air.

Another system of sterilisation is by means of the Ultra Violet ray, to which the water is subjected before re-entering the bath. One further method may be referred to whilst dealing with the question of sterilisation. Some authorities maintain that if an ammoniator be added to the ordinary chlorination equipment, the dosing of the water with ammonia will neutralise the effects of excessive chlorination.

The system of filtration described above, whatever the method of sterilisation adopted, is the one which has secured general adoption in all parts of the country. Reference should, however, be made to certain modifications affecting the circulation of the water in the bath that are exercising the minds of those who are constantly dealing with problems of this nature.

It is argued that if the freshly treated water is introduced at the shallow end, and extracted at the bottom of the diving well at the deep end, there will be certain portions of surface water that are dead and which are not affected by the current set up. A simple expedient to reduce this risk would be to lower the scum trough at the deep end, say 2 inches below the level of the scum trough at the sides and shallow end of the bath. The top surface water would then flow towards the scum trough at the deep end, and floating impurities would be taken away. The scum trough in question might either run to waste or be drained to return to the filtration plant; in the latter case, precautions must be taken against 'air locks.' It must be appreciated that the second alternative involves an increased duty for the filtration plant and also the provision of an additional pipe system, and it is therefore not necessarily less expensive than the first suggestion.

Special features.

Whilst covered baths are usually built in towns, it is frequently possible to make the swimming bath more attractive and more healthy by admitting all the available sunshine. A sliding roof that is really satisfactory for swimming baths has not yet been evolved, and in fact if it were possible to open a large portion of the roof over the bath to the sky without seriously interfering with the necessary anti-condensation pipes that are required around the lantern light over the bath, the cost of the necessary mechanism would be considerable. Probably the most economical solution of the problem is for the side walls of the swimming bath hall to be fitted with large folding or sliding glass screens, which in fine weather can be opened so as to leave a very large proportion of the side of the bath hall clear of obstruction. Further, if an open air terrace and tea and coffee bar can be planned immediately outside the building proper, the benefits of sunlight and fresh air can be enjoyed by bathers.

The provision of artificial sunlight apparatus for use in the winter months might also be considered, but it will probably be necessary for the electric sunray department to be controlled by a qualified supervisor in public bathing establishments.

Water Polo Requirements.

With the rapid increase in the popularity of water polo, the difficulties experienced in obtaining adequate water depth should be faced and overcome. In fact there is no question that English players are handicapped when meeting Continental teams through having had to practice in insufficient water depths, particularly in covered-in swimming baths.

The length of the field for water polo must be not less than 19 yards nor more than 30 yards, and the width not greater than 20 yards. Whereas a water depth of 6 feet is desirable, 4 feet must be considered as the absolute minimum. Semi-final and final matches in English Water Polo Championships are not permitted to take place in baths where the depth of water in any part of the field of play is less than four feet, and there can be little doubt that, sooner or later, this condition will apply to all matches. With the great majority of covered-in swimming baths, it will be found that, for half the game, one side will be able to stand on the floor of the bath and, though the half time change over equalises this as far as the opposing sides are concerned, the loss to the efficiency of the teams is apparent. If a minimum depth of 4 feet is required this will only be found possible in a bath 120 feet in length unless the usual water depth at the shallow end can be increased and non-swimmers and children relegated to another and shallower swimming bath. In public swimming baths, it is frequently required to convert the swimming bath from a racing area into a water polo field, particularly on gala nights, and consequently the polo goals must be readily accessible and capable of being quickly fitted into their respective positions at the deep end and near the shallow end. If the polo goals cannot conveniently be

stored near the bath surround, they may be suspended from the ceiling and lowered into position by means of winches.

The goal posts and crossbar must be of wood or metal, rectangular in section, and 3 inches square and painted a single distinctive colour. They must be rigidly fixed at the ends of the playing space at even distances from the sides and at least one foot in front of any obstruction. The goal posts must be 10 feet apart and the crossbars 3 feet above the water surface when the water is 5 feet or more in depth. When the water is less than 5 feet deep, the crossbar must be 8 feet above the floor of the bath. These measurements are to be taken at the inner sides of the goal posts.

It should be added that experienced players when shooting at goal frequently impart great impetus to the polo ball, and accordingly glass of any kind in the vicinity of the goals, whether in glazed doors or windows, or electric light fittings, should be eliminated as far as possible.

ing. For notes on the design and heights of diving equipment, including firm boards and springboards, and the necessary water depths in the diving pool, see page 70.

reshments. Provision is usually made in modern public baths schemes for a Café or Refreshment Room for the use of bathers and spectators as being an attractive feature and also for revenue-producing purposes. A tea and coffee bar near the swimming bath, which can be used by bathers in costume, is sometimes provided, and reference has already been made to the possibility of such facilities being arranged in connection with the bathers' open air terrace. But in any case it is desirable for a Café, with service counter and small tables and chairs, to be included in the establishment where tea and coffee and similar light refreshments can be served.

Convertible l. No description of the tendencies in modern swimming bath design would be complete without reference to the very interesting engineering achievement at Earls Court. The swimming pool is 195 feet long and 95 feet wide, and it is not required to keep this large bath open in the winter months. The chief objection to the installation of the usual wooden dance floor, carried on specially designed tubular scaffolding, was the estimated time to erect and then remove the floor. This was eight days in each case.

The problem was ultimately solved by Messrs. Fraser and Chalmers, Engineering Works of the General Electric Company, who designed and constructed a movable platform within the bath proper. This platform is built in three sections, which occupy the entire area of the pool. The sections are raised and lowered by means of hydraulic rams.

For swimming and diving purposes, the sections can be sloped to give approximately 3 feet 0 ins. of water at the shallow end sloping to a depth of 7 feet 3 inches, and the diving pool at the deep end can be formed with a depth of 13 feet 4 inches. †

When the bath is converted for public hall purposes, the sections can be raised level with the bath surround or, if required, they can be raised 5 feet above the general floor level to provide a raised platform. Whilst such a system is admirable for its purpose, it is unlikely that the cost of the necessary machinery would be justified in the case of public swimming baths.

Slipper Baths. Easily accessible from the principal Entrance Hall and ticket issuing office, the separate suites of men's and women's slipper baths in two classes should be approached by separate waiting rooms, which should be proportionate in size to the number of slipper baths in each suite. In several recently erected bath buildings, one waiting room has served both first and second class bathers, and in fact the only difference between the two categories of baths has been in the provision of additional towels for first class users.

The waiting rooms should be well lighted and ventilated and fitted with fixed hardwood seats for the use of intending bathers awaiting their turn. The entrance from the waiting room to the slipper baths should be directly planned in relation to the slipper baths corridor along which the bath compartments are ranged. A small box for the attendant, with towel store adjoining, should be so arranged that he can supervise the entry of bathers. If the ranges of slipper baths can be planned in one length with the minimum number of breaks and turns, the pipework in the subway below the corridor will be simplified and cheapened.

On presenting his or her ticket of admission to the attendant, the bather will be shown into a vacant compartment, and the supply of hot and cold water will be regulated by the attendant by means of a special valve operated from the corridor by a key. Terrazzo, or reconstructed marble, consisting of marble chippings in cement and highly polished, is the material most generally used for the construction of the divisions forming the slipper bath compartments, and the main walls of the building should be faced internally with the same material up to the height of the partitions. The underside of the transverse partitions is so shaped as to give an opening over the greater part of their length of at least three inches between the underside of the partition and the floor level. Partitions immediately adjacent to built-in slipper baths should not have this shaping. Should independent slipper baths be used, the openings in the partitions

† A depth of 15 feet is required for a 10 metre diving board.

will permit suites of slipper baths to be easily washed down by means of a hose pipe and a mop.

A surface water channel running along the entire length of the range of bath compartments should be provided, and the floors laid to a slight fall to facilitate cleaning.

The minimum size of the compartment should be 6 feet 6 inches by 6 feet, and teak doors, framed seats and bath standing mats as well as mirrors, and coat and hat hooks, should be provided. The doors should be hung at least 3 inches above the floor level, and should be fitted with specially designed bolts operated from the inside and only opened by a master key in the possession of an attendant.

Fireclay slipper baths are usually provided as being the most suitable for public use. Cast iron porcelain enamelled slipper baths are cheaper in first cost but they require re-enamelling at regular intervals. Fireclay baths on the other hand require no expenditure in maintenance, but they are liable to be cracked or broken if improperly used.

urkish aths.

The popularity of Turkish Baths is varied in different districts, but in densely populated urban areas they are usually in great demand. A suite of Turkish Baths usually comprises :—

(*a*) Entrance Lobby and Cloak Room counter, small lockers being provided for the storage of valuables, and Boot Room.

(*b*) Cooling Room, containing dressing boxes, lockers for bathers, and couches or divans separated by light partitions or curtains.

(*c*) A series of three Hot Rooms of increasing temperatures.

(*d*) A Steaming Room.

(*e*) A Shampoo or Massage Room.

(*f*) A Plunge Bath.

(*g*) A Kitchen and Service Bar for the service of light refreshments to bathers in the Cooling Room.

(*a*) *Cloak Room.*

This should serve as a Reception Office and Cloak Room with the usual equipment for hats and coats. The small lockers required for bathers' valuables should be fitted with locks and keys, and the latter may be retained by the bather or kept by the attendant who hands a numbered token to the bather.

(*b*) *Cooling Room.*

This room should present an appearance of comfort and should contain, in addition to the dressing boxes referred to, a number of couches in cubicles formed by partitions or curtains. Each cubicle should have its own reading lamp and side table.

Small tables and lounge chairs should also be provided, and a weighing machine is a useful provision.

(*c*) *Hot Rooms.*

Great care must be exercised in the construction of these rooms to ensure that they are completely insulated from the rest of the building. Fixed seats are usually fitted round the walls, and opinion is divided as to whether they should be in the form of Teak slatted strips or marble or similar impervious material. In any event, it is essential that the seats be so constructed as not to harbour dirt or vermin and be easily cleaned. Impervious wall and floor finishes are desirable, and the provision of a trapped gulley in the floor will facilitate washing down.

(*d*) *Steaming Room.*

Though the process of steam bathing properly forms an essential feature of Russian and not Turkish Baths, there has been a demand of recent years for such provision to be made in the Turkish Baths Suite. The Steaming room should be equipped with a series of Teak slatted seats open underneath for cleansing purposes. Steam is admitted under control until the required temperature and humidity are reached. A small shower and a drinking water fountain are desirable. Particular care must be taken in insulating the Steaming room from the remainder of the building, and also in the design of the finishings to both floor and ceiling to resist the effects of steam and condensation.

(*e*) *The Shampoo or Massage Room.*

This room is fitted with the necessary shampoo slabs made either of fireclay or marble. It is usually found more convenient for operation if the slabs project into the room clear of obstruction so that the bather can be approached from both sides. A fireclay sink or lavatory basin with a length of hose and spray attachment are required near the head of each slab. Shower baths are frequently fitted in the shampoo room, and more elaborate establishments include Aix or Vichy Douches, though strictly these fittings are more appropriate to medicated baths.

(*f*) *Plunge Bath.*

The Plunge Bath should be at least 20 feet in length and 8 feet wide. It should be lined with glazed tiles or similar material, those on the floor of the bath being 'non-slip.' The water depth may vary from 3 feet to 6 feet. Entrance steps at one end of the bath, fitted with handrails as well as handrails around the edge of the bath, are desirable.

(*g*) *Kitchen.*

As the refreshments provided are usually of a light nature, the kitchen can be of modest dimensions.

ussian 'aths.

Russian baths are similar to the Steaming room accommodation referred to above, and a small plunge bath may be usefully provided in an adjoining room. A cleansing room should also be provided, fitted with lavatory basins and showers. Dressing Boxes and a Cooling Room, similar to those already described, are also necessary.

oam Baths.

Foam baths are becoming increasingly popular, and the equipment necessary is similar in many respects to that required for ordinary slipper baths, but electric power is essential. It must be remembered that a rest room, where the bather can repose for some considerable time, is a very necessary adjunct. If, then, it is proposed to utilise some of the Slipper Baths for purposes of foam bathing, a rest room containing couches must be provided in addition to the ordinary waiting room. If the foam baths are planned in proximity to the Turkish baths department, the cooling room can be extended to accommodate foam bathers.

'eating and 'ot Water 'upply.

There are four different methods of generating heat for water and general heating requirements in a baths building. In most cases it will be found that coke fired boilers remain the most economical method, whilst gas, oil or electricity, provide alternatives that offer many practical advantages but which are usually more costly in first costs and in running costs.

The old high pressure steam system, with its cumbersome Lancashire boilers, tall unsightly chimney stack, and its costliness in construction and in working expense, is out of date, and the following system of heat generating plant has now largely superseded the high pressure steam system. This low pressure system was invented to obtain simplified control, economical fuel consumption and running costs, and cheaper cost of installation. It enables the plant to be attended to by semi-skilled labour instead of the skilled attendance required for the high pressure plant. The system consists of cast iron or steel sectional low pressure boilers, combined with calorifiers and circulating pumps, coupled

together direct without the intervention of any steam traps, automatic condense pumps, or boiler feed pumps, mechanical stoking apparatus being employed for the boilers.

The apparatus consists of a battery or batteries of sectional steam boilers working at a pressure not exceeding 10 lbs. per square inch, but generally working at 5 lbs. per square inch or less, and above the steam boilers, in suitable positions, are fixed calorifiers, the number varying according to the duties required. For instance, one calorifier would be provided for warming up the water in the swimming pond or ponds, one for generating hot water in the slipper baths, public and establishment laundries, etc., and one for warming the building on the low pressure hot water system. The steam boilers are directly coupled to the calorifiers, and the condense taken back from the calorifiers direct into the boilers, the whole of the condense water returning by gravity, no steam traps or mechanical device being necessary to effect the return of the condense water. This being so, the same water in the boilers is continually being re-evaporated and condensed, consequently no lime deposit is generated in the boilers, and the cleaning of the boilers is unnecessary. Mechanical stokers for the feeding of the boilers are recommended as reducing labour.

The method of warming the swimming pond or ponds is by passing cold water from the Company's main, when filling the ponds, through its particular calorifier on the way to the swimming ponds, thus the cold water takes up a considerable amount of heat on its way to the ponds, without the assistance of any mechanical energy. When the swimming ponds are filled and the Water Company's main is shut down by the valve, the necessary additional heat to the water is obtained by circulating the water in the ponds through the calorifier by means of a centrifugal pump coupled direct to an electric motor, or the pump may be belt driven if the circumstances are suitable, and by this means any temperature of the water in the ponds can be achieved; the final temperature required usually being from 72° to 75°.

The hot water for the slipper baths, Public and Establishment Laundries, etc., is generated in a separate calorifier installed for this purpose, the water passing through the calorifier on its way from the cold water storage tank to the slipper baths and other appliances. When necessary, a circulation throughout the mains can be maintained by means of a centrifugal pump electrically or mechanically driven, but this is generally found unnecessary, as the water is continually being drawn from the mains, so that the time is insufficient to permit the water in the mains becoming cool between the drawing process.

The Low Pressure heating apparatus is also generated by an independent calorifier, and the circulation to the various radiators, heating pipes, etc., is

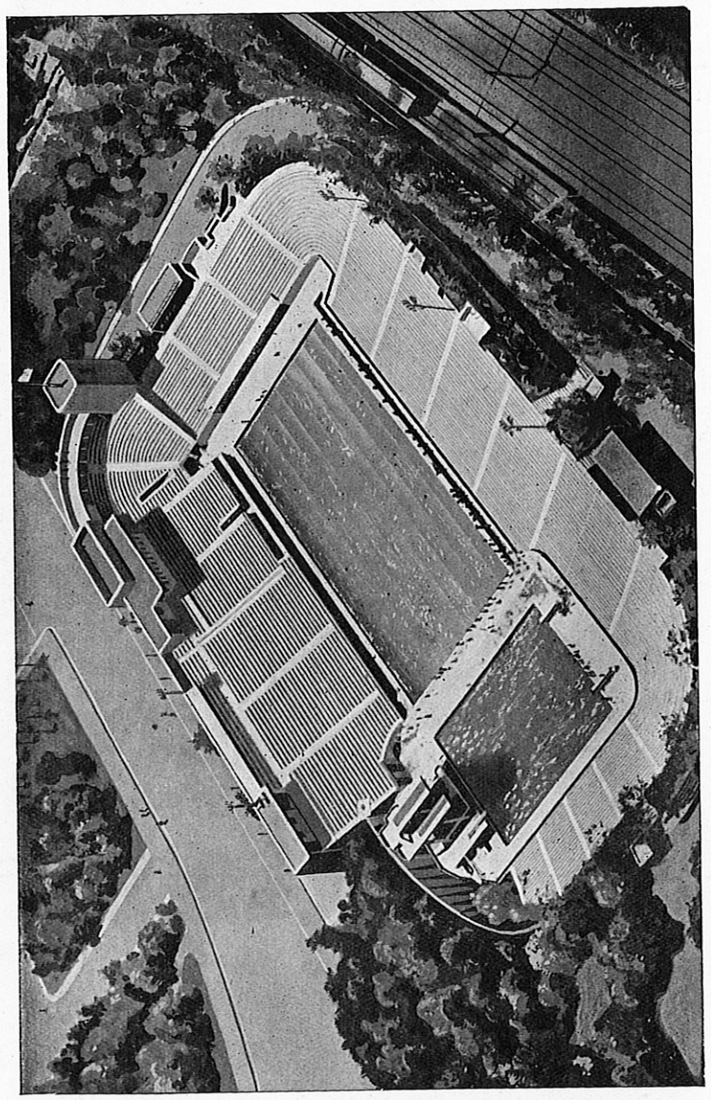
maintained either on the gravity system, if the levels of the building are suitable, or by forced circulation actuated by a centrifugal pump, in which case all variations of level are readily overcome and an efficient circulation is ensured to every part of the building.

Where gas heating is employed, specially designed gas boilers are installed, and both the water and the bath building can be kept at the required temperature by means of thermostatic controls.

The boilers described above, in connection with a low pressure system, are suitable in type for oil fuel. Special burners have to be fitted, and a chimney flue to take off fumes, generated particularly when the plant is being started up, must be provided.

No chimney stack of any kind is required where electric heating is employed. By means of the system of electrical thermal storage, electric power is purchased off-peak load and the water is heated and stored in large containers insulated against loss of heat. Electrode boilers are used for the heating process and the whole supply is thermostatically controlled. Theoretically this system is entirely automatic and requires practically no attention. Maintenance costs are usually found to be low. The primary consideration is the price per unit at which electric power can be purchased, and a low figure must be quoted if comparison is to be made with other systems.

OPEN-AIR SWIMMING BATHS

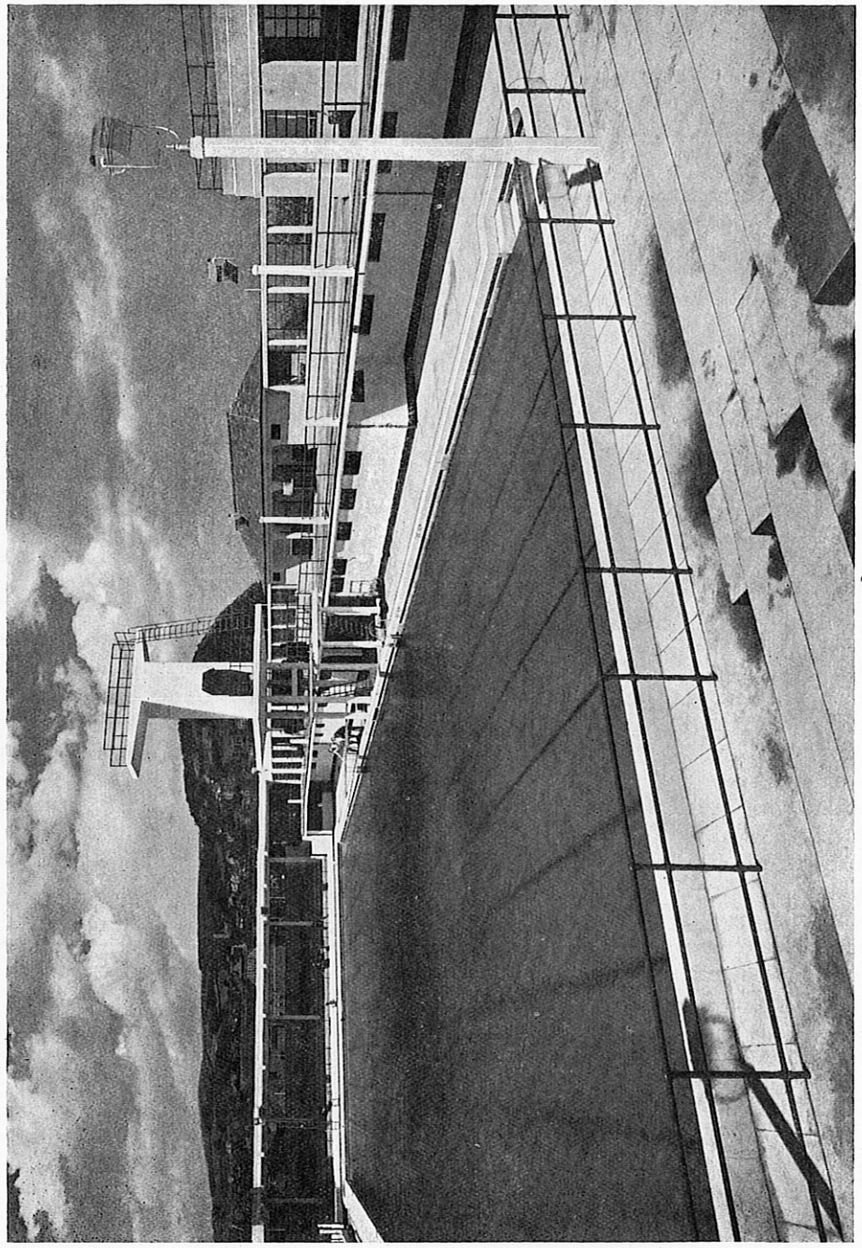


Aquatic Stadium, Nagoya, Japan. Excellent accommodation for spectators to view the Swimming Bath and Sports Area, which is kept separate from the Diving Pool.

OPEN-AIR SWIMMING BATHS

General Conditions.

In dealing with the question of open-air swimming baths the subject may be divided into four categories, viz:—Municipal Bathing pools for the provision of bathing facilities at cheap rates for large numbers of the general public; road house and club bathing pools; bathing pools in private gardens; and bathing pools for the use of schools. On the long view very probably the latter are most important of all. If every boy and girl can be taught to swim, and can form the bathing habit, the results to the future health and happiness of the community will be incalculable. It has been customary during the past ten years or so to look to some of the continental nations for leadership in the provision of swimming establishments, as being part of the physical fitness campaign that is slowly and peaceably revolutionising Europe. That movement has now reached England and has received increased impetus in the recent public endorsement by the Prime Minister. It is for us to see that where others have shown the way we shall learn from their experience, profit by their mistakes, and finally evolve standards of our own that will bear comparison with those of all other nations. That health, happiness and efficiency are very closely related is incontestable, and that the physical fitness of a community makes for economy in the avoidance of illness and disease, are themes that are capable of considerable expansion. Many experience a thrill of satisfaction on learning that some well known prison is no longer required and is to be demolished. How much greater would be the feeling of satisfaction as we learnt that one by one the great hospitals were found to be superfluous, whereas the bitter truth is that they are increasing in size and in number every year. Overcrowding is very great, working conditions in many offices and factories are bad; though much has been done in the provision of new houses, many thousands of people still live in squalid and sordid homes. Fresh air, sunlight, exercise and companionship are essential to the fulness of life, and the provision of the necessary facilities is not a luxury; it is an urgent and ever insistent national need if the standard of physique and morale of our people is not to be allowed to deteriorate.



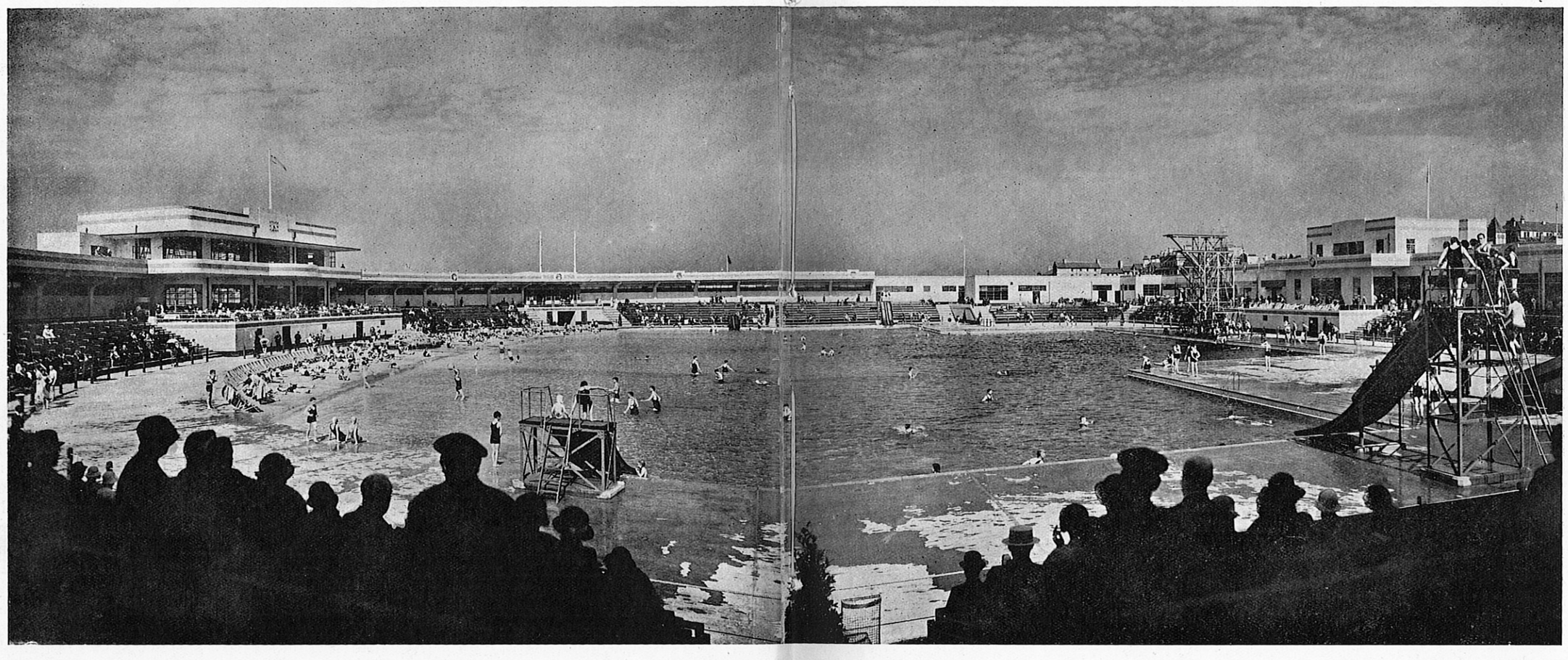
Architect, Edwin Gunn, A.R.I.B.A.

Minehead Open-air Swimming Pool.

MUNICIPAL BATHING POOLS

Location. In regard to the locality to be selected for an open-air swimming bath, conditions will obviously vary, but it is possible to suggest one or two general principles in the choice of a site which would appear to be of universal application. Many open-air baths are built in sea-side towns where for one reason or another sea bathing is unsafe or unsuitable. Ease of access from all parts of the town is essential if the establishment is to be successful; a prominent position on the promenade is desirable if such a site is available. Some promoters have had the swimming bath and ancillary buildings constructed on the sea shore, but a word of warning is perhaps not out of place in regard to a practice that is both risky and expensive. In most cases, the construction of a sea wall is necessary projecting out beyond the existing sea wall and promenade, and thus is costly. Moreover, there is a possibility that upward pressure may cause the lifting of the floor of the bath and thus add to the structural costs. It cannot be too strongly emphasised that a swimming bath requires foundations as good as those of any other structure, and the disposition to assume that because a swimming bath contains water, and has an aquatic atmosphere, it can be suitably constructed in a marsh or in the shifting sands of a sea shore, is to be strongly deprecated. In the case of an inland bathing pool, a site should be chosen where there is ample space available, so that by the judicious planting of trees and the laying-out of grass lawns and gardens, the setting may be as attractive as possible. Imagination and skill in taking advantage of natural features are of greater importance than the indiscriminate covering of the whole of the area available with elaborate buildings out of harmony with their surroundings. This of course applies with equal force to sea-side resorts, where the open-air bath may be the primary attraction, as well as to the urban district. In many cases sufficient importance has not been attached to the employment of properly trained practising architects, and the delegation of this work to officials whose business is not architecture but surveying or engineering, frequently results in schemes which are both costly and unattractive in appearance. It is sometimes possible to plan the open-air swimming bath in an existing public park or gardens, and in some cases this is to be recommended. If, in addition, a public sports ground were adjacent, an excellent civic centre of healthy amusement and recreation could be provided in which games of all kinds, water and sun-bathing, refreshment and rest, might be obtainable by all members of the community. The magnificent establishment at Frankfort affords an example of civic enterprise in which bathing facilities for children and adults, playing grounds, bandstand, sports stadia, gymnasia, cycling and running tracks, miniature shops and cafés, form a large and comprehensive health and amusement centre.

The question of car parking arrangements is one that affects the town as a



New Brighton Bathing Pool. County Borough of Wallasey. *Architect, L. St. G. Wilkinson, M.Inst.C.E.*
The artificial beach is on the left, the swimming area is in the centre, and the high dive and polo area on the right of the picture.

whole, but if there is no existing car park near the swimming bath buildings, ample provision must be made as part of the scheme.

yout.

In the case of the sea-side resort, provision is usually desirable for spectators to watch the diving, swimming and water polo, and this is in fact a considerable source of revenue to the establishment. If the buildings can be so arranged that the spectators can obtain a view of the sea as well as a clear and unobstructed view of the swimming bath, this is desirable, but care must be exercised in the disposition of the seating so that the spectators do not have to face the glare of the sun. At the same time the pond must not be in the shade. The roofing of large blocks of spectators' seats is a costly item. The seating should be arranged where possible on the amphi-theatre system with tiers of seats rising from a level above that of the bath surround, and in no case should the angle of the slope formed by the rising tiers be greater than 35°.

The most suitable angle will be determined by the width of the bath surround which affects the sight line from each seat.

In regard to the departmental planning, the entrances and exits must be so arranged that after passing a central ticket office all bathers complete a circulation in performing the desirable routine connected with bathing. The following sequence may be adopted in the layout of the various buildings surrounding the swimming bath :—

(*a*) Centrally placed Towel, Costume and Ticket issuing office.
(*b*) Dressing Rooms for the public containing dressing boxes and lockers, or alternatively a counter and cloak room arrangements.
Club Dressing Rooms.
(*c*) Lavatories easily accessible to bathers entering the bath and if possible also accessible from the bath surround.
(*d*) Cleansing Rooms.
(*e*) Swimming Bath.
Items (*b*), (*c*) and (*d*) should be duplicated for men and women.
(*f*) Café, terraces, etc., for bathers and for the public ; bathers' light refreshment bars.
(*g*) Spectators' seats.
(*h*) Lavatories for the public.
(*i*) Filtration Plant and settling tanks for sea water.
(*j*) Heating plant as required.
(*k*) Establishment Laundry if required.
(*l*) Sun Bathing.

It will probably be found impossible for large numbers of spectators to be served by the bathers' ticket office, and separate provision will accordingly have to be made. On no account should any members of the public, other than bathers in costume, be allowed on the bath surround.

General Description.

In the majority of cases slight variations of the layout outlined above are adopted and items (*a*), (*b*), (*c*), (*d*), (*e*) and (*i*) are essential in every scheme, however small. In a large establishment, a swimming pool of Championship size might include an area for water polo playing, and the water area for high diving might be separated by a barrier from the swimming area. In addition, a shallow portion of the bath should be allocated to children and non-swimmers. It will probably be found more economical to make this provision as part of the large bath rather than to construct a separate children's bath. A sloping artificial beach laid to an even gradient is an attractive and useful feature for children, and serves for paddling as well as for total immersion.

Provision must be made for sun-bathing, which is increasing in popularity among non-bathers as well as bathers. If space can be found near the bath surround, this is probably the best position ; the flat roofs of adjoining buildings can also be used, but care should be taken to provide adequate shelter from the wind, particularly at the seaside.

Useful subsidiary adjuncts to the baths establishment might include tennis courts, bowling greens, and possibly Turkish and Slipper Baths, and a bandstand.

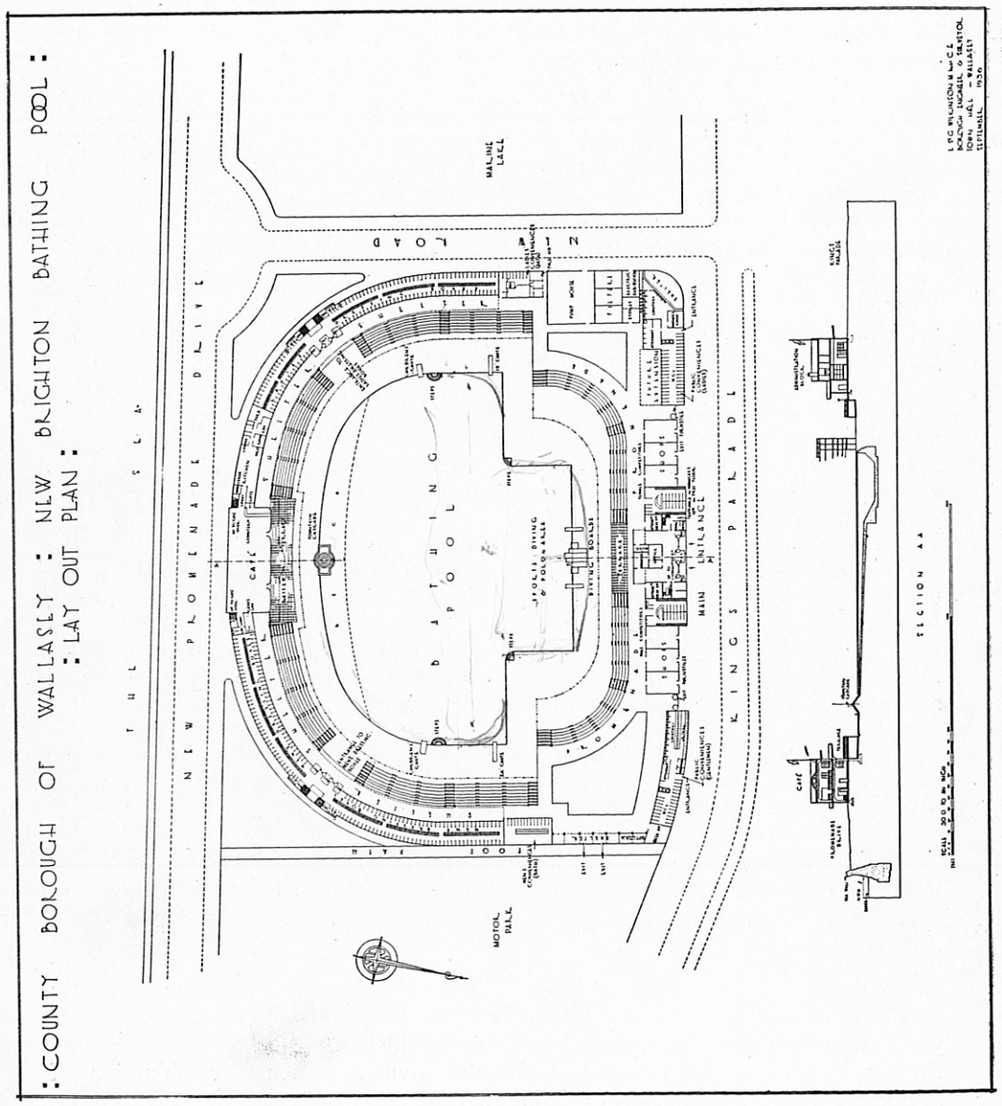
Shape of Pool.

In regard to the shape of the pool, there are various alternatives which might be considered, and as broad generalisations, subject to local conditions of site, etc., the following suggestions are made :—

(*a*) Rectangular Pools. This shape is the one most commonly adopted in the case of covered swimming baths for structural reasons, and usually the water depth is graded from one end to the other.

(*b*) Wide Rectangular Pools. Such pools are frequently shallow at each end, with a deep portion in the centre running the full width of the pool.

(*c*) Oval, Circular, Elliptical or Semi-elliptical Pools, of an ornamented character in regard to plan form. These pools are used chiefly by children and non-swimmers and for teaching purposes. They should only be planned alone in very special circumstances. Ordinarily they should form only an adjunct to pools of rectangular shape, as it is the latter which are used by swimmers and for displays of swimming, water-polo and diving. Such a combination of swimming baths is particularly suitable at sea-side resorts and in towns, so that a family can form the habit of visiting the bathing establishment which caters for children and adults alike.



If the bath for the use of adults can be so planned that the swimming area complies with National and International Regulations, an additional attraction will be added to the Baths establishment in the holding of National and International contests.

In these circumstances, it is essential that ample well planned seating should be arranged near to the swimming area in such a way that each spectator shall have a clear and uninterrupted view of the swimming races, water-polo matches and diving exhibitions. Long distance views of such sports and competitions are most unsatisfactory. Many recently erected open-air swimming baths, in addition to underwater lighting, are illuminated by means of overhead high power lighting, either gas or electricity being suitable for this purpose. Such lighting enables the bath to be used in the late evenings in Summer time and thus considerably increases its period of usefulness. Heat losses in the water of an open-air swimming bath are low in Summer time, and if mechanical heating is employed they can of course be reduced to zero. For gala purposes, underwater lighting, an illuminated cascade aerator, and flood lighting for the pool, with spot lighting for divers, combine to produce most attractive effects.

Dimensions.

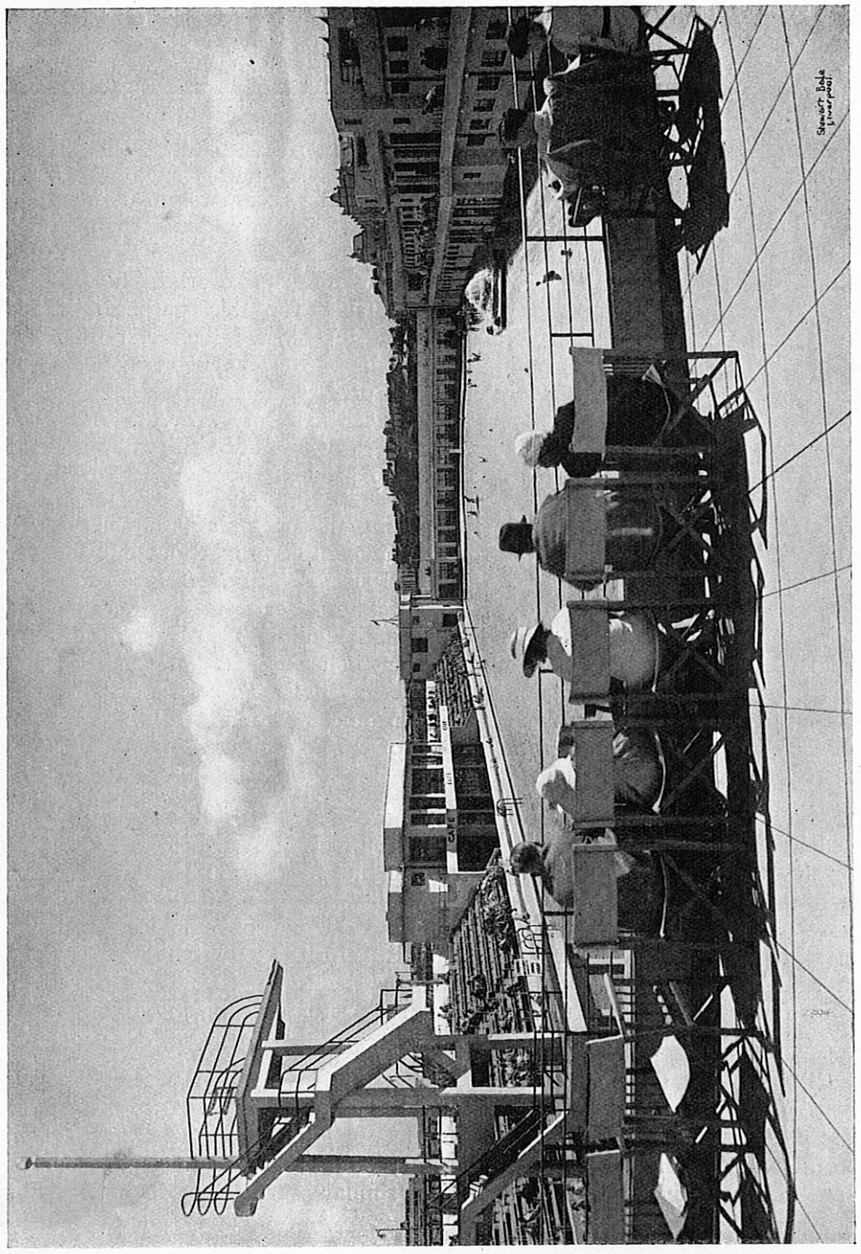
The dimensions of the buildings surrounding the open-air bath will depend on the magnitude of the scheme. Broadly, they will be proportionate to the size of the swimming pond. For a bath of small size, say 100 feet × 42 feet, the various auxiliary services such as Cafés, spectators' seats and restaurants will probably be omitted. In such a scheme the essential buildings, such as the entrance hall and dressing rooms and the filtration plant house, should be grouped round the bath in such a way as to form a protective screen against cold winds. In the case of larger schemes, the block containing entrance hall and dressing rooms can be united to the spectators' seating by means of covered and screened colonnades, the screens being movable.

Construction of Buildings.

The surrounding buildings referred to above may be of brick construction finished in fair faced work in inland districts, or at the sea-side, owing to the perishable nature of brickwork under the influence of sea air, they may be rendered in one of the various cements available. As far as possible, the materials most frequently used in the district should be employed both on grounds of economy and in order to harmonise with their surroundings. Steel frame or reinforced concrete construction may be employed, and in the latter case, if suitable aggregate is to be found on the site, a saving in building costs will be achieved.

Wall Finishings.

It will be found that good facing bricks provide the best external facing for the buildings for inland districts in view of their lasting qualities and low maintenance costs. Where the buildings are at the sea-side, structural concrete and cement rendering may be decorated by means of one of the proprietary cement paints or other similar surface treatment. For



Architects, K. M. B. Cross and C. A. L. Sutton, F. & A.R.I.B.A.

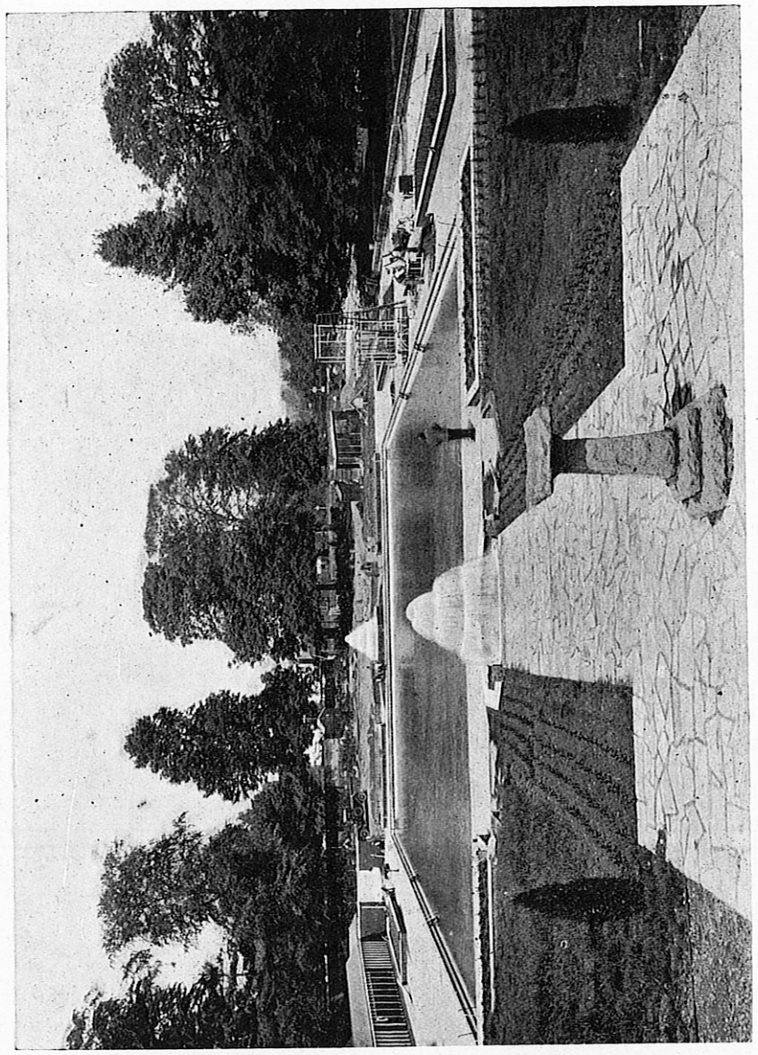
Morecambe Open-air Swimming Pool.
This bath is 330 feet long and 110 feet wide. The swimming area is on the left and the cascade aerator and artificial beach are on the right of the picture.

internal use, there are several economical glazed finishing treatments for use on plaster or brickwork. Special care must be taken in regard to the paintwork generally where sea water is used in the bath, and also for washing floors, etc. Few ordinary paints successfully resist the action of sea water and most metals show signs of corrosion in course of time.

Dimensions of Swimming Pool.

The minimum dimensions of an open-air swimming pool should be 100 feet × 42 feet, but a larger water area is desirable because it is impossible, in a length of 100 feet, to cater for learners, swimmers, water polo players and divers. The difficulty is sometimes overcome by providing a small separate pool for learners. (*See Chapter on School Baths*). The Amateur Swimming Association, therefore, urges Local Authorities planning open-air pools to have regard to the ever-increasing popularity of swimming as a sport and exercise, and to provide facilities which will attract swimmers, water polo players and divers alike, and at the same time provide an adequate water area for the learner. Now that swimming is taken as a recognised subject in every elementary and secondary school where facilities are available, in the future, swimmers—as distinct from bathers—will predominate, and their patronage will go to the pool where they can get the facilities they require. The 100 feet pool is probably adequate for rural districts, but for towns of over 20,000 population, it would be wise to provide a larger pool, say 120 feet or 132 feet long × 48 feet wide. All measurements must be from wall to wall of the bath. For racing purposes, it is usual to allow six feet for each competitor, while for water polo, the minimum playing area is 57 feet long, and the width not greater than 60 feet. The maximum water polo area is 90 feet × 60 feet, and the minimum depth of water required is four feet. For competition matches, the Association always favours the larger field of play and water of a depth in which the players cannot stand on the bottom during any part of the game. The water depths for diving are dealt with in another chapter. (*See p.* 70).

Where it is desired to hold all types of championship contests, the minimum length of the bath required is 165 feet (approximately 50 metres) and the minimum width 60 feet. Fifty metres is the standard length for the Olympic and other International swimming contests. For English Championships over 440 yards, the Amateur Swimming Association requires a course of 165 feet, and it is probable that, in the near future, this requirement will also apply to all District Championships. The Authority, therefore, desiring to cater for International and other important contests, should bear these requirements in mind. The width of 60 feet is chosen, because this is the maximum width required for the game of water polo. The obvious advantage is that the side walls of the bath can serve as the boundaries of the water polo area; if the pool is of a greater width, the side wall will serve as one boundary only, and the other boundary will have to be provided by means of a wooden boom or some



Guildford Open-Air Swimming Pool. A good lay-out in a pleasant natural setting. Note the Cascade-Aerators at each end of the bath and the wide bath surrounds.

J. W. Hipwood, M.Inst.C.E., Borough Surveyor.

similar device, which is in practice troublesome to arrange. For International and National matches, preference is always given to the full size water polo area where the depth all over is such as will not admit of the players standing on the bottom during the game.

Where a very large pool is contemplated, it is well to provide a Championship area of deep water, 165 feet × 60 feet, together with a special diving pit for high diving purposes, somewhat in the lines of the New Brighton pool (*see page* 44) except that it is undesirable to place the diving stage in the centre of the Championship area, because it obstructs the view when swimming races are in progress. The tiers of seating should be adjacent to the Championship area. The position of the pool allocated to non-swimmerrs and children should be as large as circumstances permit in view of the unpleasantness of over-crowding during the summer months.

Structural Details of Pool.

Open-air bathing pools are usually constructed of reinforced concrete as being the most lasting and economical method of containing a large volume of water. Owing to the size of the pool, it is usually found that to provide a glazed tile finish of any satisfactory description is impracticable on grounds of cost. The ordinary cement concrete finish is unattractive and gives to the water a dull and lifeless appearance. The most economical method of overcoming this difficulty is to treat the concrete face with one of the proprietary cement paints which, in the case of fresh water, should last for three or four years if applied under proper conditions. In the case of sea water, the application will probably have to be renewed annually. A more costly method is the construction of the reinforced concrete walls of the bath in two thicknesses with a sliding shutter. That portion of the wall actually lining the pool is made of concrete mixed with white cement. The floor of the bath would in this case be rendered with white cement. It is inadvisable, owing to the risk of "crazing," for the walls of the bath to be rendered in cement. Theoretically, reinforced concrete, if carefully mixed and laid as directed, should be watertight, and any waterproofing compounds would only be considered as an additional precaution.

It is desirable that a scum trough be constructed at one end of the bath. Many authorities advocate the scum trough being carried round all the sides of the pool, but this is not strictly necessary if a spray rail is provided at one end which, with the current formed by the filtration circulation, will drive all impurities floating on the surface of the water to the opposite end. The scum trough may be of simple section and formed in concrete, or preferably it may be made of glazing fireclay, The coping or nosing at the edge of the pool may be of heavy pre-cast tiles, specially grooved against slipperiness, or of smaller non-slip tiles, many types of which are specially made for the purpose, or it may be of tile mosaic. Natural stone or polished terrazzo are not to be recommended

for this purpose owing to the danger of slipperiness. Depth markings at frequent intervals are necessary along the sides of the bath. They must be so arranged that all bathers shall be aware of the water depth before diving in. Applied figures made of metal but without sharp arrises are probably most suitable. Handrails are necessary along the sides of the bath above water level. If the scum trough is taken all round the bath and is designed for the purpose, it may form a substitute for the handrail. In this event it is desirable that a short length of handrail be fixed at the shallow end for teaching purposes.

Guide lines along the floor of the bath for the use of swimmers are no longer considered necessary, as experts now favour the provision of 'lanes' formed by cords stretched along the surface of the water and supported by small corks at regular intervals.

Steps.

Steps for the use of bathers should, if possible, be recessed in the sides of the bath to avoid obstruction to swimmers. It is usually most convenient for these steps to be formed in reinforced concrete as part of the structure of the bath, and a stout and firmly fixed metal handrail is essential.

Under-Water Lighting.

An attractive feature of some open-air swimming baths is the provision of underwater lighting by means of powerful lamps fitted in the sides of the pond below water level which throw their rays across the breadth of the bath. The bath can thus be used at night time for aquatic fetes, gondola riding, etc. as well as for swimming. The lighting units are placed about 2 feet 6 inches below water level and about 10 feet apart. Portholes are formed in the sides of the bath and a heavily glazed bronze frame built into the structure. The high powered lamp and reflector is accessible from the subway below the bath surround. Extreme care must be taken in forming the junction of the frame and the structure of the pond, and the elimination of condensation is essential. A normal effective throw for a beam of light in these circumstances is approximately 40 feet.

Construction of Surrounds.

The surrounds or bathers' sidewalks may be constructed of mass concrete or of reinforced concrete, but where it is possible the latter method is preferable. If the surrounds and the structure of the bath and also the staging for the spectators' seats are homogeneous, the risk of unsightly cracks owing to uneven settlement is reduced considerably. The surrounds must be laid to fall to a surface water channel either some distance from the nosing or alternatively actually adjacent to the nosing. It is of the utmost importance that a non-slippery surface is provided, and the most economical method of achieving this is for the concrete to be spade finished. Other alternatives are non-slip artificial stone, coloured concrete with carborundum, non-slip tiles, tile mosaic. Apart from consideration of cost, tile mosaic will probably be found to be most suitable for use by bathers. It is not suitable for the passage of boots and shoes to any considerable extent.

The surround to open-air baths should, if possible, be 10 feet wide, and the surface water should be collected and taken to the main drainage system. In some instances a low parapet is formed immediately around the pool, say 6 inches high and 12 inches wide. This has the advantage of effectively preventing any surface water from the surrounds from reaching the pool, but if proper provision has been made by laying the surround to fall to a channel, the parapet is unnecessary. It has the disadvantage of obstructing the view of spectators in the seating gallery and also makes it rather more difficult for a swimmer to get out of the bath quickly in case of necessity. Theoretically, all bathers should use the steps provided for this purpose, but they do not always do so.

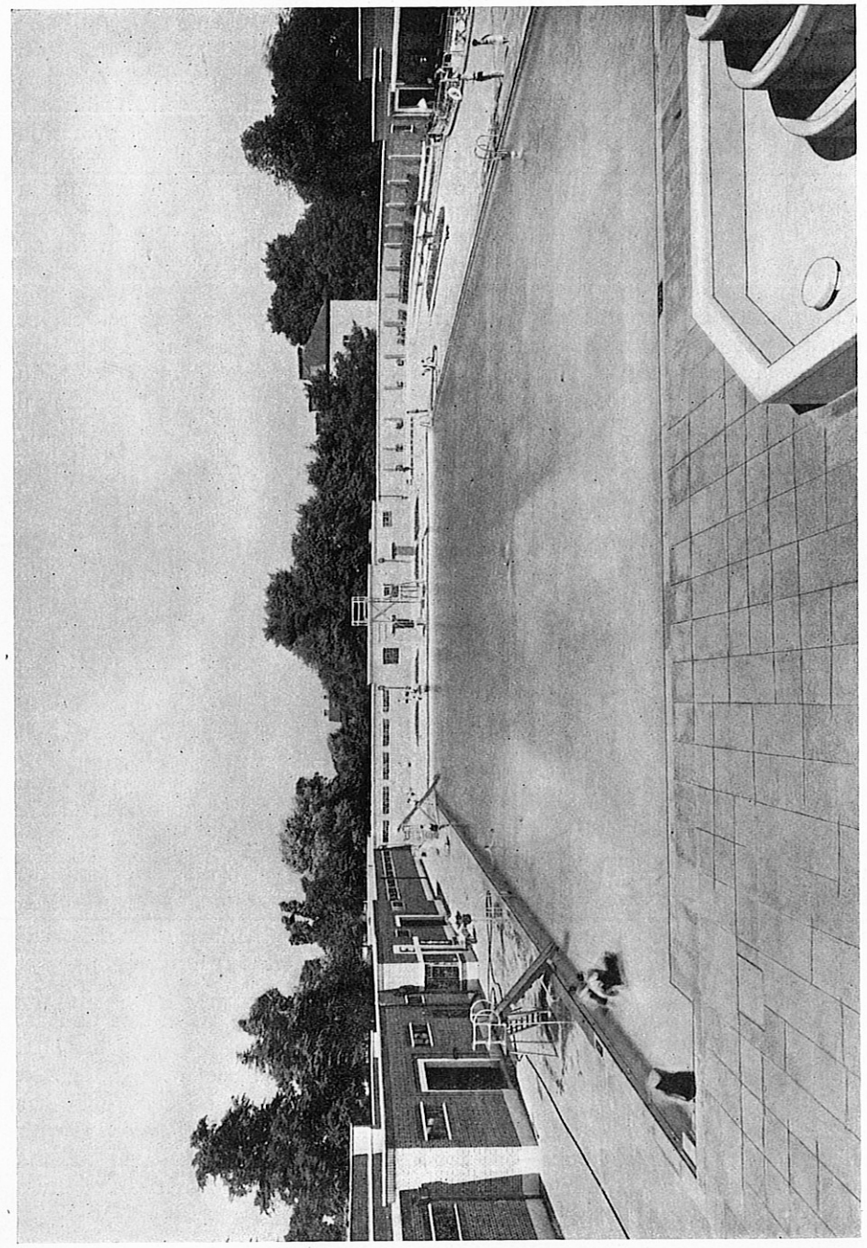
Galleries for Spectators.

These should be constructed of reinforced concrete or of steel frame construction if local conditions point to its use. In any event the structure will presumably be cased with concrete, and wooden seats with backs can be fixed thereon. It will probably be found most economical to use teak in view of its lasting qualities. Alternatively, if comparatively small numbers of spectators are to be accommodated, terraces with Café tables and chairs may be arranged round the pool. It would even be possible in certain circumstances to combine the two systems. In any event, gangways should be wide and all entrances and exits should be generously planned in order to impart a sense of spaciousness as well as to provide for the safety and comfort of patrons.

Dressing Rooms.

It is usually found convenient to plan dressing rooms for men and women respectively on each side of the entrance hall. Good natural light and ventilation are desirable, and the dressing boxes should be so arranged that congestion is avoided. If space permits, the system known as the wet and dry corridor is desirable. The boxes are approached by bathers fully clothed and, after changing, the bathers leave by another door and enter the wet corridor. There are two systems for the disposal of clothes, both of which are described on page 15.

The various materials of which the dressing boxes can be constructed are pressed steel, teak or some form of metal ply-wood. Deal dressing boxes are not usually found to be satisfactory as being less durable than the other materials suggested. The minimum size of the dressing boxes, where the combined wet and dry corridor system is adopted, is 3 feet 6 inches × 3 feet, but where the separate wet and dry corridor is used, the boxes should be at least 5 feet long to permit two doors to open inwards, one at each end of the box. The old fashioned system, under which the bather leaves his clothes in the box whilst bathing, is extravagant, inasmuch as the box cannot be used by other bathers for some considerable time. Each dressing box should be equipped with a mirror and shelf and two hooks—one for hanging the clothes container and the other for general use. A teak or rubber mat should also be provided and seats



Architects, H. A. Rowbotham and T. L. Smithson, A. & L.R.I.B.A.

Brockwell Park Open-air Swimming Pool, London County Council.

should be built in. The provision of a small wringer for costumes is a useful and popular adjunct to the dressing room. The floor finishes to dressing rooms should be laid to fall to a surface channel, and all junctions between floor and wall surfaces should be rounded. The question of the heating of dressing rooms for open-air baths requires consideration and depends very largely on the extent to which the establishment is likely to be used in cold weather. The possibility of heating open-air swimming baths is discussed elsewhere, and it seems that if the bath is heated with a view to extending its availability during the Spring and Autumn, the dressing rooms should also be heated to some extent. A simple system, consisting of a pipe circulation under the seats in the dressing boxes, will probably be found adequate.

Cleansing Rooms, Etc.

It is an axiom of bath planning that every intending bather must pass through a cleansing room on his way from the dressing room to the swimming bath, and this is equally applicable to covered or open-air swimming baths. The cleansing room should contain a large footbath with warm chlorinated water through which bathers must walk, and a series of hot and cold showers should also be provided. Various automatic devices have been tried, but long usage indicates that the simpler the appliance, the better service it will give. In some instances bathers are compelled to walk through a veritable barrage of water that is projected from the walls as well as the ceiling of the cleansing room. This would appear to be neither necessary nor desirable. It should be left to the individual bather to see that he is in a reasonably fit condition to bathe in public before doing so.

The floor of the footbath must be of impervious non-slip material, either tiles or mosaic are suitable, and the walls should be lined with tiles or terrazzo. In cases where sea water is used in the swimming bath, an adequate number of fresh water showers, say one shower to every 40 bathers, must be provided. Lavatory accommodation requires careful attention; all fittings should be selected for durability in view of the rough usage they are liable to receive. A suitable provision would be a ratio of one W.C. for every 40 women, minimum provision two W.C.'s, and one W.C., and one urinal for every 60 men, minimum provision two W.C.'s and three urinals.

Additional Equipment.

Water chutes are a popular feature in many open-air baths, but these should not be installed where space is restricted. The arguments in favour of relegating high divers to a portion of the bath apart from swimmers apply with equal force to users of water chutes.

Life saving and first aid equipment should receive consideration, and fresh water drinking fountains are desirable in all kinds of swimming baths.

In large open-air pools, bathers' rafts are not infrequently provided—owing to their instability they do not form ideal diving platforms, but they are popular with the casual swimmer.

Artificial waves have not yet achieved popularity in this country. There are one or two important objections to a superficially very attractive idea. In the first place, in order to achieve the full effect of waves as on a sea shore, the shallow end of the bath must have a water depth of zero. This of course makes the swimming of a length impossible until the bath has been re-filled to its normal level. Secondly, if the water in most English swimming baths is lowered some three feet, the pond is not usable for general purposes. Thirdly, the partial emptying and re-filling of a bath of reasonable size is a slow and costly matter. Finally, wave making machinery is costly to instal and occupies valuable space at the deep end of the bath which may reasonably be required for other purposes. If wave making machinery be installed, it will be desirable for the scum trough to drain back to the filtration plant, otherwise the loss of water may be considerable.

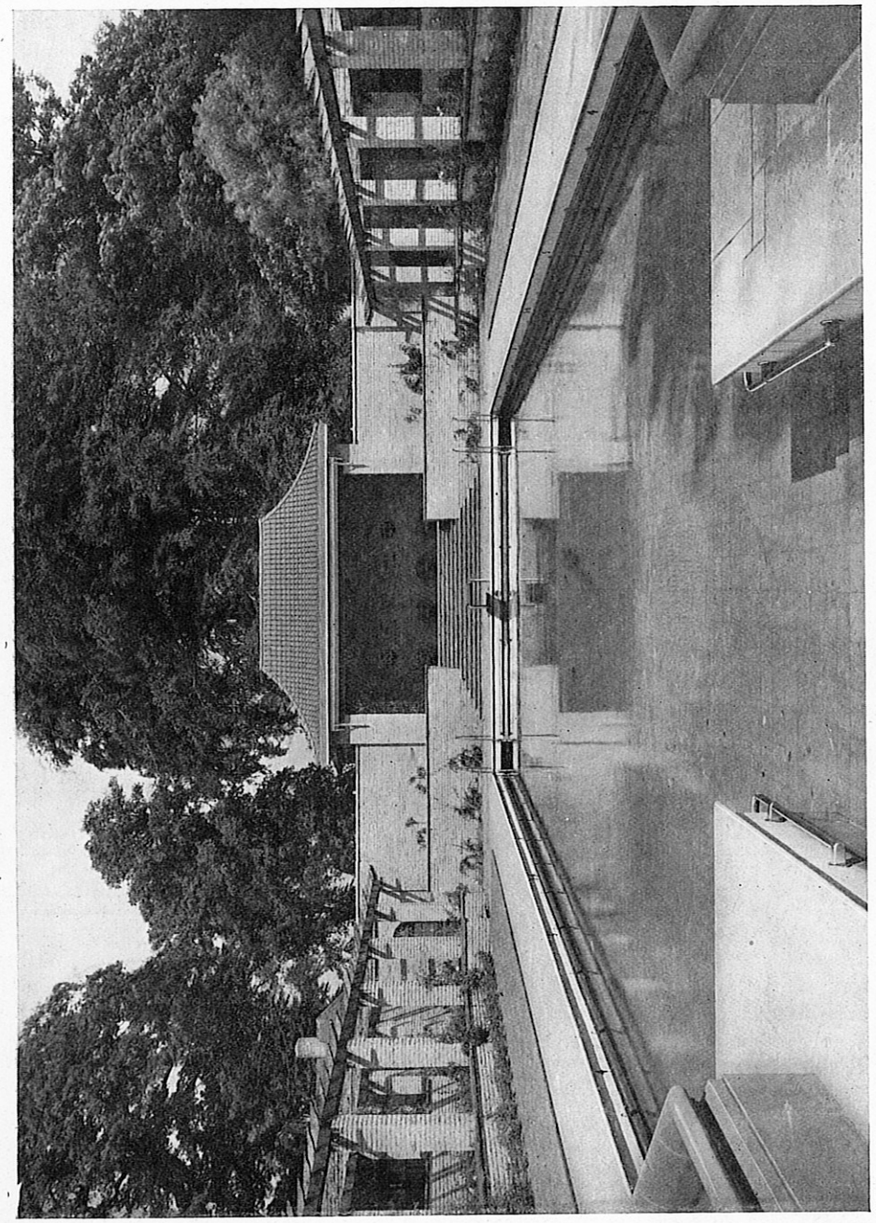
ıfés.

It is now customary and desirable for small café counters to be provided to enable bathers to take light refreshments either when in costume or after bathing. In the former case, the question of the method of payment will require consideration. Cafés for the use of spectators also form an attractive feature of any large bathing establishment. Apparatus for the supply of tea and coffee and similar light refreshments should be installed, together with the requisite provision for washing up and storage. Local considerations will determine whether restaurants for the service of meals, dance floors and orchestras, wireless and loud speakers should be included in the scheme. There is no doubt that such features would be popular at sea-side resorts and would be revenue-producing assets.

Vater reatment by eans of iltration lant.

In open-air baths, water may be obtained from the town main supply, from an adjacent river or canal, or from the sea. Before the Great War, filtration systems were being installed in a few instances in place of the old fill and empty system. More recently a very large proportion of newly erected open-air baths is equipped with what is known as filtration plant.

This system, in reducing the volume of water required to a minimum, has removed one of the greatest obstacles to the provision of large swimming pools. If the water is obtained from a river or canal, it is usually desirable to instal filtration plant. Very few sources of supply of this nature are found, on analysis, to be perfectly pure and suitable for bathing, and though superficially the diversion of some of the water from a river to pass through the swimming bath is attractive, further investigation usually shows that this is not so. Sea water baths are sometimes constructed so that the side or end wall of the bath forms a catchment for the sea at high tide. The water can thus be changed with the incoming tide, but it is open to serious objection in that materials such as seaweed, sand and other sea borne matter are deposited in the bath and frequent cleaning becomes imperative.



Private Swimming Pool at Hampstead Lane, Highgate, London, N. *Architects, Wimperis, Simpson & Guthrie, F.F.R.I.B.A.*
Constructed for Oswald Lewis, Esq., M.P.

With very few exceptions, the installation of filtration plant provides the best solution to the problem of water supply for open-air swimming baths, and the Ministry of Health insist on the provision of such plant. A brief outline description of such a plant as recommended by the Ministry of Health (see "The Purification of the Water of Swimming Baths" published by His Majesty's Stationery Office) is as follows :—

The water is drawn from the deep portion of the bath by means of a suction pump, but before reaching the pump it passes through a strainer easily accessible and removable for cleaning purposes. Coagulants are then added in the form of sodium carbonate and sulphate of alumina. These reagents form a film on the surface of the sand in the filters, through which the water next passes by gravity or under pressure. Beneath the sand in the filter shell is placed gravel or crushed quartz. After passing through the filters, the water is chlorinated in order that it may have disinfectant properties. After chlorination, the water should contain not less than 0.2 or more than 0.5 parts per million of free chlorine. The water is then aerated, in order to give it that quality of sparkle and attractive appearance that the filtering and chemical treatment processes have taken out, and then returned to the shallow end of the bath. In open-air baths, cascade aerators form an attractive and decorative feature and can be usefully placed in a shallow portion of the bath, out of the way of the swimmers, or on the bath surround. If they are planned in the latter position, splashing may be found to take place owing to the action of the wind.

It is usually desirable for the filtration plant to be so designed as to turn over the entire content of the swimming bath in 6 hours, though in some instances an 8 hour turn-over is permissible. The rate of filtration should be between 220 and 250 gallons per square foot per hour.

'arming the ater in open- r baths.

It is well known that the heating of open-air baths is not practicable during the winter months owing to the inevitable heat losses that would be experienced. It is, however, possible to make a case for heating such baths during the Spring and Autumn and thus extend the Summer Season. To maintain the water at an even temperature of say 68° from the beginning of May until the end of October is not an unreasonable proposal, and in cases where it can be shown that large numbers of bathers will take advantage of the facilities offered, the undertaking may well be commercially satisfactory. The various methods usually applied to the heating of covered-in swimming baths are applicable. Low pressure coke fired boilers remain the cheapest method of water heating, and gas, oil and electricity can be supported on account of their efficiency and cleanliness. The use of mechanical stokers facilitates the use of hard fuel, but the unsightly chimney stack is usually undesirable on a sea promenade.

iving.

For notes on the design and heights of diving equipment, including firm boards and springboards and the necessary water depths in the diving pool, see page 70.

SWIMMING BATHS FOR SCHOOLS

In November, 1914, a joint deputation from the Amateur Swimming Association and the National Union of Teachers obtained an interview with the Minister of Education, when the question of the instruction of school children in swimming was discussed. It was then suggested that, in cases where other facilities were not available, the provision of small swimming baths for children might be considered. Such baths would form part of the school buildings and would be controlled by local educational authorities.

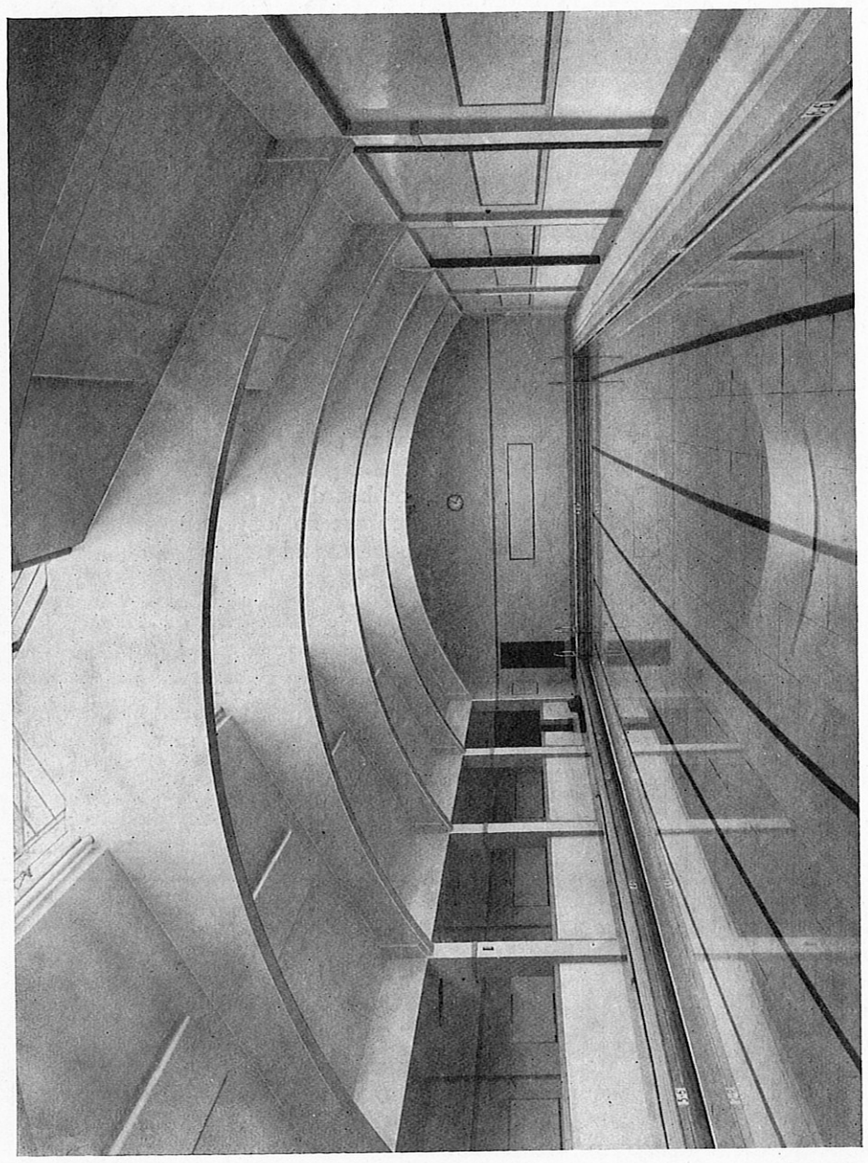
By the Education Act of 1918, swimming is very properly included in the list of approved physical exercises and, further, educational authorities are empowered by the Act to provide school swimming baths and are now being encouraged by the Board of Education to do so. Of the desirability of such establishments, and the material benefits that will result from their provision, there can be no two opinions. In view of the encouragement offered by the Government, and in consideration of the great need, it is surely the duty of educational authorities, committees, and boards of governors to see that proper provision is made, and that the children are no longer deprived of one of the most useful and beneficial forms of recreation and training in qualities of self-reliance and physical courage.

Public authorities are also invited to remember the urgent need for providing swimming facilities for boys and girls when considering large municipal schemes. The provision of a small separate bath for juniors and learners is not usually a costly or a difficult matter when a larger bath is being provided for adults, and considerable economies in the construction of the various services can be effected.

Open-air swimming baths are considerably cheaper to construct than covered baths, but it must be remembered that their use is limited to the summer season, and, even if heated, they can probably only be used from April to October at most. Another objection is that the regular use of an open-air bath depends very largely on the suitability of the weather. Swimming lessons form part of the regular curriculum of the schools, and inclement weather is apt to play havoc with both the lessons and the timetable. It is known that the Board of Education, for the reasons given, favour the covered bath in all but exceptional cases.

Lay-out.

In many cases, the development of school buildings proceeds by stages, and although the planning of all departments should be laid down at the inception of the scheme and adhered to, this is not always done. The swimming bath, whether it be covered-in or open-air, not frequently has to be "fitted in" with



Small Bath, Marylebone Public Baths, London. *Architect, K. M. B. Cross, F.R.I.B.A.*
Spectators accommodation on the left, note flush heating panels on walls.

the general scheme after the main buildings have been completed. Questions of site levels, foundations and drainage require consideration. If the exigencies of the site or the existing arrangement of the playground space make it desirable for a covered bath to be at some distance from the main school buildings, it may be thought desirable to provide a covered way, but, of course, in the case of an open-air bath, this is not necessary as the bath will probably not be used in bad weather. If it were found possible to plan a new covered bath near the existing boiler house containing sufficient power or capable of extension, economies in heating might be effected, but in most instances heat losses in the pipework make the proposal inadvisable. For an open-air bath, greater latitude in the selection of the site is possible, although levels, drainage, foundations, water and electric supply must not be overlooked.

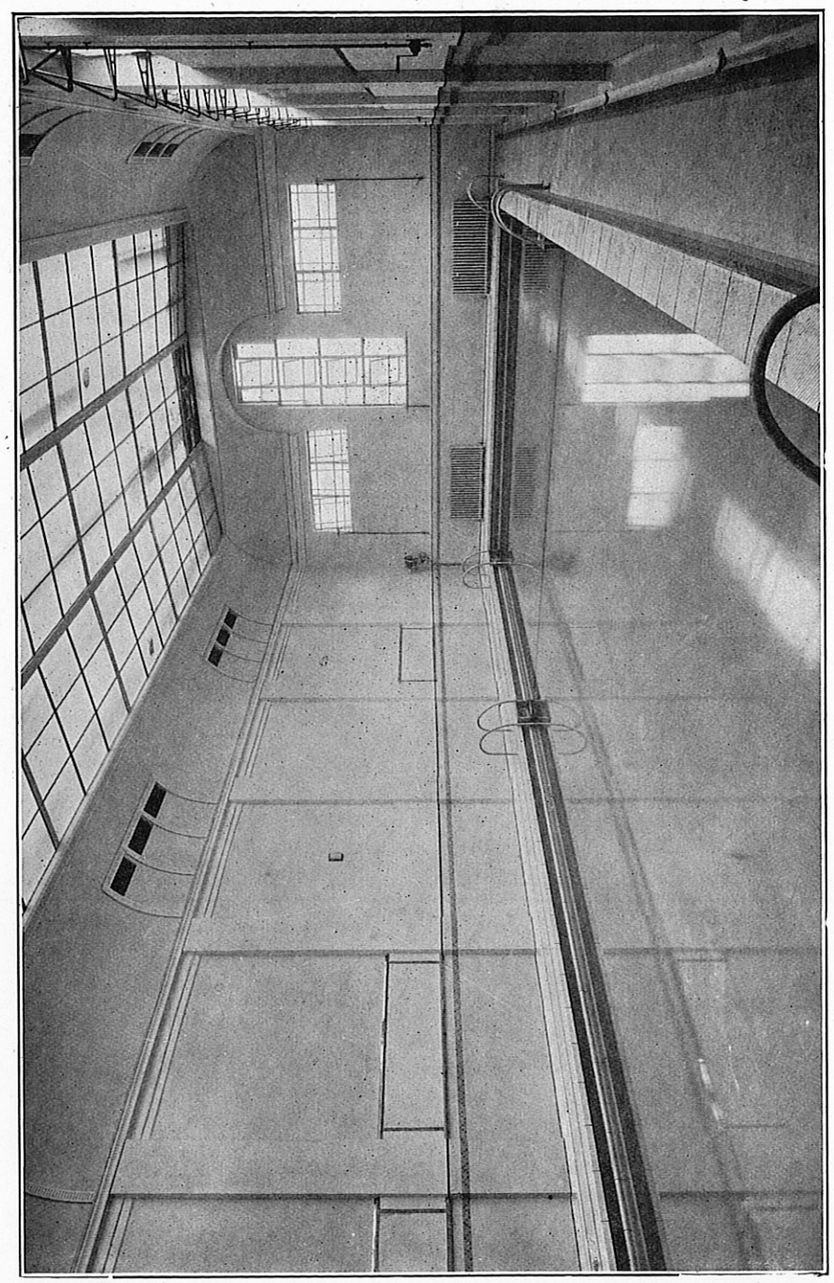
All school swimming baths should have filtration plant installed, comprising filtration, aeration and chemical treatment, as recommended by the Ministry of Health.

Should the bath be situated at some distance from the main school buildings, it is very desirable that a room for land drill, etc. should be provided.

COVERED SCHOOL BATHS

Dimensions. The pool should be 75 or 100 feet in length. The former is usually sufficient in cases where the use of the bath is confined to the scholars of one school, but the greater length is preferable, and is justified economically, when the bath is to be used by groups of schools, or clubs and evening institutes. This latter is a development which is likely to receive a good deal of encouragement as a result of the National Fitness campaign. The width in the case of a 75 feet bath should not be less than 30 feet: in the case of an 100 feet bath, a width of 42 feet is recommended. This latter gives greater scope for competitions, and will admit of the use of the bath for the game of water polo. The depth of the water should be 7 feet at the deep end, and should be carried forward at that depth to a distance of about 20 feet from the end. At the shallow end, the depth should be 3 feet for at least 20 feet from the end. It is in the 3 feet area that the class instruction of learners will be conducted. A maximum depth of 7 feet at the point of entry of a dive will not admit of the use of a fixed diving board of a greater height than 10 feet, but, in the case of school baths, it is not anticipated that a greater height of board will be found necessary.

The bath surround should be 8 feet wide at the sides, and 15 feet wide at the ends.



Architect, A. P. Howell, M.Inst.C.E.

Borough of Leyton. Children's Bath, High Road, Leyton, Essex.

Construction.

The pool should be lined with white or cream glazed tiles, and the bath surround, laid to fall away from the pool, should be covered with non-slip material, with nosing and a scum trough at the deep end. A handrail, 1¾ inches diameter, should be fixed below the nosing at the shallow end and the sides. Not only is such a handrail essential for the safety of the bathers, but it is also extremely useful for swimming instruction. It should be 2 inches above water level, and 2 inches away from the wall of the bath. Recessed, access and egress steps or ladders should be provided at the four corners of the pool.

On the sunny side of the bath, large folding windows of a kind which can be readily thrown open in fine weather should be provided, and so furnish the fresh air and sunlight associated with an open-air bath.

It is most important that the question of acoustics should be considered; the provision of the necessary sound absorbing surfaces in the ceiling of the bath hall to avoid the effects of excessive reverberation is a wise precaution.

Dressing Rooms.

Two dressing rooms should be planned near the bath, each about 336 square feet in area (i.e. adequate for a class of 40). Each should have good natural light and ventilation. The floor should be impervious and non-slipping. Where the bath is to be used by both sexes, one may be used for each. The rooms should be warmed, and fitted with seats, numbered hat and coat hooks, and boot racks. Dressing cubicles are not required in these changing rooms, where their use is confined to children, nor should they be placed round the bath side. If the bath is likely to be used by adults, then the dressing room to be used by girls and women should be provided with curtained cubicles fitted with seats and mirrors, hat and coat hooks and a small shelf.

Lavatory Accommodation.

Lavatory accommodation, separate for sexes, and in proportion to the size of the dressing rooms, should be provided. Two W.Cs. and three urinals may be regarded as a minimum for boys, and three W.Cs. as a minimum for the girls. The lavatories should adjoin the dressing rooms.

Cleansing Rooms.

As in the case of larger bath buildings, the swimming bath should only be approached by bathers passing through a cleansing room containing a sunk footbath, filled with warm water about six inches deep, and along one side a low bench on which the bathers can sit while cleansing their feet. There should also be one centrally placed shower.

Diving Equipment.

A springboard at about 3 feet 3 inches (1 metre) projecting at least 3 feet over the water, should be provided. A full description of this board will be found on page 78.

If an additional board is required, a springboard at bath level can be provided. Such a board should be about 14 ft. long, with a rise of about 6 ins. from back to front. If a shorter board (minimum 10 ft.) be provided, the rise will be correspondingly less. The width should be from 18 to 20 in., and the thickness from 2 to 3 ins., according to the wood employed. Douglas Fir, Oregon or British Columbian Pine and Ash are suitable. The board should be supported on a fulcrum placed about half way along its length, and consisting of a block of hard wood with a rounded top.

Standing fixed boards of varying heights up to 10 ft. should also be provided if possible, but in no case should one board be placed under another. The springboards should be not less than 5 ft. clear of the side of the bath. Guard rails should be provided at the sides and ends of the bath to prevent children from diving across in front of the springboards, or from underneath the higher boards.

Other Accommodation.

Provision should be made for a warmed towel and costume store, and an attendant's room.

Pay boxes at the entrance are, generally speaking, unnecessary in the case of school baths, nor is any fixed seating accommodation necessary.

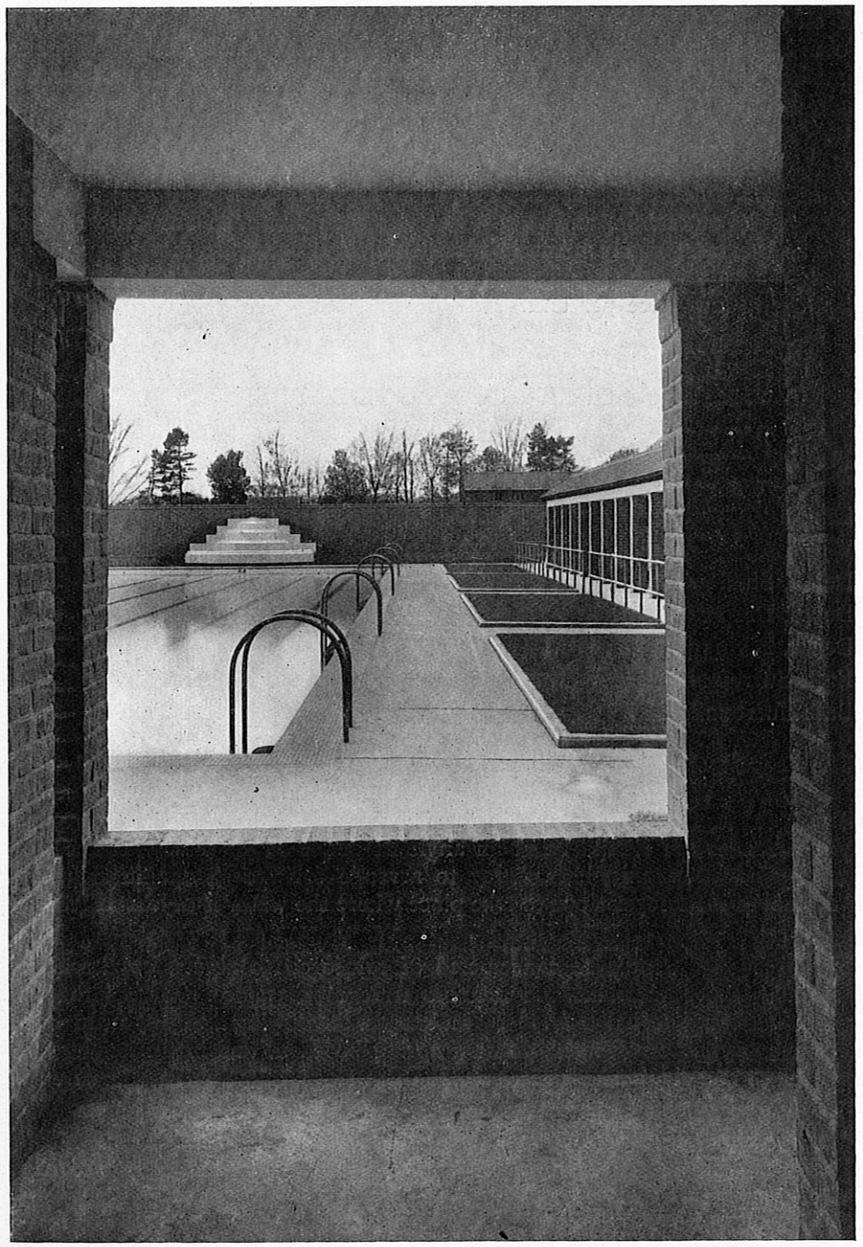
Filtration Plant.

In all cases, filtration and water purification plant should be installed. The filter house may be planned either in the Basement or at Ground Floor level. The plant should be planned to deal with the entire content of the bath in four to six hours, and the speed of filtration should be from 220 to 250 gallons per square foot of filter area per hour. The detailed particulars of the system are laid down in the booklet on the subject published by the Ministry of Health and are also referred to in the chapter dealing with Public Swimming Baths (*See page* 22).

Heating.

It is essential that the bath water should be heated, and if the bath is not situated near the central boiler house which supplies heat for the school buildings, a separate heating plant must be installed. It will be found that a system employing coke or coal fuel is the most economical in running costs, and automatic stoking apparatus reduces the amount of labour necessary. The planning of the chimney stack in relation to the prevailing winds must not be overlooked. If the boiler house and filtration plant chamber can be planned in juxtaposition, it will be an advantage in reducing heat losses in pipework.

Gas is in certain districts a suitable method of bath water heating, and its labour-saving properties, involving thermostatic control, are advantageous. Only a comparatively small flue is necessary to dissipate the fumes after combustion.



Oundle School Swimming Bath. *Architect, K. M. B. Cross, F.R.I.B.A*

If oil heating is employed for the main school buildings, it will probably be economical to extend the contract for supply to include that required for the swimming bath. In the case of oil, as in the case of gas, a flue is necessary. Smoke is seldom visible after the plant has been started up.

Finally, electric thermal storage plant may be installed. This is probably the cleanest method of water heating and no flue is necessary. It is claimed to be practically automatic, and it requires less attention than any other method. But it is the most costly plant to install and is usually the most expensive in running costs unless electric power can be obtained off-peak load at an exceptionally low price per unit.

OPEN-AIR SCHOOL BATHS

mensions. The following dimensions are recommended :—

Length	100 feet.	75 feet.
Width	42 or 35 feet.	30 or 35 feet.
Depth, Shallow end	3 feet.	3 feet.
Depth, Deep end	7 feet.	7 feet.
Depth, Diving pit	8½ feet.	—
Bath Surround, sides	10 feet wide.	10 feet wide.
Bath Surround, ends	15 feet wide.	15 feet wide.

The deepest area (or diving pit) should start at a point immediately below the end of the highest board, and should be continued forwards for at least 20 feet from this point. The rise in the floor of the bath from the deep portion to the normal slope should be at an angle of about 30 degrees. If the length of the bath will permit, it is better to arrange for the change in slope from the normal to the steeper slope to take place where the water is at least 6 feet deep.

iving age. The diving stage may be constructed of reinforced concrete, or alternatively of steel. The former method requires little maintenance, whereas the latter requires painting periodically. Firm boards at varying heights from one to three metres can be arranged, while a spring board at one metre height should be placed at one side and apart from the main stage, allowing an adequate space between.

The maximum height of a springboard for a pool 8½ feet deep is 3 metres (9 feet 9 inches).

Further notes on the construction of diving stages will be found in another section of the book (page 70). The Association will gladly advise, without charge, on proposed diving stages.

Construction. The pool is usually constructed of reinforced concrete and the surfaces treated with special concrete paint of light colour. Heavy glazed tiles or faience ware provide an excellent and durable finish if the initial cost does not prohibit their use. Alternatively, white glazed bricks have been used with success and good effect in a large open-air swimming bath at one of our leading public schools. If maintenance costs over a number of years are considered, such a finish will be found to be economical.

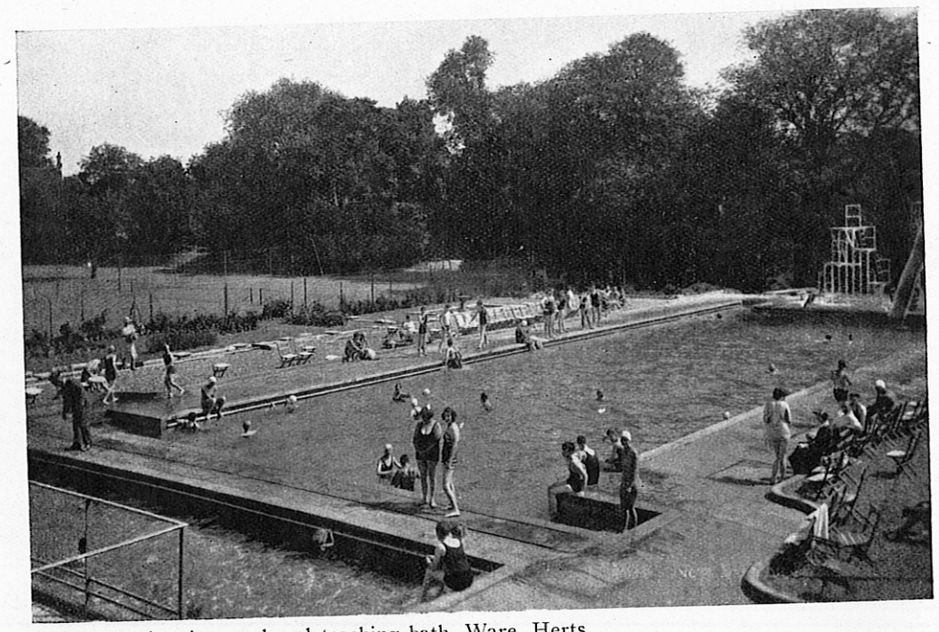
If the painted finish is adhered to, the nosing and scum trough, at the deep end, can be formed in the structural concrete and appropriately finished, the one with non-slip and the other with a smooth surface. Nosing tiles in terra cotta are obtainable and give good results. If some form of tiling is used for lining the pond, the nosing should be made of non-slip tiles.

It will be sufficient to have a scum trough at the deep end of the pool, with a spray rail at the other end and round the two sides of the bath. The handrail is essential to the safety of the bathers and is also very useful for swimming instruction purposes; it should be fixed 2 inches above water level and 2 inches from the wall.

The bath surround must be laid to fall to a channel or gulleys in such a way that the surface water on the surround cannot reach the pond. It must be of non-slip nature, and the most economical method of achieving this is to use a spade finish concrete. Artificial stone specially faced for the purpose or coloured concrete with alundum or carborundum added could also be used. Specially made non-slip tiles make an excellent surround if funds permit.

Seating. In some cases, it may be desired that provision should be made for spectators to watch sports, competitions, etc. Such accommodation might take the form of slightly raised seating along each side of the bath but cut off from the bathers' promenade by railings or other barrier. It will be found most economical, taking the long view, for such seating to be made of teak.

Dressing Rooms. As in the case of covered-in baths, it is suggested that two dressing rooms should be provided or, if there is only one, that it should be capable of sub-division to prevent delay in one class following another, and also for the use of visiting teams. For description of dressing rooms (see page 61).



Open-air swimming pool and teaching bath, Ware, Herts.

Cleansing Rooms and Lavatories.

For cleansing rooms and lavatories see page 61.

Filtration Plant.

The filtration plant room may be planned at bath surround level to avoid the cost of excavation. It should be designed to deal with the entire content of the bath in six to eight hours, depending on the use to which the bath is likely to be put. The speed of filtration should be from 220 to 250 gallons per square feet per hour. In many cases it is desirable for the aeration to be contrived by means of a cascade aerator which forms an attractive feature at the shallow end of the bath. This is usually placed on the bath surround and is built up in a series of steps constructed of concrete and lined with faience blocks. For a full description of the working of a typical Filtration Plant see pages 22 and 54.

Heating.

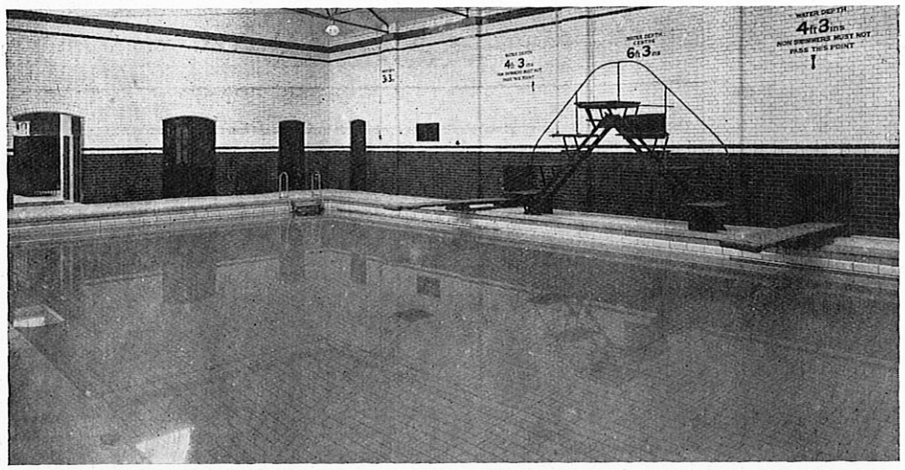
It is frequently desired to extend the swimming season by making the open-air swimming bath usable in the Spring and in the Autumn, and to ensure this a modified system of heating can be employed. Though on account of heat losses, it is seldom considered practicable to heat an open-air bath all the year round, it is quite feasible to do so at the beginning of the Summer term and during September and occasionally in October. If the bath is not situated in close proximity to the boiler house of the main establishment, a separate plant will have to be installed. Coke or hard fuel will be found to be most economical, but attention must be given to the direction of the prevailing wind in planning the chimney stack. Other possibilities are gas, oil or electricity, their relative cost depending largely on local conditions. Frequently, however, their running costs are found to be increasingly expensive in the order given. As it is usually required to increase only the water temperature from say 52°F. to 68°F. or 70°F. and maintain such a maximum temperature during the swimming period, a large heating plant is not necessary, and it has been demonstrated that the low running costs make the provision of heating worth while.

Additional Acccom-modation.

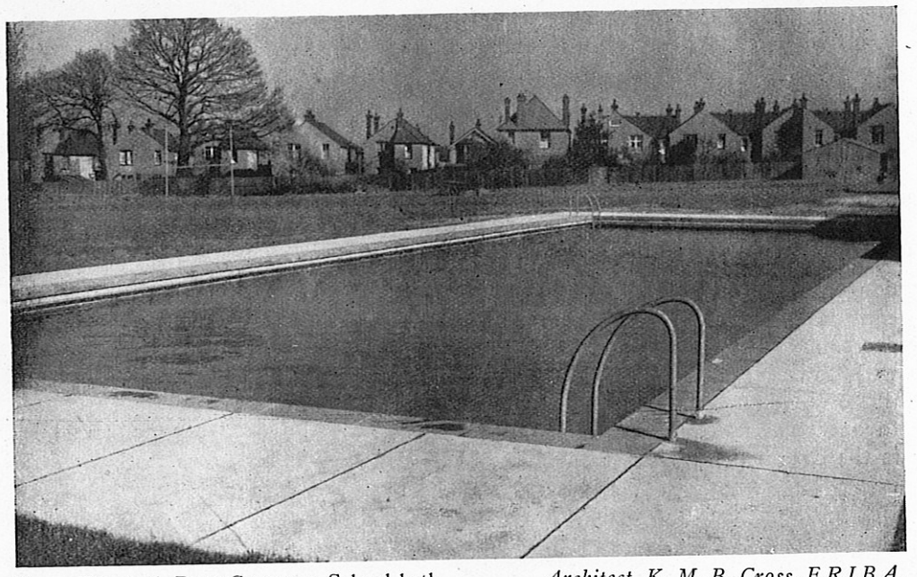
Water chutes are not recommended in School swimming baths owing to the danger to swimmers. The question of towel and costume stores will require consideration, and the provision of an adequate supply of clean towels is of great importance. In some schools, private laundries are capable of dealing with towels and costumes, in others individual bathers bring their own with them. It is not usual in the case of school swimming baths for service laundries to be constructed and equipped solely for purposes of the swimming bath, as is the case in municipal establishments.

TEACHING BATHS IN MUNICIPAL ESTABLISHMENTS.

A comparatively recent development in connection with some municipal establishments is the inclusion of a small teaching bath, which is most valuable



Teaching bath. Romford Road, West Ham, London, E. *Architect, W. Lionel Jenkins, M.A., M.Inst.C.E.*



Queen Elizabeth Boys Grammar School bath, Barnet, Herts. *Architect, K. M. B. Cross, F.R.I.B.A.*

for use by local school children and others who are learning to swim. Preferably, such a pool should be distinct and separate from the other pool or pools, and special regard should be had to its accoustic properties, bearing in mind that it is chiefly used for organised class teaching.

These teaching baths are sometimes of a uniform depth of 3 or 3½ feet, so that the whole pool is available for class teaching at hours reserved for the schools. An alternative is to have a pool with a centre of deeper water for diving. The pool illustrated on page 68 is that included in the Romford Road establishment, West Ham, London. This measures 60 by 30 feet, and is 3 ft. 3 ins. deep at each end. The water deepens very gradually for a distance of 21 feet from each end, and then the floor of the pool drops very sharply to a depth of 6 ft. 6ins. The gradual slope of the pool bottom allows fairly large areas of shallow water for the teaching of school children. Prominent notices are exhibited showing water depth, and a warning indicating the spot where the sudden change of depth takes place. For the six months ended 30th September, 1937, the attendances of boys and girls at this bath numbered 53,365.

The other illustration shown on page 66 is a children's pool adjacent to the open-air swimming pool owned by the Ware Urban District Council, Hertfordshire.

NOTES ON THE CONSTRUCTION OF BATHS, DIVING STAGES, ETC.

The regulations laid down by the International Amateur Swimming Federation (F.I.N.A.) should form the basis of the design of every diving stage and swimming bath. These regulations are as follows :—

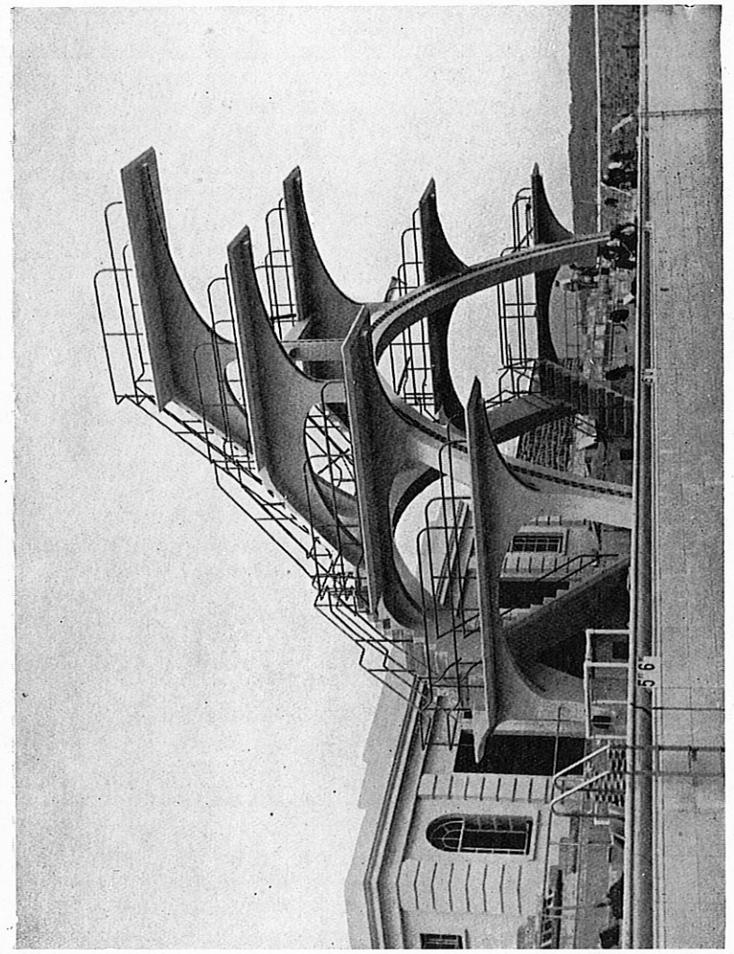
SPRINGBOARD DIVING. The springboards shall be 1 and 3 m. above the water level, at least 4 m. long and ½ m. wide, and covered along the whole length with rough cocoanut matting. The springboards for the Olympic Games, Continental Championships and Inter-Nation contests shall be provided with movable fulcrums. The front of each board shall project at least 1 m. beyond the edge of the bath. The depth of the water shall be at least 3 m., 1 m. back, 10 m. in front and 4 m. each side from a vertical dropped from the centre of the front end of the board.

FIXED BOARD DIVING. The platforms must not move, shall be at least 5 m. long and 2 m. wide, and covered with cocoanut matting. The front of the 10 m. platform must project at least 2 m. beyond the edge of the bath, and 1 m. beyond the platform immediately underneath, which must project at least 1 m. beyond the edge of the bath. The back and sides must be surrounded by a handrail and each level must be accessible by stairs (not ladders).

The height of the platforms must be 5 and 10 m., variations of 10% being permissible. The depth of the water must be at least 4.5 m., 2 m. back and 16 m. in front from a vertical dropped from the front of the 10 m. platform and 4 m. each side from verticals dropped from the outside edges of the 10 and 5 m. platforms.

General. The first consideration in the design of a diving stage is the greatest depth of water which is available, or can be provided, and in this connection it may be said that with the introduction and general use of the filtration system, economy in the volume of water used is no longer of primary importance, and greater depths are now practicable than could formerly be justified.

In deciding on the various heights, it should be noted that running boards are far more useful than standing platforms, which can be provided at intermediate heights where they do not interfere unduly with the use of the running boards. The placing of standing platforms under running boards is dangerous, and should be avoided.



H. A. Brown, M.I.M.E.Cy.E., Borough Engineer.

Weston-super-Mare. An extremely effective Diving Stage of good design, comprising seven boards.

There should be no obstructions such as hanging lights, polo goals, beams, etc., within a radius of at least 15 feet from the diving end of each platform provided and, if possible, there should be no lights directly in front of such boards.

Heights and Depths.

As it may not be possible in some instances to comply with all the F.I.N.A. regulations, the following recommendations are made with regard to the desirable depths of water :—

For Springboards (International type).

Height, 1 metre (3 ft. 3 ins. approx.); Depth of water, 10 feet (minimum 8 ft. 6 ins.).

Height, 3 metres (9 ft. 10 ins. approx.); Depth of water, 10 feet (minimum 9 ft.).

For Firm Boards.

Height, 5 metres (16 ft. 4 ins. approx.); Depth of water, 12 feet (minimum 10 ft.).

Height, 10 metres (32 ft. 7 ins. approx.); Depth of water, 16 feet (minimum 14 ft.).

As a broad principle, it may be said that the height of a diving board should never exceed twice the depth of water, with a minimum of 8 ft. 6 ins., and a maximum of 16 ft.

A diving stage for the type of bath with a depth of 9 ft. to 12 ft. should include standard International type springboards at heights of 1 and 3 metres, a firm running board at 5 metres and intermediate boards as may be possible. Baths with a depth of water of 14 ft. to 16 ft. should include the above equipment, and in addition a firm running platform at 10 metres, while an intermediate firm running platform at 7½ metres (24 ft. 5 ins. approx.) is very desirable.

Design of deep end, or diving pit.

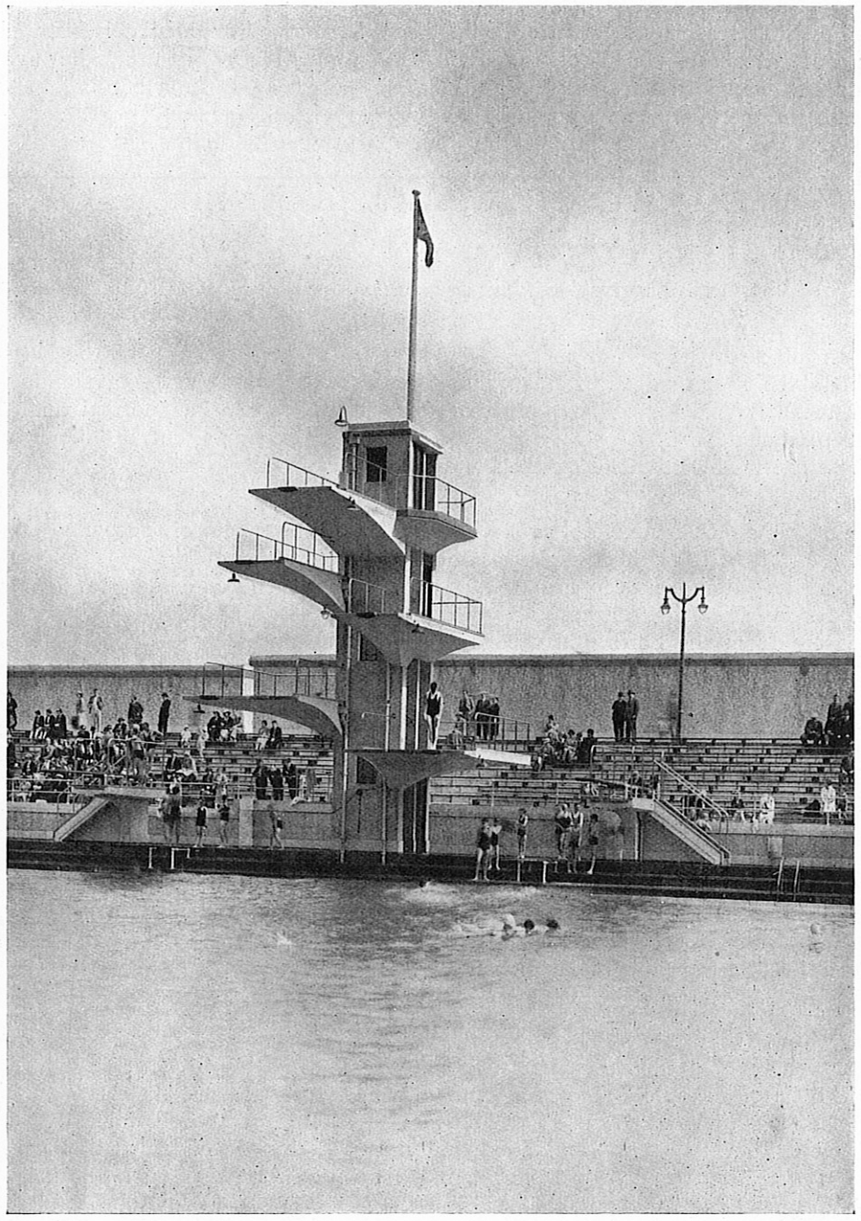
It should be borne in mind that according to the dive performed, the entry into the water may be almost vertically under the end of the diving board, or it may be about :—

(*a*) 15 ft. out in the case of a 1 or 3 metre springboard,

(*b*) 20 ft. out in the case of a 5 metre board, and

(*c*) 30 ft. out in the case of a 10 metre board.

the line of flight being continued under water for a distance of 15 to 20 feet, or in some cases a few feet backwards under the board, before the body emerges.



Diving Stage at Portobello Bathing Pool, Edinburgh.

Architect, W. A. Macartney, A.M.I.C.E. City Engineer.

For these reasons, the greatest depth should be at a point immediately below the end of the board. This depth should be continued backward from the diving end of the board for a distance of at least 3 ft. to 6 ft. according to the height of the board, and should be continued forward, as necessary, to suit the height and character of the various boards provided. Thus :—

(*a*) Where only springboards are provided, forward for 15 ft. to 20 ft.

(*b*) Where a 5 metre board is provided, forward for 20 ft. to 30 ft., and

(*c*) Where a 10 metre board is provided, forward for 40 ft. to 50 ft.

In all cases the rise from the deep area to the normal slope of the bottom should be at an angle of about 30 degrees to the horizontal (maximum 45 degrees). When possible the change of slope, between the normal and the steep, should be at a point where the bather is already out of his depth and therefore unable to stand on the bottom, say about 6 ft. 6 ins.

In baths 40 feet wide or less, the deep area should be carried right across the bath, with a slight rise towards the sides for drainage purposes. In wider baths the deep area should be continued for a distance of at least 10 ft. on either side of the diving stage, the slope upwards then being 30 to 45 degrees from the horizontal according to circumstances.

aterials and overings.

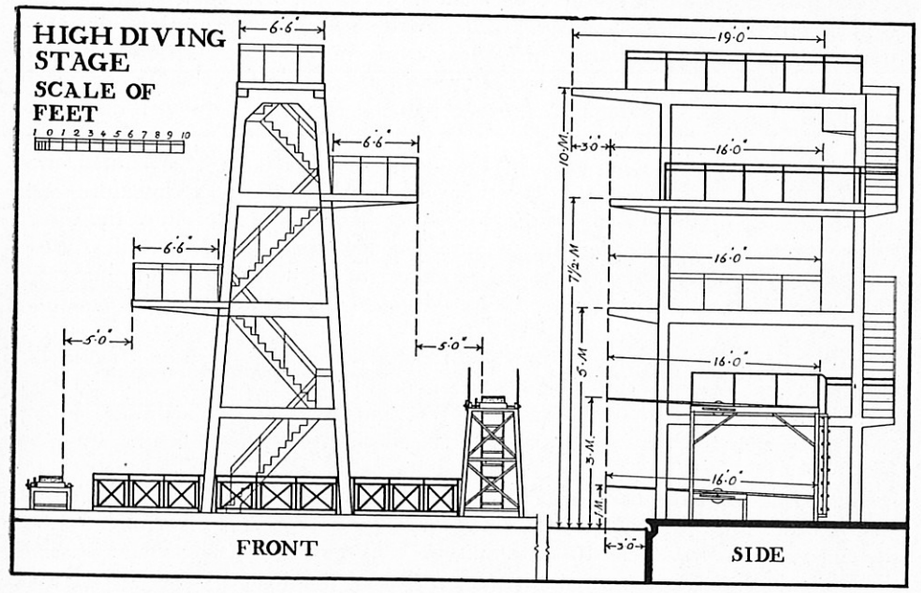
The framework of all diving stages should be of wood, metal or reinforced concrete.

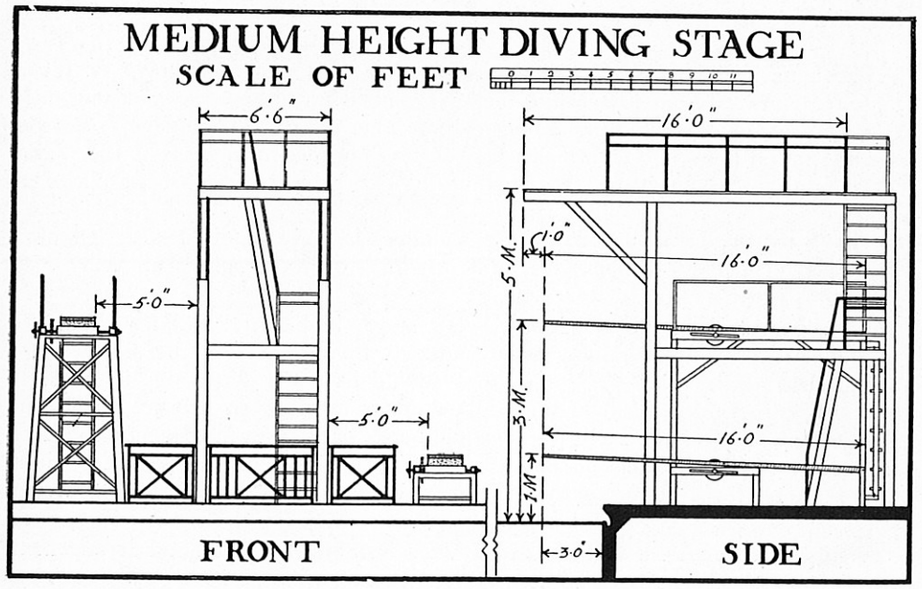
Springboards should be constructed of Douglas Fir, or of Oregon or British Columbian Pine. (See special description later).

Firm boards and platforms should be of selected Pitch Pine, of very straight grain, or of Teak or other hardwood, well seasoned and oiled with linseed oil, or they may be in concrete, brought to a smooth surface, or constructed of steel joists covered with hardwood planks.

Ladders should not be employed, but steps with Teak treads.

All boards should be covered with one piece of cocoanut matting. India-rubber should never be used. The matting should be turned down over the front end of the board and fixed underneath it, and should also be securely fixed at the back end to prevent the possibility of its rucking up. The matting should not be wider than the board.





The matting should preferably be fixed in an easily detachable manner (*e.g.*, by means of turn-buttons or similar fastening devices), so that at night and other times when the board is not in use the matting may be removed and hung up to dry. This is especially of importance in the case of springboards, which are liable to become sodden if they are always covered with wet matting.

hting.

In covered baths, the position of the artificial lights is of great importance. They must be so arranged that they do not in any way interfere with the free use of the diving stage by either balking or dazzling the diver. Where flood, or indirect lighting, is used, it has been found that it is often impossible, when standing on the diving stage, to see the surface of the water. This difficulty can be overcome by the provision of top lights in suitable positions.

In the open air, consideration should be given to the position of the late afternoon and evening sun when deciding on the position of the diving stage, as it is at this time that the stage will be mostly used. The most suitable arrangement is for the stage so to be placed that the sun is behind it.

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ered Bath.

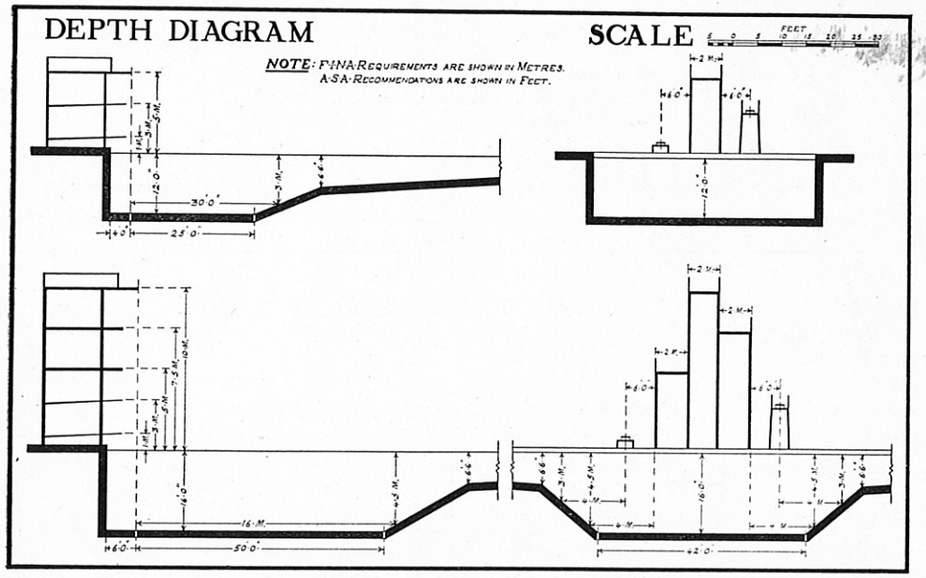
The diving stage should be symmetrically planned on the centre line of the bath, and, in order to avoid too great a projection of the running boards over the water, the end gangway should be 10 to 12 ft. wide. Where such a width is impossible, the difficulty has been overcome in some cases by the provision of a recess behind the deep end, so as to provide the necessary space without unduly lengthening the whole of the bath hall.

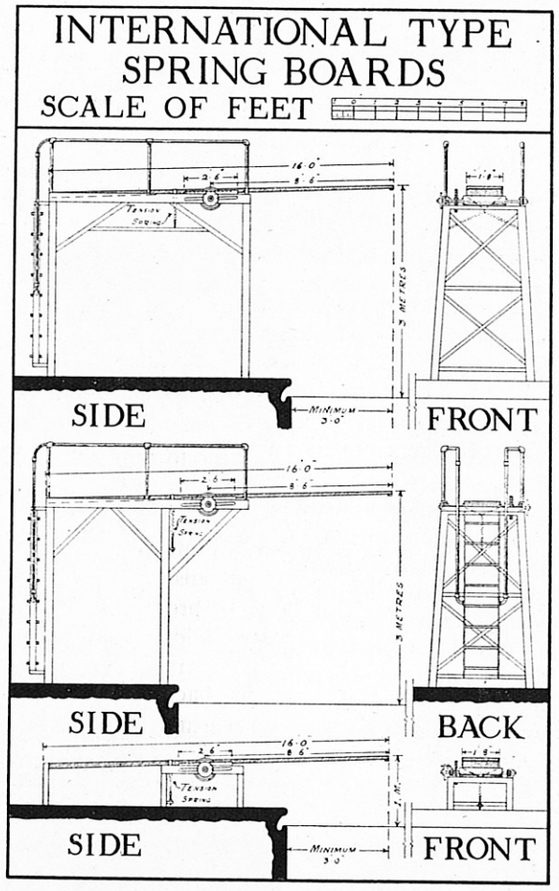
The 5 metre board should be a platform, 16 ft. long and from 4 ft. 6 ins. to 6 ft. 6 ins. wide, a low railing being provided on either side and continued to within about 4 feet of the diving end. This platform should be free from spring, and stiffened by struts as necessary. The platform itself is the diving board, and another narrower board should not be placed on top of the platform.

The 3 metre spring board (see special description), should be carried on a rigid platform about 4 feet wide, and provided with railings as above.

Between the front posts of the diving stage, high metal railings should be provided to prevent swimmers from suddenly diving in from the side while a board above is in use. These railings should be made detachable in order to give more room for the starting of swimming races from the deep end, and for the same reason, the front posts should be set back from the edge about 2 feet. Similarly, railings should be provided along each side of the bath for about 20 to 30 feet, according to the height of the board, to prevent cross diving.

Where circumstances will not permit of a 5 metre board, a good arrangement





is to provide a 3 metre springboard on the centre line of the bath, with a one metre springboard on either side, allowing adequate space between each.

The steps to the various boards are best placed at the back.

Running boards (not exceeding 6 ft. 6 ins. wide) should not be placed nearer together than 8 ft. centre to centre, and the outside boards should be not less than 8 ft. clear from the side of the bath.

No board should project less than 3 feet over the water.

When designing diving stages for covered baths, it should be borne in mind that all vertical supports are obstacles in the way of the general users of the bath and spectators and officials at galas, and the number of supports should be reduced to a minimum. The possibility of some of the boards being cantilevered out from the back wall of the bath hall should not be overlooked.

The springboards used in all International and A.S.A. Springboard Diving Competitions are fixed at heights of 1 metre (3 ft. 3 ins. approx.) and 3 metres (9 ft. 10 ins. approx.), these heights being measured from the front end of the board to the water.

They are made of Douglas Fir, or of Oregon or British Columbian Pine, carefully selected for perfectly straight grain and freedom from knots and other defects which might cause the boards to warp or crack.

national

igboards.

The boards are 16 feet long, 20 inches wide, and 3 inches thick at the back end, from where they are reduced along the *under* side, to a thickness of 1½ inches at the diving end. A strong hardwood fillet (about 2 ins. by 1 in.) should be bolted under the full width of the diving end to prevent warping.

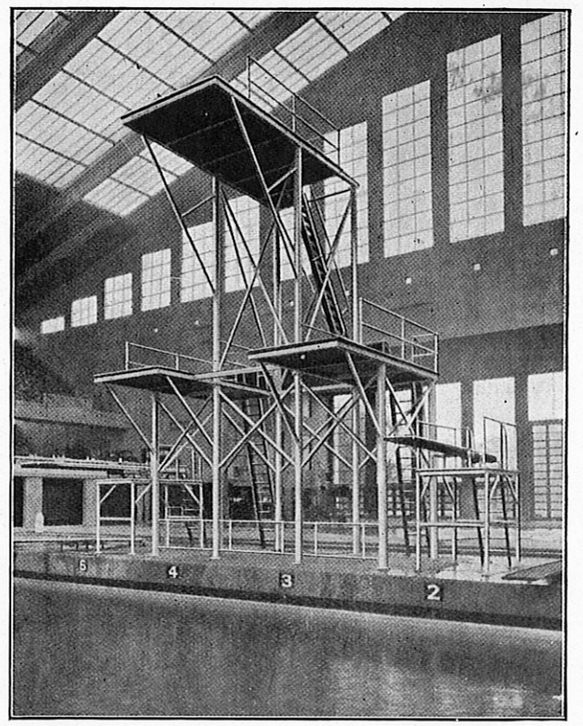
The boards should be oiled from time to time to keep them in good condition.

The boards are laid with a rise of 6 inches from back to front, and are held down only at the back end, preferably by means of a pivot so as to recoil freely after the spring. It is advisable that tension springs should be attached beneath the board, in rear of the fulcrum, to prevent excessive rebound. The board merely rests on the fulcrum, which should be normally at a distance of about 8 ft. 6 ins. from the diving end, but arranged to be movable over a range of about 2 ft. 6 ins. (*i.e.*, 1 ft. 3 ins. backward or forward of normal) in order to secure the correct amount of spring and allow for variations of elasticity in different boards.

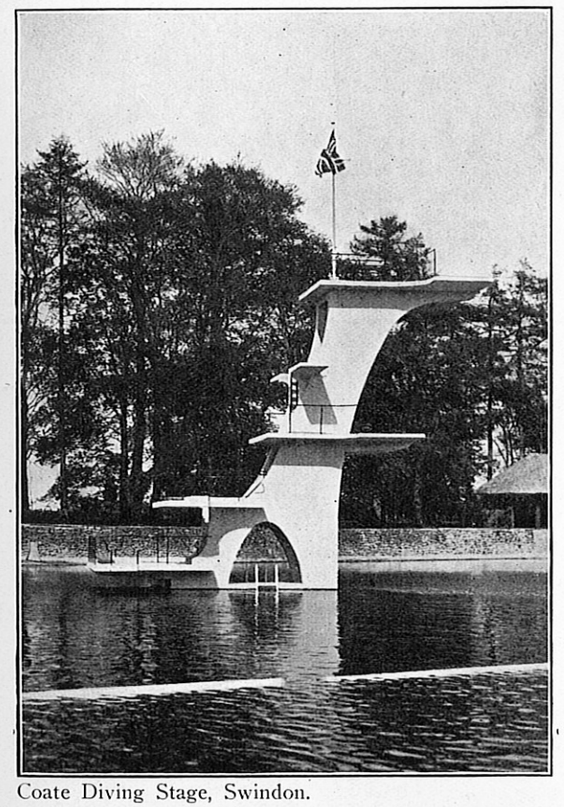
The fulcrum may consist of a length of stout piping, covered with a rubber sleeve, and carried in either side by T pieces made to slide, backward or forward, on horizontal supports. This type of fulcrum. however, is rather clumsy and haphazard, and is now largely being replaced by one which can be adjusted rapidly by the user to suit his individual requirements.

This consists of a roller moving backward or forward on the rack and pinion principle, and controlled by a knurled wheel which can be operated by hand, or by the foot while the diver is actually standing on the board. It can be locked, if necessary, in any required position. The rack should be fixed at the same inclination as the *under side* of the board. This type of fulcrum is strongly to be recommended.

Where the width of the gangway will not permit of the usual type of fulcrum being placed at the correct distance from the diving end of the board, a special cantilevered adjustable fulcrum can be provided.



The Diving Stage at the Empire Pool Wembley.


Coate Diving Stage, Swindon.

The 1 metre board can be carried on pipe standards, while the 3 metre board can be carried in the same way, or on a rigid platform about 4 feet wide.

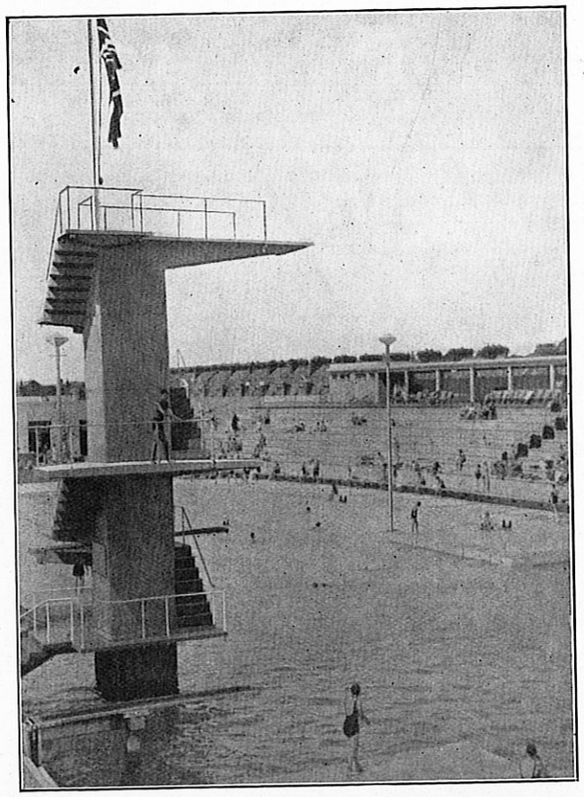
In the case of the 3 metre board, it has been found that where it is carried on a framework of pipe standards or other light form of construction, it is inclined to rock. This might be overcome in some cases by the provision of adjustable stays terminating in screw hooks in the ground, but in most cases such stays would be very much in the way.

Except where a light form of construction is absolutely necessary owing to the fact that the whole structure has to be moved periodically, or for other reasons, it is far better to use a heavier type of construction such as any suitable standard steel section, or reinforced concrete.

h Diving ges.

The most important firm boards to be provided are those at heights of 5 metres (16 ft. 4 ins. approx.) and 10 metres (32 ft. 7 ins. approx.), while an additional board at about 7½ metres (24 ft. 5 ins. approx.) is very desirable.

Each of these platforms should be at least 5 metres long and 2 metres (6 ft. 6 ins. approx.) wide. The 5 metre platform should project not less than 3 feet beyond the edge of the bath, and the 10 metre platform should project at least 3 feet beyond the 5 metre platform. Each platform should be surrounded on three sides by a low railing terminating on each side at a distance of about 4 feet from the diving end.



The Diving Stage at the Bathing Pool, St. Leonards-on-Sea, Hastings. *S. Little, A.M. Inst.C.E., Borough Engineer.*

It is very undesirable that any board should be placed immediately over another if such an arrangement can possibly be avoided. The 10 metre platform is best placed in the centre of the staging, on vertical supports, while the 5 and 7½ metre platforms can be arranged one on either side, and carried on vertical supports or brackets.

All these platforms must be entirely free from spring, the ends, if necessary, being stiffened with struts, but care should be taken to see that such struts do not in any way interfere with the free use of a lower platform. The platforms themselves are the diving boards, and narrower boards should not be placed on top of the platforms.

On either side of the main stage springboards should be provided at 1 and 3 metres, and should be carried on entirely independent supports.

Staircases may be arranged to suit the design of the stage, but they must not interfere with the 16 ft. run and the free use of the platforms.

Miscellaneous.

In a Swallow dive (arms outspread) the span from finger tip to finger tip may measure 6 ft. 6 ins. or so, according to the height of the diver.

From springboards the head may rise, at an angle of 15 degrees from the vertical, to a height of 12 feet or more above the board.

From firm boards the rise may be about 10 feet, at an angle of about 25 degrees from the vertical.

All depths quoted are for fresh water. In sea water, a slight reduction is possible. To obtain the equivalent safe depth of sea water, the relevant fresh water depth should be multiplied by 0.97.

MODEL BYELAWS

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MODEL BYELAWS

SERIES VIIIA

SWIMMING BATHS AND BATHING POOLS

MEMORANDUM

1. Section 233 of the Public Health Act, 1936, is as follows:—

"(1) A local authority may make byelaws with respect to swimming baths and bathing pools, whether open or covered, which are not under their management for—

(*a*) securing the purity of the water therein;

(*b*) ensuring the adequacy and cleanliness of the accommodation thereat;

(*c*) regulating the conduct of persons resorting thereto; and

(*d*) the prevention of accidents:

Provided that this section shall not apply to any swimming bath or bathing pool which is not open to the public and for, or in connection with, the use of which no charge is made.

(2) Byelaws made under this section may require the person responsible for any swimming bath or bathing pool to which the byelaws apply to keep a printed copy of the byelaws exhibited in a conspicuous place on the premises."

2. It will be observed that the section does not apply to swimming baths and bathing pools under the management of the Local Authority. The Minister will therefore, before confirming byelaws submitted by a Local Authority, require them to give an assurance that they will observe equally high standards in the baths and pools under their management.

Ministry of Health,
October, 1937.

NOTE.—*Any Local Authority proposing to make byelaws on this subject should apply for forms on which to forward drafts in duplicate of the byelaws for preliminary approval.*

BYELAWS made under section 233 of the Public Health Act, 1936, by the [Mayor, Aldermen, and Burgesses of the Borough of acting by the Council,] [Urban/Rural District Council of] with respect to swimming baths and bathing pools in the [Borough] [Urban/Rural District] of which are not under their management.

Interpretation.

1. In these byelaws "bath" means a swimming bath or bathing pool for or in connection with the use of which a charge is made and which is open to the public.

2. The rules numbered (i), (ii) (*b*), (ix) and (xv) in byelaws 3 (*three*) shall not apply to any bath which is a natural lake or part of a natural lake or part of a running stream or river.

For securing the purity of the water in the bath.

3. A person responsible for any bath shall comply with the following rules :—

(i) The water admitted to the bath shall be not less pure as judged by bacterial tests than the local public water supply.

(ii) (*a*) The water in every covered bath shall, while such bath is in use, be changed at such a rate that the whole of the water is changed once at least in every *four hours.*

(*b*) The water in every open bath shall, while the bath is in use, be changed at such a rate that the whole of the water is changed once at least in every *six hours.*

(*c*) The water in every bath where water which is taken from the bath is returned to it shall be purified by means of filtration, aeration and disinfection.

Where disinfection is effected by means of chlorination, there must at all times be present in the water not less than 0.2 parts and not more than 0.5 parts per million of chlorine.

(iii) Every bath to which paragraph (*c*) of the preceding rule applies shall be emptied and thoroughly cleansed :—

(*a*) in the case of a bath which is open for less than the *twelve months* of each year, before the date of opening in each year; and

(*b*) in the case of a bath which is open throughout the year, at least once in every *twelve months.*

For ensuring the adequacy and cleanliness of the accommodation.

(iv) All paths and surrounds to the bath shall be kept clean.

(v) Every bath shall be provided with sufficient dressing accommodation for the use of bathers.

(vi) All dressing-boxes, dressing accommodation, and receptacles for clothing shall be maintained in a clean condition.

(vii) Every dressing-box shall be provided with a duck-board or cork or other suitable mat.

(viii) No person using the bath shall be supplied with a towel or garment which has not been thoroughly cleansed since the last occasion on which it was supplied.

(ix) Every bath shall be provided with a sufficient number of shower-baths for persons of each sex using the bath, and of foot-baths or other facilities for washing for the number of persons admitted to the bath at any time.

(x) Every bath shall be provided with a sufficient number of sanitary conveniences for persons of each sex using the bath.

For the prevention of accidents.

(xi) Every bath shall at suitable points and in the vicinity of all diving boards and spring boards which may be provided be marked by signs which will indicate the depth of the water at those points.

(xii) Every diving board and spring board which may be provided shall be marked with its height above the surface of the water and there shall at all times when the bath is in use be such depth of water therein as will ensure the safety of persons using any such diving board or spring board.

(xiii) All diving boards and platforms, spring boards, chutes, and other apparatus provided in connection with any bath shall be kept in good repair.

(xiv) Every bath shall be provided with steps or other suitable means of access to the water.

(xv) Every bath shall be provided with a proper handrail or other convenient means of holding on to the side of the bath.

(xvi) No electrical plug or socket in the immediate vicinity of the bath shall be supplied with alternating current in excess of *fifty volts* or with direct current in excess of *two hundred and fifty volts* and all electrical apparatus connected therewith shall at all times be effectively connected with earth.

(xvii) Every bath shall be provided with a sufficient number of lifebuoys and lifelines which shall be kept in good condition and shall be easily accessible.

(xviii) There shall be in attendance at every bath while it is in use an attendant who is proficient in swimming, life saving and artificial respiration.

For regulating the conduct of persons resorting to the bath.

4. A person shall not :—

(*a*) while being in any bath use any soap or other substance or preparation whereby the water may be rendered turbid or unfit for the use of bathers;

(*b*) wilfully and improperly foul or pollute the water in any bath, or wilfully and improperly soil or defile any towel, bathing drawers or bathing dress supplied for his use, or any dressing-box or any furniture or article therein;

(*c*) enter any bath while knowingly suffering from any cutaneous, infectious or contagious disease;

(*d*) permit any animal to enter any bath.

Byelaws to be exhibited.

5. The person responsible for any bath shall keep a printed copy of these byelaws exhibited in a conspicuous place on the premises.

Penalties.

6. Every person who shall offend against any of the foregoing byelaws shall be liable on summary conviction to a fine not exceeding *five pounds* and in the case of a continuing offence to a further fine not exceeding *forty shillings* for each day during which the offence continues after conviction therefor.

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