

HEATING & VENTILATING

by

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HEATING AND AIR-CONDITIONING OF BUILDINGS

WITH SOME NOTES ON
COMBINED ELECTRICAL GENERATING STATIONS

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INTRODUCTION

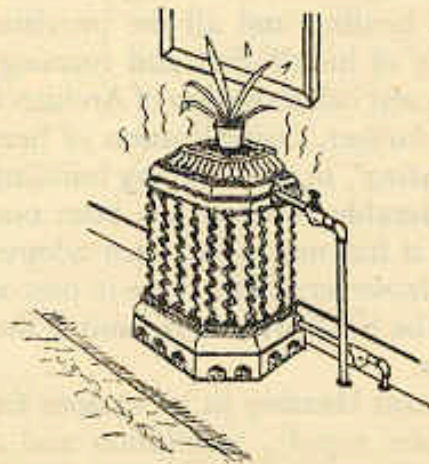
The most virile races of the world live in the temperate zone. They are subject at some times to severe cold and at others to almost tropical heat. As a result their temperature regulating apparatus has been developed to a higher degree than in more equable climates. They can survive the blizzards of the Arctic, and go campaigning in the desert or jungle.

In their own normal habitat it might be thought that they would equally by now have become acclimatized to living happily without artificial heat. Such, however, is not the case.

In winter in temperate latitudes there is a deficiency of sun, and mankind has apparently from pre-historic times sought by various means to keep himself and his house warm by fire. At first it was by a fire in the centre of the cave, in Roman times by a fire under the floor, and later by fire in a grate with a chimney to carry off the smoke. The fire became by long tradition the centre of the home, the natural focal point of all family activity, and such it will no doubt long remain.

But as buildings became larger, heating by many fires was necessary, though laborious, wasteful and dirty. Thus was evolved the system known as Central Heating, to heat many rooms from one large fire situated in the cellar or elsewhere.

Early attempts at this were not entirely successful. Central Heating was deemed to be foreign and unhealthy. And no wonder, for 'You must



'The sort of thing over which savages would have built a temple.

remember', as Beverley Nichols has said in his recent book, *A Thatched Roof*, 'that their recollection of central heating is mainly based on a night they spent in a hotel in Worthing for Ada's wedding in November, 1902.

They occupied the royal suite, which contained the hotel's only radiator. This radiator, of Persian design, was the sort of thing over which savages would have built a temple. It hissed and gurgled and spat—at noon it boiled—at night it froze solid, and housemaids approached it on tiptoe, with nervous giggles.⁷

The system has long since been perfected in numerous forms to suit all kinds of purposes, but even so there are still a diminishing few who class it among the undesirable scientific novelties of the age.

The majority have, however, by now become accustomed and educated to it. The War, for instance, has brought many changes in the habits of people, one of which is the living together for the first time in huts, camps and hostels, and the working together in factories, depots and offices, all centrally heated. Those who have had this experience know the comfort of a warm building in cold weather, and will take unkindly to a return to the dampness and chilliness of clothes, furniture, tools and so on associated with a lack of proper heating. Most of our factories, public buildings, and all large establishments could indeed not function without such a system.

It may, therefore, be stated that Central Heating, which covers all means of warming from a central source, including gas and electricity, has become an essential part of building construction; just as important as the drains or electric light. The days are past when a case had to be made out for it, or when it was looked on by the Architect or Owner as a sort of poor relation, to be treated only as an afterthought at as little cost as possible.

In fact, the position is now becoming reversed. The necessity for fuel economy due to possible shortage or high cost, demands that buildings shall be easily heated. In future construction more regard must be had to insulation and weather-tightness. Planning from the start must take into account the means of heating and all the provisions necessary must be made so that economy of installation and running shall be paramount. This will call for the closest collaboration of Architect and Engineer.

If carried a stage further, centralization of heating becomes what is known as 'District Heating', in which many buildings are served from one central source. Considerable progress has been made in other countries along these lines, but it has not so far been adopted on a large scale in Great Britain. It may, however, find a place in post-war development. The subject is too great to be dealt with here, and is the subject of a separate treatise by the Authors.

The 'How' of Central Heating in its various forms, together with its allied systems, hot-water supply, ventilation and air-conditioning, constitutes the subject matter of this book. The reasons for choice of one system as compared with another are as far as possible given in each section, followed by details of the main principles of design and, where useful, some idea of costs.

The illustrations are generally of actual installations carried out under

the direction of the Authors, and are intended to help those unfamiliar with these matters to visualize the finished product.

It is intended that the presentation of the subject as a whole shall be such that all those interested in building and who feel that highly technical matters are outside their scope, may gain a clearer perception of the relative importance of the problems which have to be faced, and some idea of the ways of solving them. At the same time Engineers and Students of the subject should find the technical side carried sufficiently far to be useful in their work.

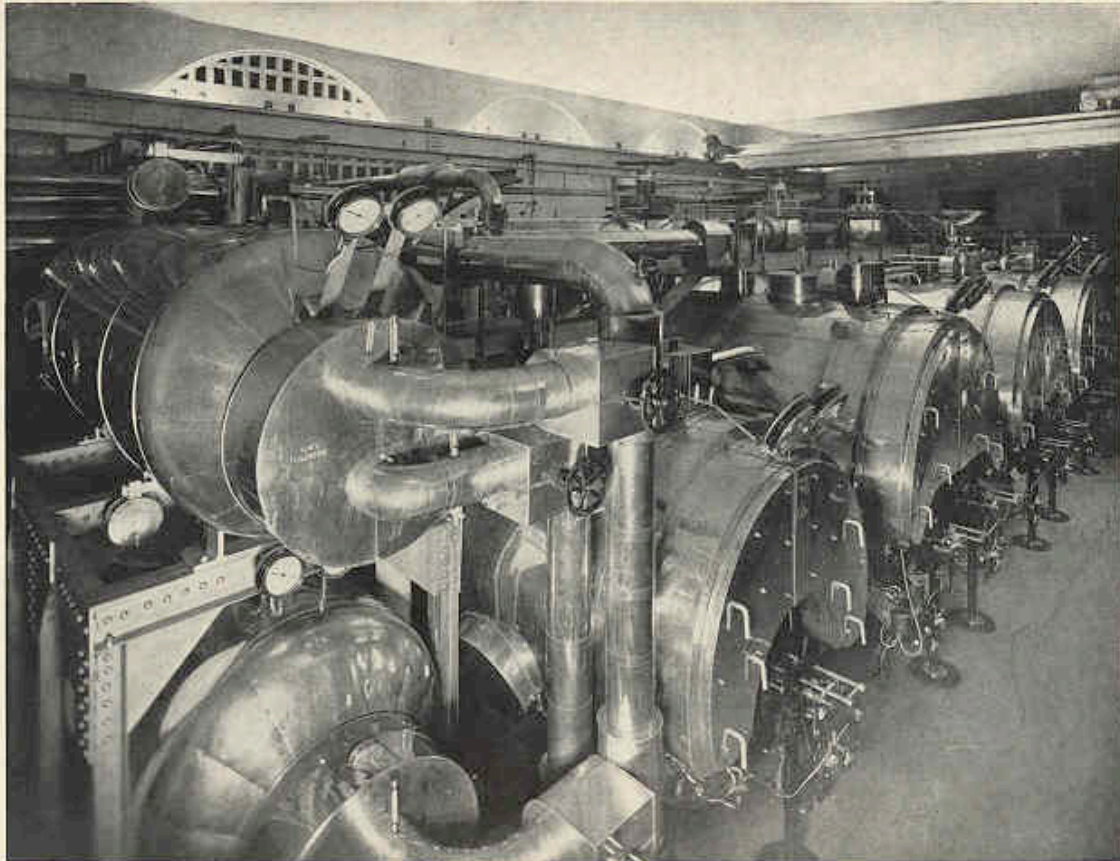


Plate IX. Oil-fired boilers at the Bank of England, now burning creosote-pitch (see p. 164)

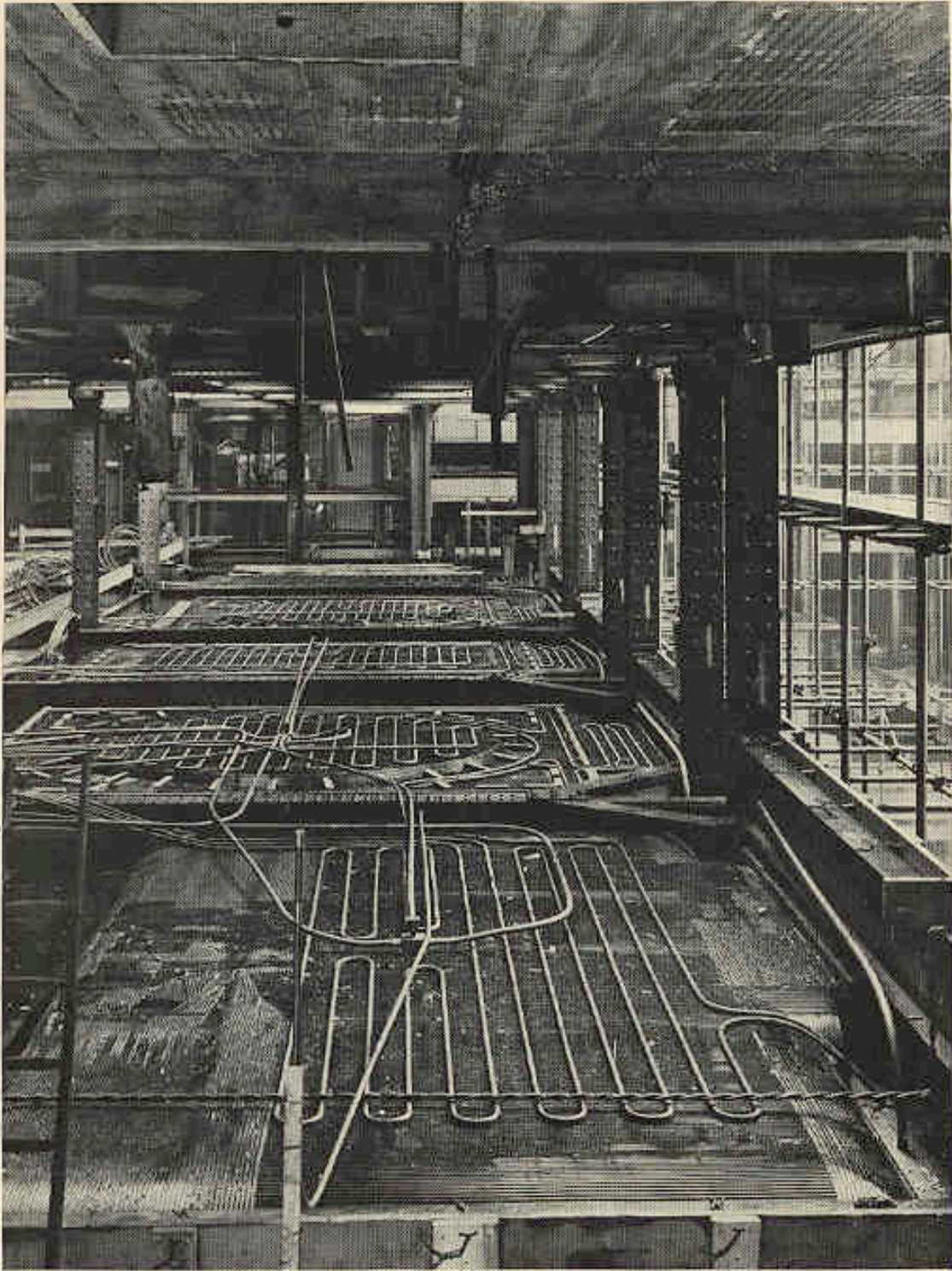
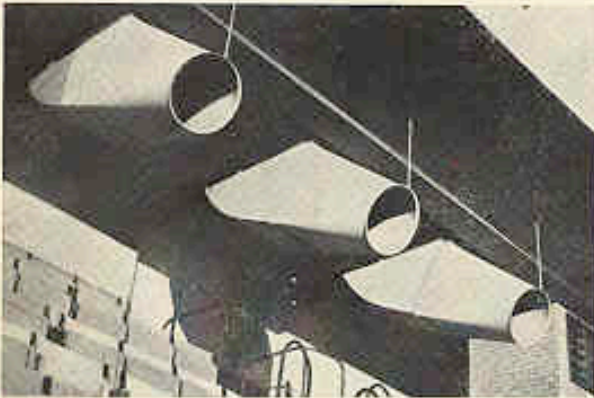


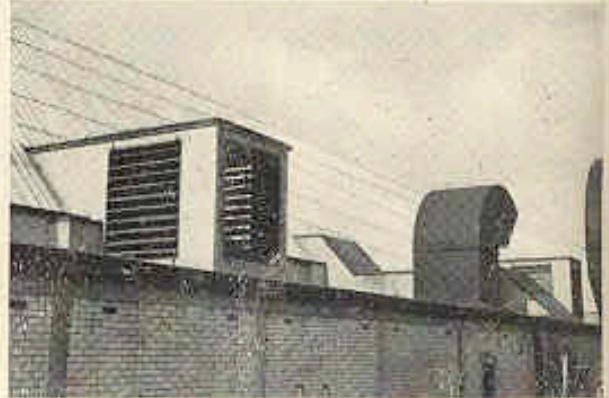
Plate III. Example of Panel Heating, Bank of England. The pipes are laid on the shuttering before the concrete is placed. Note the ribbed rubber sheeting to give a key for the plaster, and also the fixing of reinforcement over the pipes, commenced in extreme foreground. The pipes in this instance are copper (see p. 184)



(a)



(b)



(c)

Plate XXVII. Earl's Court, London. (a) View of main hall showing nozzles at high level. (b) Detail view of nozzles. (c) Outside view of fresh air intakes and exhaust discharges

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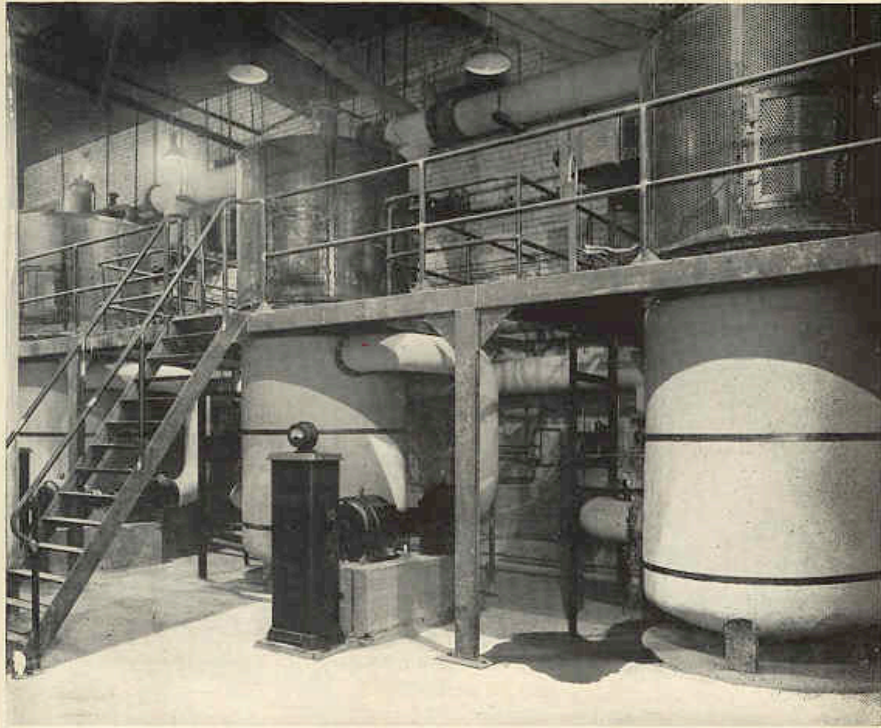


Plate XVII. Electric thermal storage system at Earl's Court, London, showing three Electrode boilers, 14,000 KVA total. Installed by Bastian and Allen, Ltd. for the Fulham Borough Council (see p. 292)

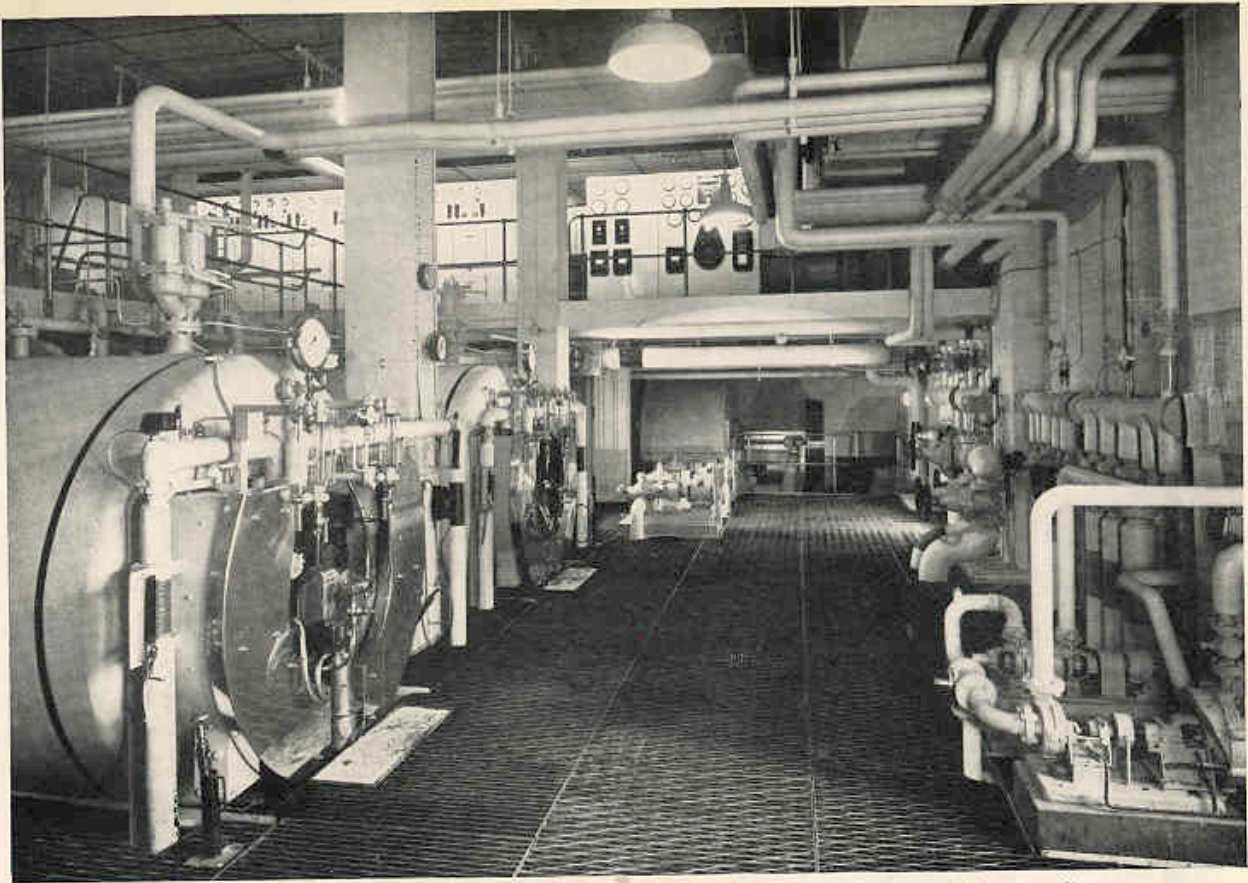


Plate I. A modern Oil-fired Boilerhouse at the Royal College of Surgeons of England (see p. 156)

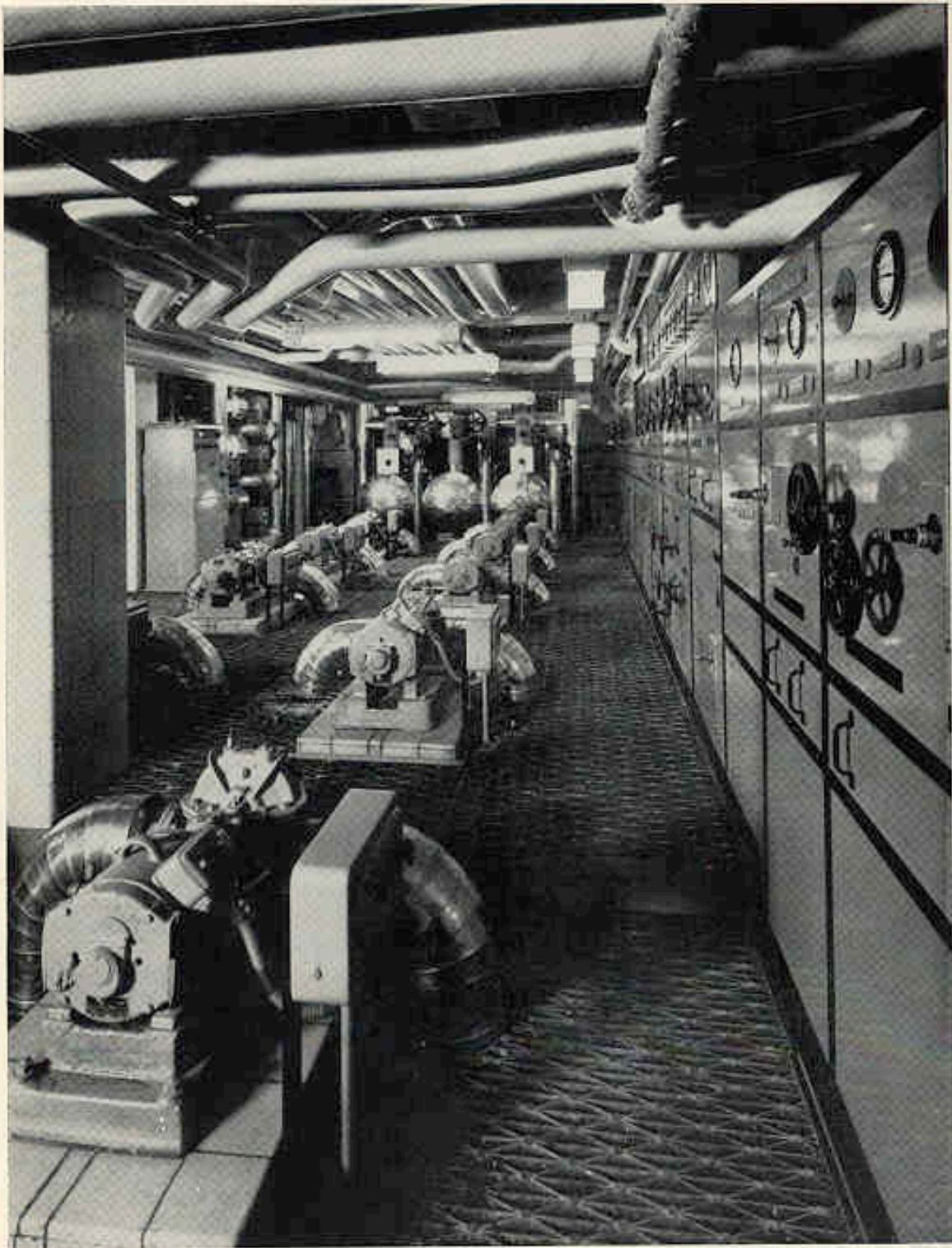


Plate IX. The Pump Room at the House of Commons. In the distant background are calorifiers, and the valve and thermometer panel is on the right (see p. 227). (Photo: courtesy of the Ministry of Works and Benham and Sons Ltd.)

Oscar Faber

ENGINEERING IN HISTORIC BUILDINGS

Dr Oscar Faber was an active member of the Society for the Protection of Ancient Buildings in the 1920s, giving advice to Lethaby and others on the technical panel. Since that time, the company has continued to give its expert advice on engineering work in historic buildings.



The Bank of England
Grade I

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- *Understanding historic fabric and the need not to create irreversible interventions*
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Stanton Williams

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"Brewhouse"
Grade II
Architect: Gilmore Hankey & Kirke

Front Cover: **Somerset House**
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- *Research into health risks and timber decay*



Windsor Castle
Grade I
Architects: Donald W Insall & Associates
Sidell Gibson Partnership

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Oscar Faber civil and structural engineers will undertake complex engineering problems. An example is our significant work to preserve the Roman amphitheatre at Guildball Yard, London.

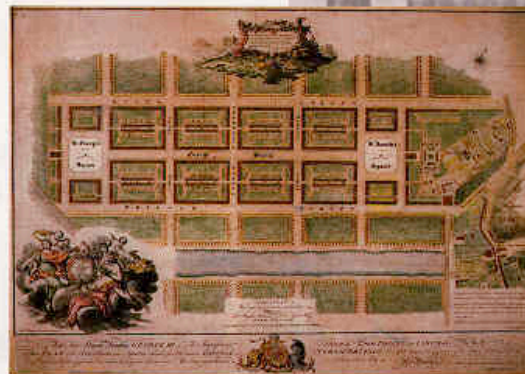


Courtauld Institute, Somerset House
Grade I
Architect: Purcell Miller Tritton & Partners

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Oscar Faber specialist conservation services engineers will undertake work to fine historic buildings and interiors, bringing a professionally holistic approach to their care, repair and reservicing.

Our engineers also have the special design skills needed for the preservation and exhibition of historic objects and works of art in museums and galleries, and where there is movement of large numbers of visitors.



Edinburgh First New Town Strategy
World Heritage Site
Planners: EDAW

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Particular expertise has been developed in the provision for movement, accessibility and enhancement to historic towns and heritage sites.



Motorola Head Office & Manufacturing Facility