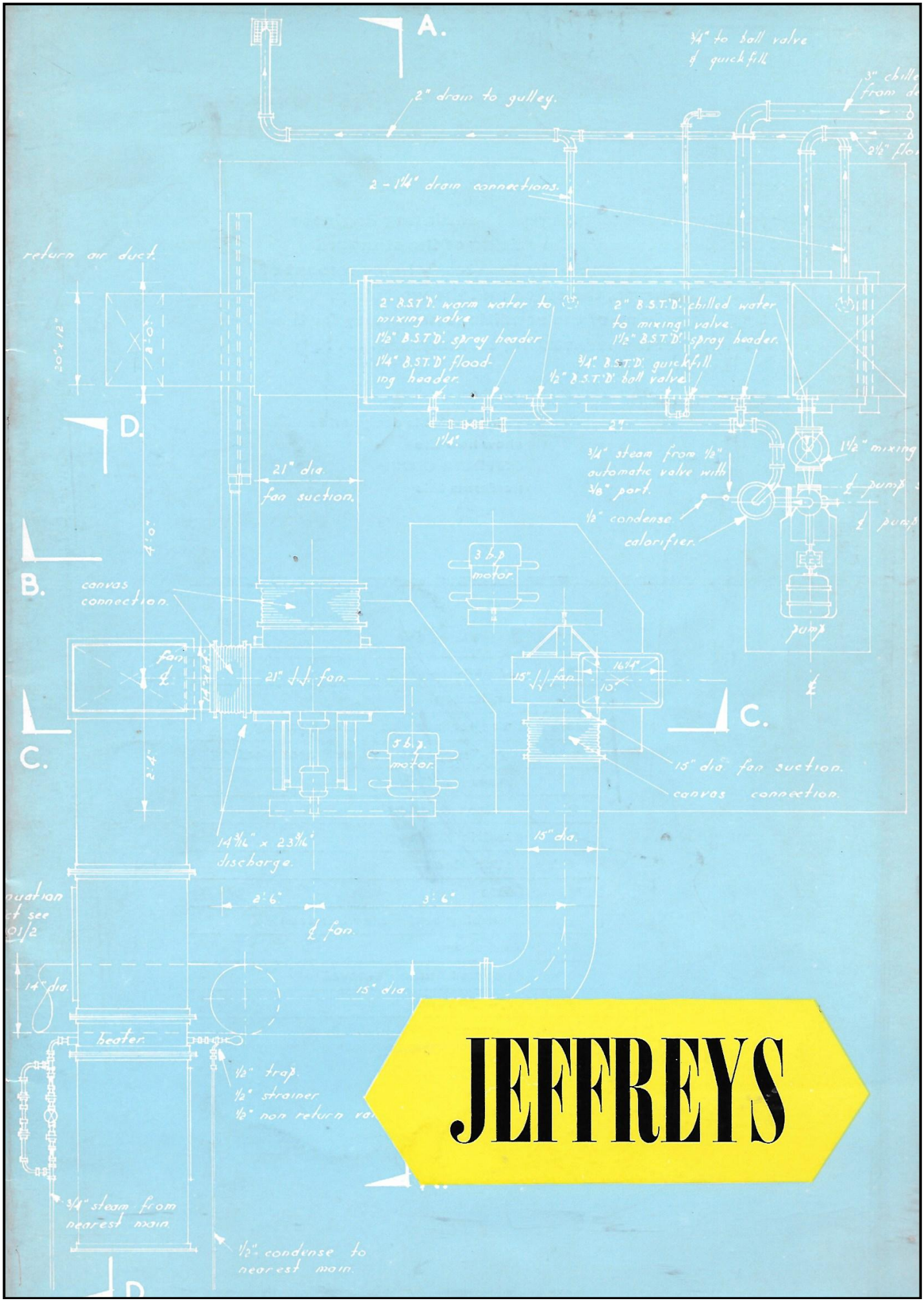

A.
¾" to ball valve
& quick fill
2" drain to gulley.
2 - 1¼" drain connections.
return air duct.
20" x 12"
4'0"
D.
2" B.S.T.D. warm water to mixing valve
1½" B.S.T.D. spray header
1¼" B.S.T.D. flooding header.
2" B.S.T.D. chilled water to mixing valve
1½" B.S.T.D. spray header.
¾" B.S.T.D. quick fill
½" B.S.T.D. ball valve
1¼"
2"
21" dia. fan suction.
¾" steam from ½" automatic valve with ⅜" port.
½" condense
calorifier.
1½" mixing
pump
B.
canvas connection.
3 b.p. motor
fan
21" d.d. fan.
15" d.d. fan.
16¼"
10"
C.
C.
5 b.p. motor
15" dia. fan suction.
canvas connection.
14¾" x 23¾" discharge.
15" dia.
2'6"
3'6"
fan
14" dia.
15" dia.
heater
½" trap.
½" strainer
½" non return
¾" steam from nearest main.
½" condense to nearest main.
D.

JEFFREYS

‘The function of the Heating and Ventilating Engineer is to contribute towards the raising of the standard of living of the community by the steady improvement of comfort in the home, the office and the workshop, and by the provision of the conditions necessary for the improvement of manufacturing techniques . . . . . ’

This booklet is designed to show how the JEFFREYS GROUP performs this function

CONTENTS

Decorative Cooling Water Pond
for Refrigeration Compressors
Messrs Sylvania - Thorn Colour
Television Laboratories Ltd,
Architects – Messrs. Jellicoe,
Ballantyne & Coleridge

Air Conditioning

'Air Conditioning is the independent and simultaneous control within an environment of the temperature, humidity, purity, velocity and the pressure of the air'.

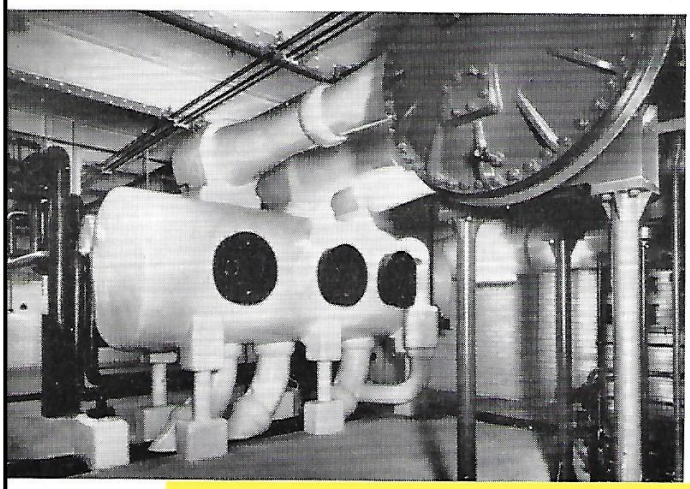
A thorough understanding of this classical definition supported by 40 years of practical experience has given our engineers a considerable pool of knowledge in this field.

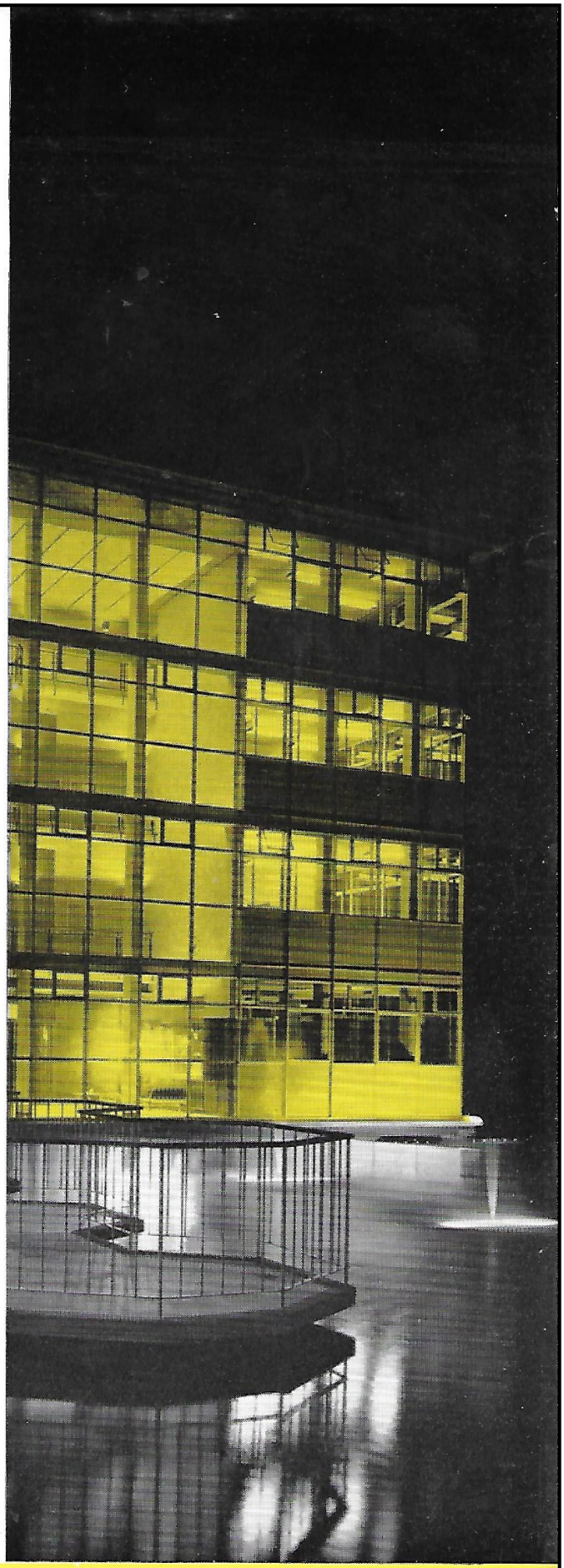
The design of equipment rests on a thorough knowledge of the properties and behaviour of the atmosphere and the effect of the various features of the structure and the contents of the space to be conditioned.

The advantages of process air conditioning have been well appreciated by industrialists for many years and we have been entrusted with the design and installation of many plants for the Tobacco, Film, Chemical, Confectionery and other industries.

The introduction of high velocity systems with their relatively small ducts offers new opportunities for the introduction of air conditioning into existing buildings, in addition to many advantages in new construction. An example of this application can be seen in our offices in London where a plant has been installed for demonstration to our clients and for the instruction of our staff.

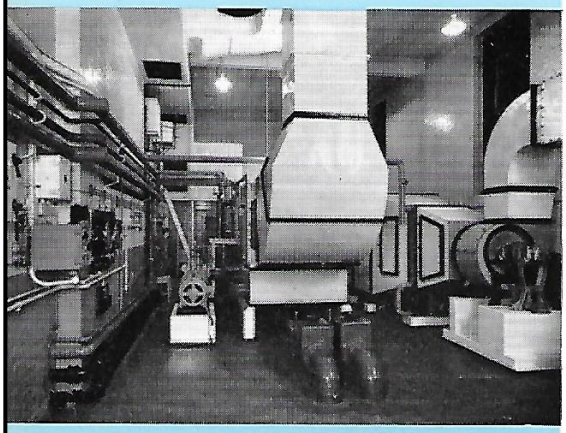
Steam Jet Refrigeration Plant
at Messrs John Player & Sons,
Nottingham





Ventilation

Distribution ducting ventilating Storeroom for Messrs Cadbury Bros. Ltd, Cambridge



Air Conditioning Plant Room at Messrs Kodak Ltd, Harrow

Full Air Conditioning Plant is not always economically justifiable but it should be borne in mind that, particularly in the field of human comfort, personnel are becoming rapidly more comfort conscious. It is our considered opinion that in the foreseeable future, office workers in the larger cities will expect something better than the traditional Radiator Heating System. Some degree of temperature, humidity and purity control will be essential. The removal of an out-dated heating system and its replacement by a Heating and Ventilating Plant will be an expensive and disruptive business if provision is not made at the time of construction of the building. The extra cost of the installation of a Ducted Air System over a Hot Water Radiator System, when the building is first planned, will be insignificant when considered against the cost of a subsequent change-over with its attendant disorganisation.

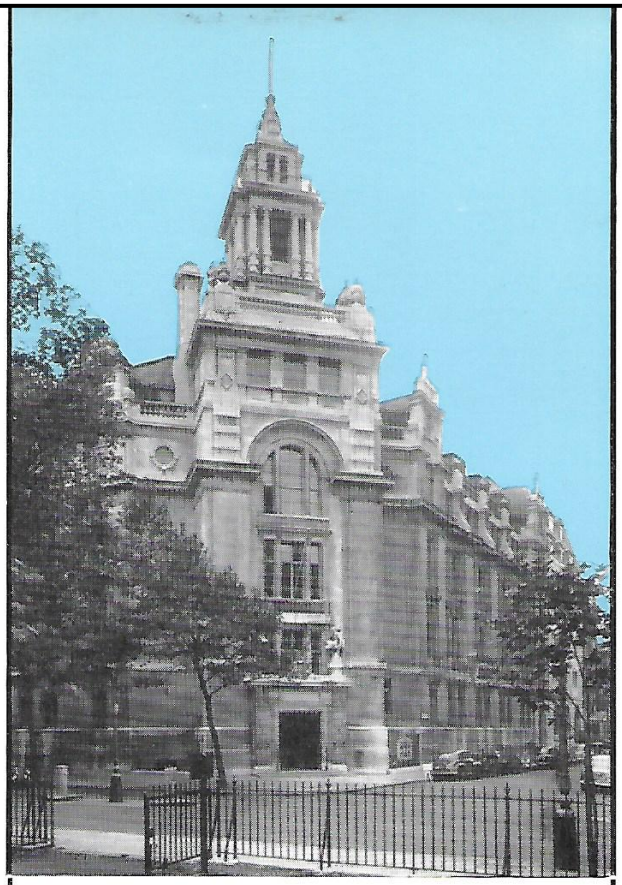
A Hot Air Ventilating System can be converted to a semi-Air Conditioning System by the addition of humidification equipment or to a full Air Conditioning System by the further addition of Refrigerating Equipment, without serious disruption to personnel, as the bulk of the work would be carried out remotely in the centralized plant room.

It is appreciated that in the very early stages of design, architects and engineers will be interested in the approximate size of plant rooms and ductwork. For that purpose only we give some average figures taken from installations carried out over many years. For every 100,000 cu. ft. of space to be treated :

(1) Ducts would occupy 25 sq. ft. This would be halved in the case of high velocity systems.

(2) Air conditioning plants consisting of fan, filter, air washer, air heater and ductwork connections, require 500 sq. ft. of floor space.

(3) Refrigeration plant to supply chilled water to an air conditioning plant to maintain comfort conditions in the United Kingdom would require 500 sq. ft. of floor space in addition.



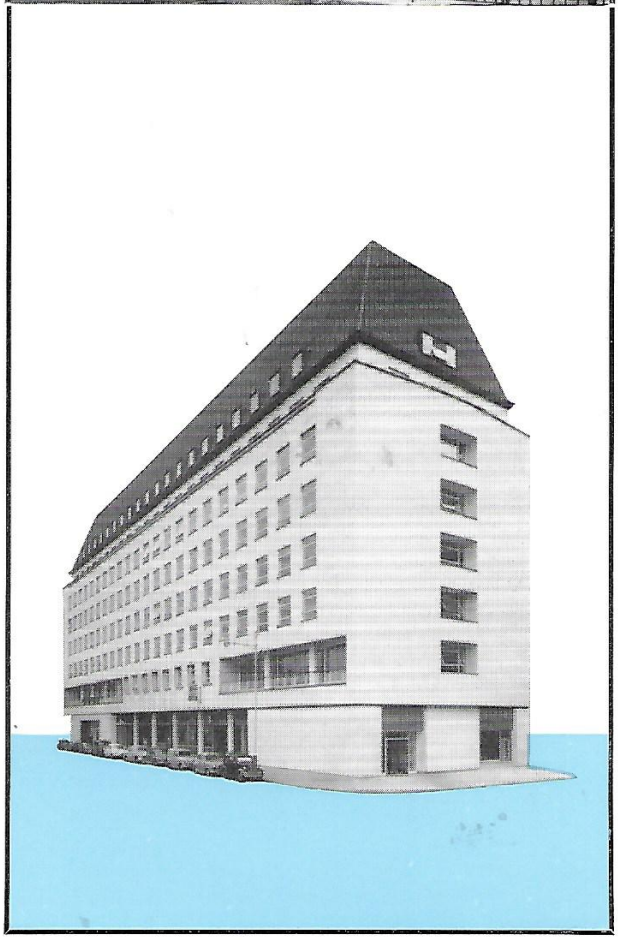
The Crown Agents Offices,
Millbank, SW1, with
new extension

Low Pressure Hot Water Heating

Low Pressure Hot Water is the medium most widely employed for residential and institutional heating.

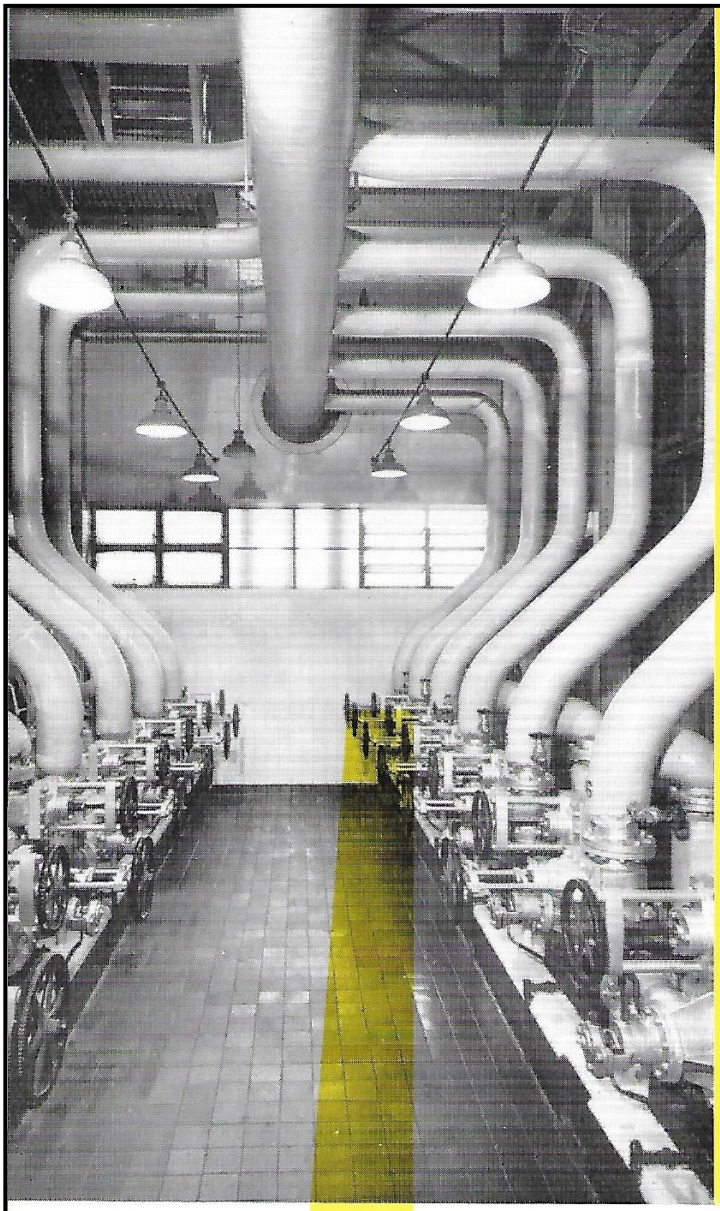
Although the technique is comparatively simple, a considerable amount of misconception exists when considering the economics of such systems. The majority of such systems are subject to intermittent running conditions, particularly in buildings such as Schools, Clinics, etc. In order to keep the running costs of such an intermittent system down, the correct margin must be allowed in the design of the equipment. These margins increase the capital charges, which must be considered, together with the saving in running costs, when selecting a competitive tender. The lowest tender is very often not the cheapest price.

The modern tendency is towards concealment of heating elements either completely by means of embedded floor or ceiling panels, or partially by the use of skirting type heaters or metallic surface panels.



Recent Extension to County Hall,
London. Architect –
Hubert Bennett, FRIBA.,
architect to the LCC

High Temperature Hot Water Heating



Distribution Pumps and Headers
at Vauxhall Motors Ltd,
Luton Works

High Level Distributing Mains
in BOAC Catering Headquarters
at London Airport

The Low Pressure Hot Water Heating System is operated at a maximum temperature of 180°F. in order to limit evaporation and prevent boiling at 212°F. under atmospheric pressure.

Higher temperatures reduce the size of the radiating and convecting surfaces and the sizes of the pipes serving them.

Steam was used initially as the high temperature medium but pressurized water systems have been developed over the past 25 years. The high temperature pressurized water system obviates the grading and draining difficulties inherent in a steam system and reduces considerably maintenance costs.

Methods of pressurization have developed considerably from the self-adjusting steam system to the independent nitrogen system now employed.

Difficulties have been experienced, particularly due to corrosion, on badly designed and maintained systems. We are able to draw on our experience to advise on the prevention of these difficulties.

Steam Heating

Steam is still used to a large extent for heating purposes in spite of the advantages of other media.

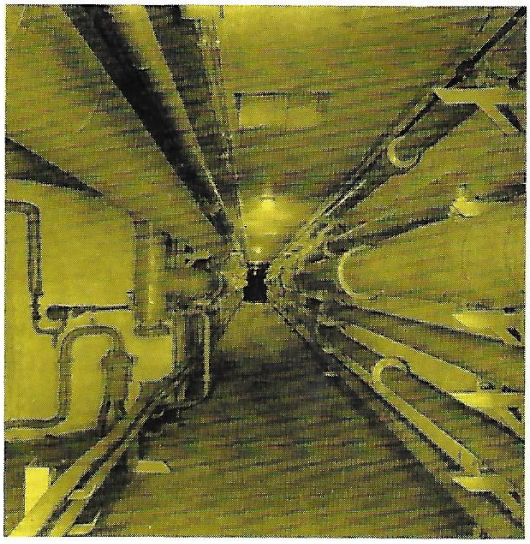
In industrial work, steam is often required for process purposes and the additional heating load can most readily be catered for by an increase in boiler power. Furthermore, low pressure exhaust steam is very often available on large industrial sites and would be blown to waste if not used for heating purposes.

The chief advantage of steam is its flexibility and although rapid changes are unusual in heating systems, they do occur in process work.

The transmission of steam over long distances and its ultimate automatic control present their own particular problems, to the solution of which our engineers can apply the experience of many years.

The life of a steam and condensate system will depend to a very large extent on the operating methods but the basic design does have a very great effect on its life.

When considering the relative costs of systems the maintenance and replacement costs must be taken into account and it will be found time and time again that the scheme with the lowest capital cost is not the most economical.



Steam and Condensate
Pipework in Distribution Tunnel
at Messrs Odhams (Watford) Ltd.

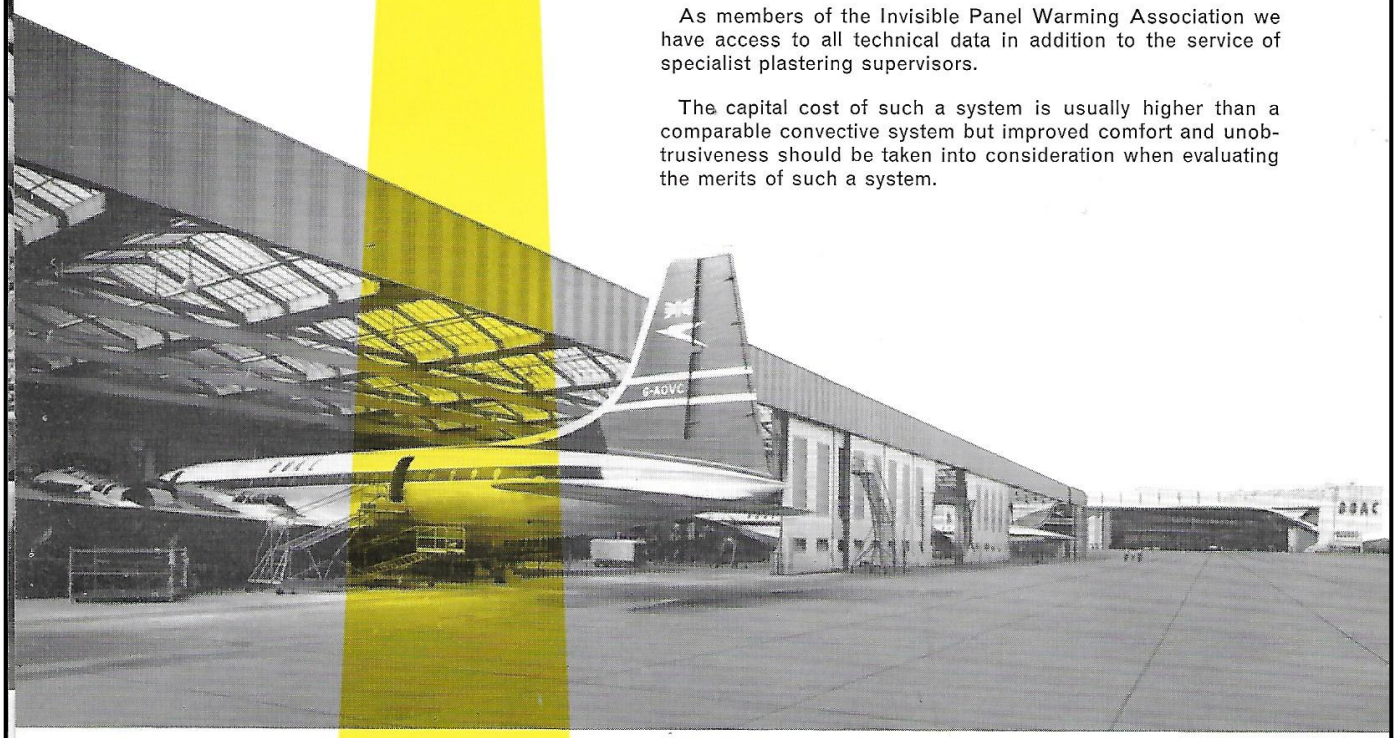
Main Offices and Laboratories,
BP Refinery (Kent) Ltd.,
Isle of Grain

Radiant Heating

The Roman Hypocaust is well known as one of the earliest forms of central heating. It is not always realised that the system was of the low temperature radiant heated floor type and furthermore it is only during the past 30 years that these systems have become accepted as more comfortable than convective systems. Rapid development has taken place since the second World War and we have had considerable experience of all types of concealed radiant heating systems.

As members of the Invisible Panel Warming Association we have access to all technical data in addition to the service of specialist plastering supervisors.

The capital cost of such a system is usually higher than a comparable convective system but improved comfort and unobtrusiveness should be taken into consideration when evaluating the merits of such a system.



Wing Hangars for
BOAC London Airport, heated
by embedded floor panels.
Consulting Engineers – Messrs
J. Roger Preston & Partners

Steel floor panels prior to
embedding in concrete at new
BEA Maintenance Building,
London Airport

The more recent lightweight combined heated and acoustic ceilings have largely overcome the disadvantage of the long time lag experienced with embedded systems.

In heating existing buildings it is more readily applied by fixing in a false ceiling. The table below gives approximate weights of the various types of suspended heated ceilings:

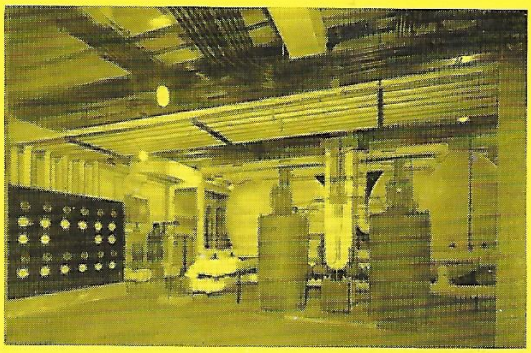
	lb. per sq. ft.
(1) ½-in. steel pipes embedded in plaster	20
(2) ½-in. copper pipes in void above plaster ceiling	10
(3) Heated Acoustic Ceiling with plaster tiles and heating pipe coils	6
(4) Heated Acoustic Ceiling with steel tiles and steel heating pipe coils	4½

If the embedded heating system is to be in the floor, then care must be taken at the outset in the selection of floor finishes. The list below gives the most suitable types of finish in order of preference:

(1) Granolithic.
(2) Thermo-plastic Tiles.
(3) Composite Wood Blocks.
(4) Carpet fitted directly over concrete floor.
(5) Hardwood flooring.

Electric Heating

The publicity being given currently to 'off peak' electric floor heating may tend to give the false impression that the use of this source of heat is comparatively new. For many years full advantage of the 'off peak' tariff for electricity has been taken in electric water thermal storage systems in which water is heated electrically under pressure and stored in large vessels for use as required.



Electro-Thermal Storage Plant at Electricity Supply Board Offices, Dublin. Electrode Boilers manufactured by Messrs Bastian & Allen Ltd.

When comparing this method with the direct electric thermal storage system now being publicised, it should be borne in mind that, although the capital cost is higher, the degree of control is closer, and the running costs are so much lower that the saving more than offsets the extra capital charge.

Boiler Plant

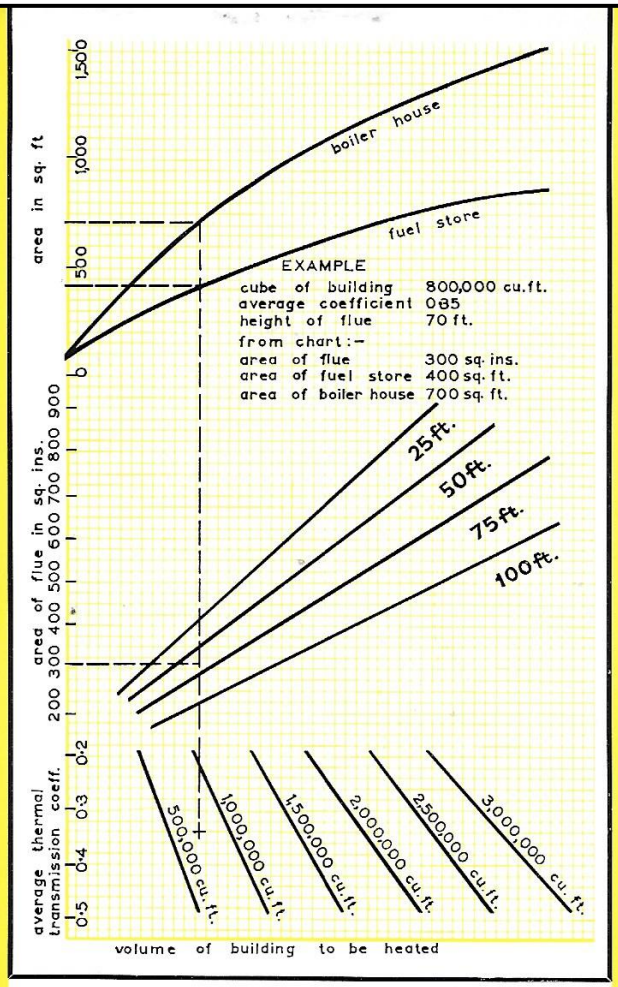
The boiler plant is the heart of any system and as such requires careful consideration in design, as upon its treatment the operating efficiency largely depends.

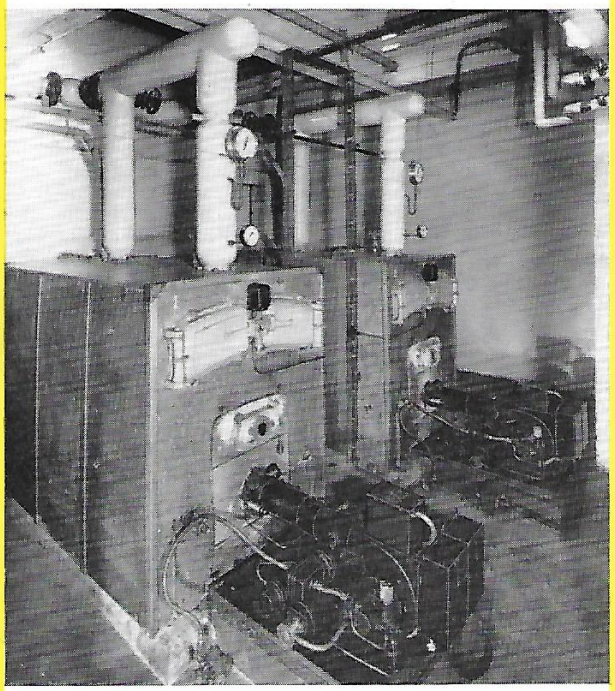
The varied choice of boiler plant and firing equipment makes it essential that the selection should be made by experienced engineers. We are proud to number amongst our staff, engineers who have had experience in the operation of all types of boilers from large marine water tube boilers down to the humblest domestic unit.

The service which we can offer does not end with the selection and installation of the plant. We can guide the users in the running and maintenance of the plant to give the highest efficiency and longest operating life by means of correct water treatment, control of combustion and proper external cleaning.

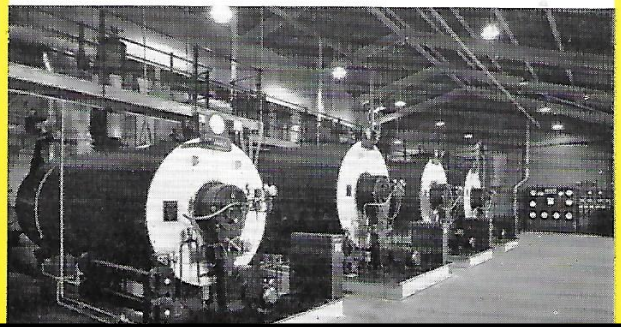
The implementing of the Clean Air Act places a new responsibility upon the user but at the same time ensures that boiler plants are operated more efficiently. We are fully aware of the implications and our engineers will ensure that new installations are fitted with the instruments which are necessary to give warning of conditions which infringe the Act. We shall also be pleased to advise on existing installations.

Once again it is realised that at an early stage in designing, architects will require to know the approximate areas which will be required to be allocated for boiler rooms and chimneys. The chart shows average figures taken from installations carried out by us over many years.

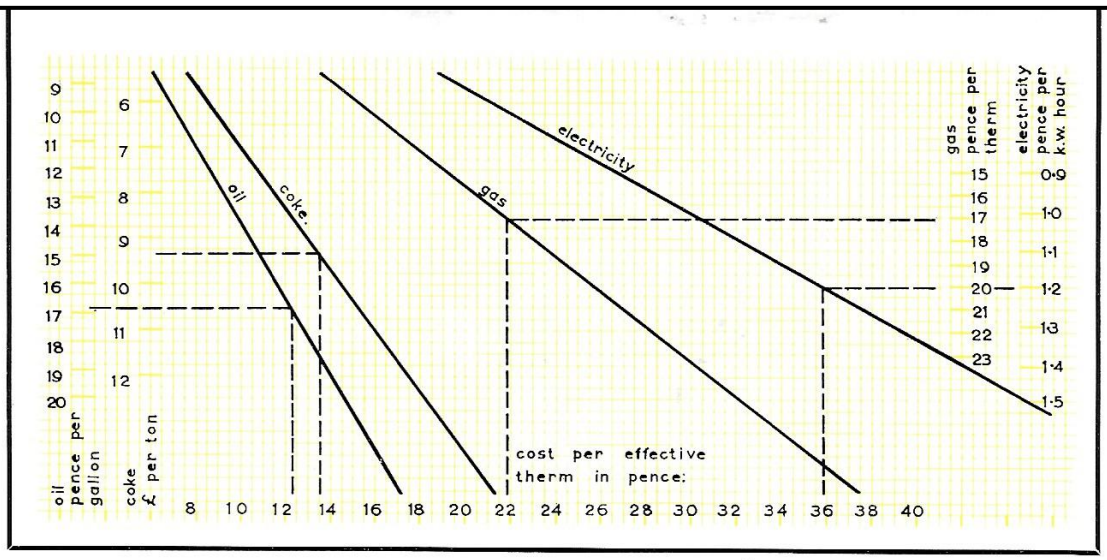




Oil Fired Hot Water Boiler Plant
for office block, Piccadilly



Oil Fired Steam Boiler Plant
at Carreras Ltd.,
Basildon



Fuels

The principal fuels used for heat production are – coke, oil, gas and electricity.

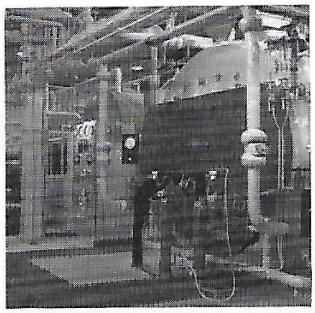
The assessment of the best fuel for any particular application depends on the following considerations:

Capital and running costs, availability of fuel, degree of cleanliness desired, type of skilled attendant available, and the space available for the accommodation of the plant.

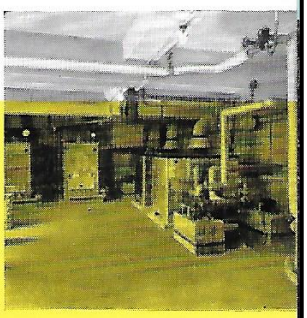
It must be fully appreciated that the relative costs of fuels may change considerably as the production of electricity from nuclear power becomes more widespread and economic.

The possibility of a plant change-over must be considered and precautions taken to ensure that the additional plant can be installed at a later date, without undue disturbance. We are fully aware of this possibility.

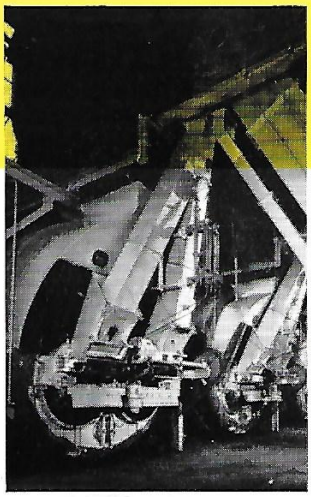
In order to assist in the selection of fuels, the relative costs are depicted graphically above.



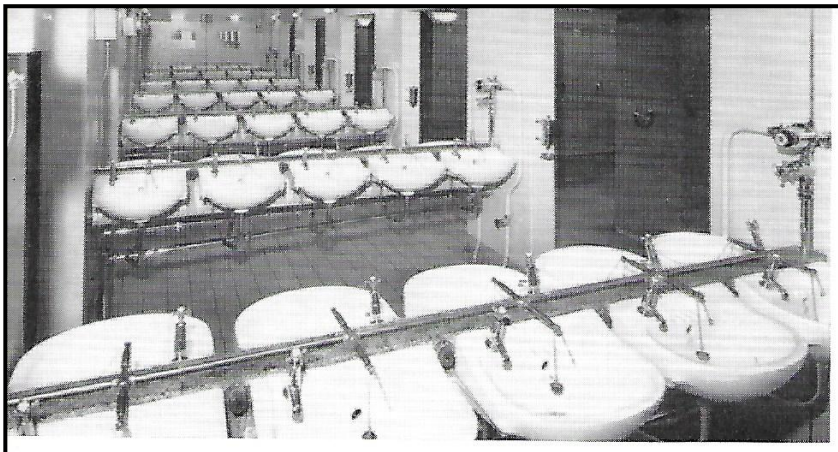
Oil Fired Boiler Plant at SW Middlesex Hospital. NW Metropolitan Regional Hospital Board Engineers' Department



Gas Fired Boiler Plant at Mount Vernon Hospital, Northwood



Coal Fired High Pressure Hot Water Boilers in Maintenance Area, London Airport, for Ministry of Aviation



Amenities Block at
BP Refinery (Kent) Ltd.,
Isle of Grain

Plumbing & Water Services

In order to enable us to offer our clients a fully comprehensive service, our plumbing department was set up in 1952. The department has matured and we are now in a position to design and install the complete pipe services in any type of building.

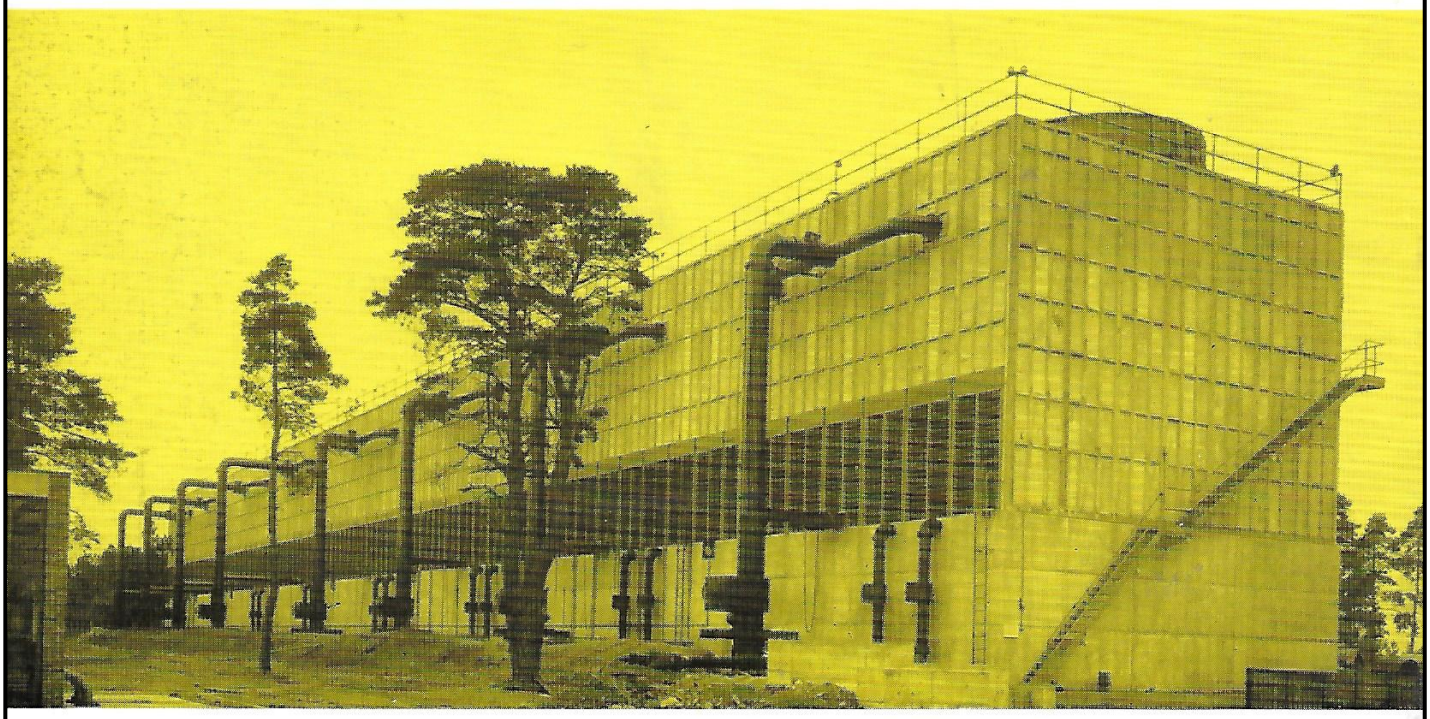
This is proving particularly useful in connection with laboratory construction with the complexity of liquid and gas lines.

The existence of this department enables us to install sanitary installations completely with the services up to and away from the fitments without any demarcation difficulties.

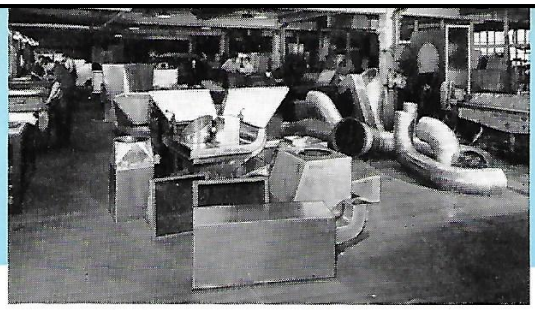
Our operatives are trained in the modern techniques involved in the use of polythene fittings.

We have been entrusted with the installation of underground cold water supplies, together with its civil engineering work, involving pipes up to 24-in. diameter and we feel perfectly confident to increase the scope of this work.

On the hot water service side, our activities range from pit head bath installations down to our 'rationed hot water service system' so successfully applied to the lower rental blocks of flats.



Cooling Water pipework at
National Gas Turbine
Establishment, Farnborough,
for Ministry of Works

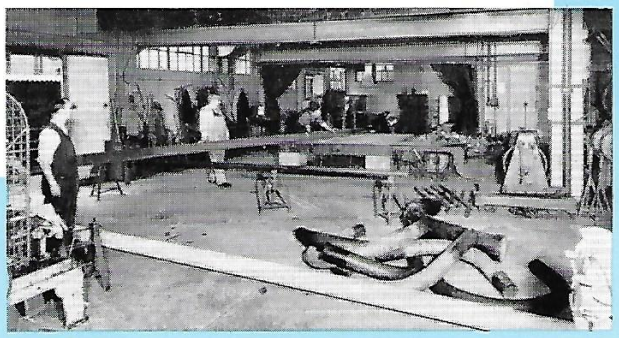


Sheet Metal Workshop
at our London Factory

Workshops

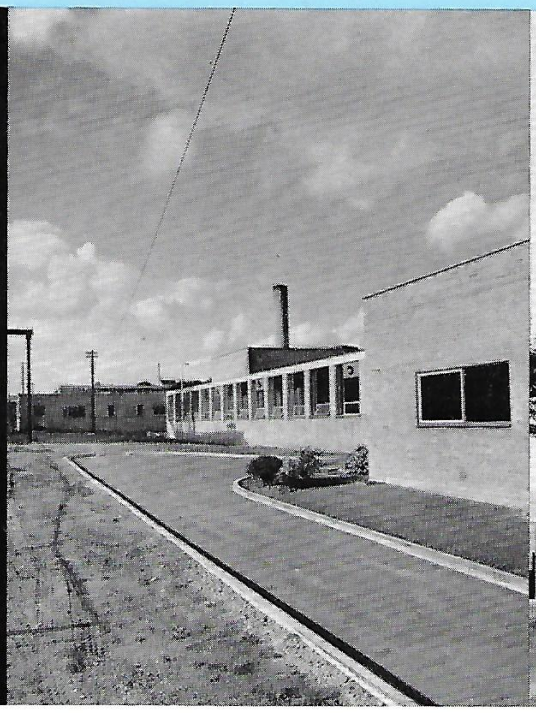
Our modern Workshops, rebuilt in 1950, adjoin our Design Offices. In these Workshops there are facilities for the fabrication of sheet metal ductwork and platework, steel structures, pipework prefabrication, welding, and general machine work.

The availability of these resources enables us to guarantee deliveries and to control the quality of fabricated work. It enables our Clients to benefit in cases of breakdown or other emergency. It also enables us to prepare particular items at short notice to comply with involved building programmes.



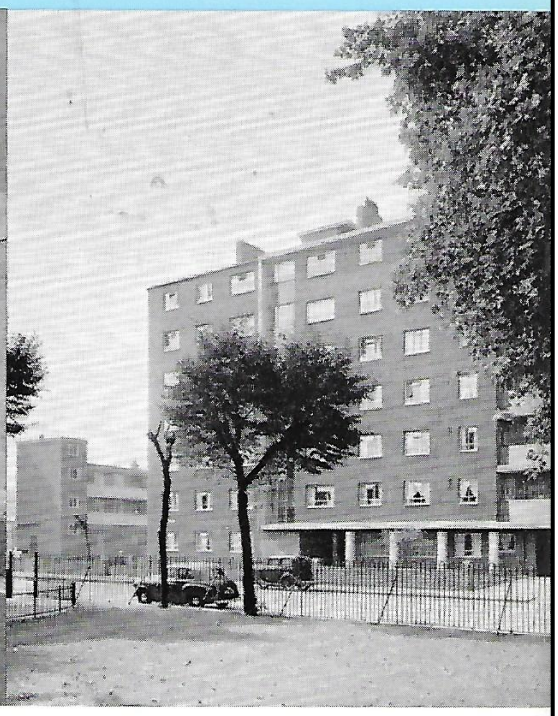
Pipe Fabrication
in our Main Workshop
at Waterloo Road

Pithead Baths Building at Selston Colliery, for the National Coal Board. Architects – East Midlands Division Chief Architect in association with Elie Mayorcas Esq, FRIBA

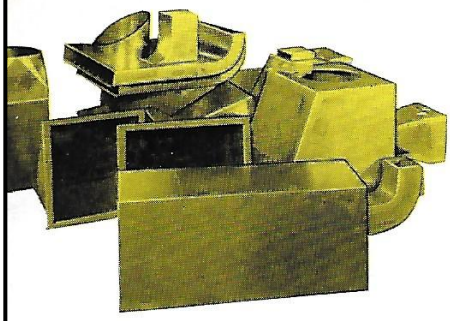


Photograph by permission of
the National Coal Board

Flats with rationed hot water service system at Shoreditch



Photograph by permission of J. L. Sharratt Esq., OBE,
Borough Engineer, Shoreditch



Dust and Fume Removal

The prevention of the ingress of dust and odours are fundamental principles of Air Conditioning Plants. However, dust and fumes are often generated within the space itself and their removal requires specialised treatment.

Knowledge and experience in handling dusts and fumes has become increasingly important during the progress of atomic and nuclear research and development. Ordinary dusts can now become radio-actively harmful and there is no room for error in their treatment.

The conventional problems still remain and are becoming intensified as the Factory Act and Clean Air Act are more rigidly implemented.

The capital cost of the mechanical plant to collect valuable dusts can very often be recovered in a matter of months.

The disposal of dusts after collection also requires special treatment and in the case of combustible materials the heat released by their destruction can be utilized in the heating system.

Drying Ovens

It is quite fallacious to regard the drying of materials merely as a matter of the removal of their moisture and this misconception has been the cause of dissatisfaction with drying machines.

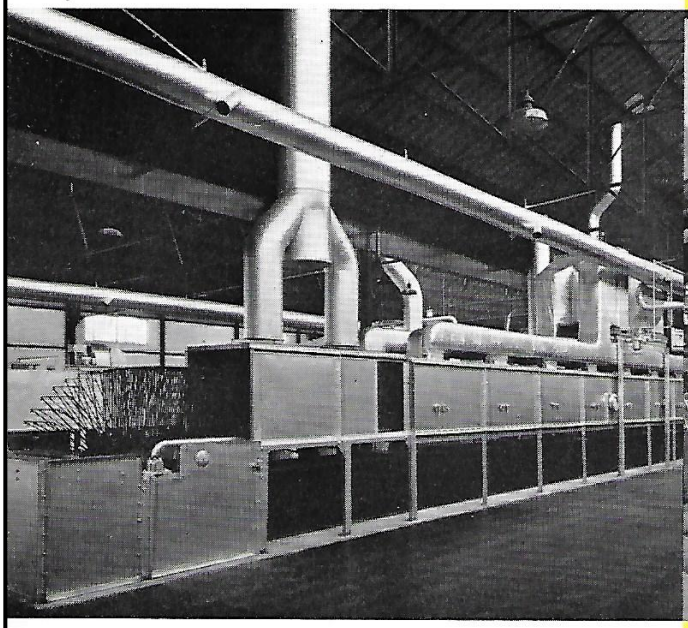
The drying of any particular material can only proceed at the optimum rate and without injury to its physical characteristics under one precise set of atmospheric conditions. Both dry bulb temperature and relative humidity must be under complete control during the whole of the drying time. Experience and research alone can determine the correct conditions for each substance.

Scientific processing can reduce the drying time over that required by 'rule of thumb' methods, without impairing the physical characteristics of the material.

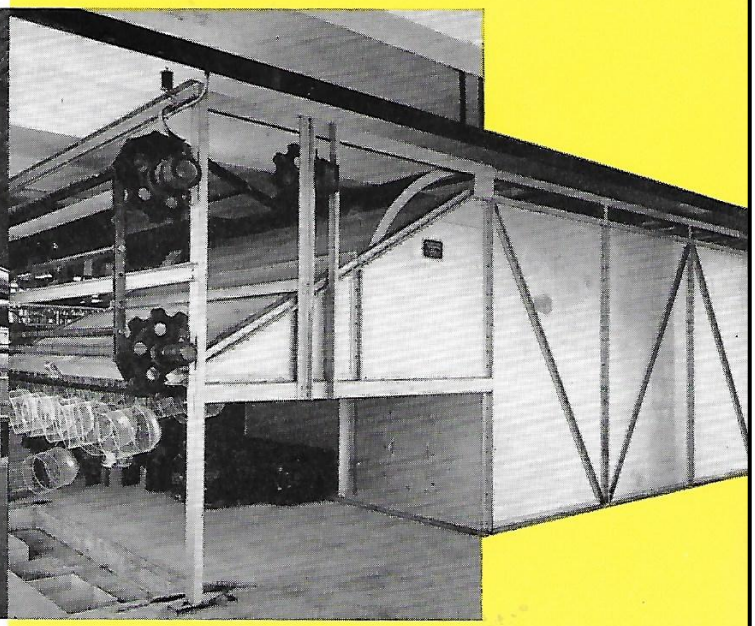
Our Drying Ovens can be heated by oil, gas, coal, hot water, steam or electricity. They are manufactured in our own workshops adjoining our design offices, where close control and inspection can be maintained.

Changing contaminated filter cells at new laboratories for General Electric Co Ltd, Erith

Fume cupboard extraction fans on roof of Research Building at The Imperial Chemical Industries Ltd, Billingham



Conveyor type oven for drying printing inks on tin plate



Continuous Drying Oven for Hygienic Wireworks Ltd, Mitcham

Air Conditioned Flats for
P. & O. S. N. Co., Aden

Overseas

Until 1955, our associate company, the Air Conditioning Corporation Ltd of India, carried out a very large number of installations in the East. The experience so gained over 30 years has enabled our sister Company in London, the Air Conditioning Corporation (Jeffreys) Ltd to extend our activities in tropical and sub-tropical areas. Systems have been designed and installed in recent years in areas as widespread as Bahrein, Aden, Kenya, Uganda, and Cyprus.

In some of these areas, our agents are actively engaged on our behalf. Where agents have not yet been appointed, skilled and experienced engineers are sent out from this country.

We have past experience on works in Canada and several European countries and nearer home our subsidiary, McCann, Ltd, of Dublin, is in a position to offer similar services to ours in Ireland.

All enquiries for work overseas should be made in the first instance to our head office in London.

J. JEFFREYS & CO LTD

ST. GEORGE'S HOUSE 195-203 WATERLOO ROAD
LONDON SE1 · Telephone WATerloo 2543 (10 lines)