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The Irish Plumber and Heating Contractor, August 1961 (complete issue)

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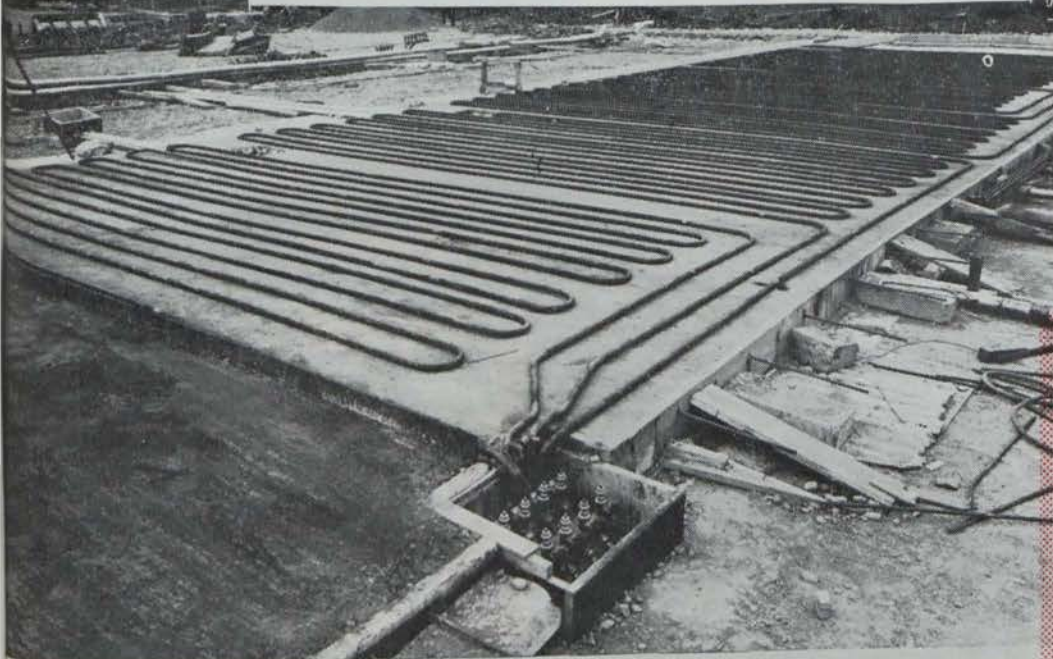
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VOLUME 1, NUMBER 5.

AUGUST, 1961



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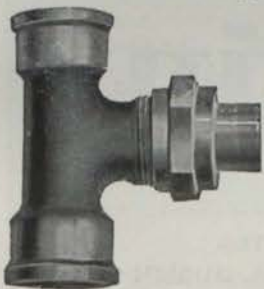
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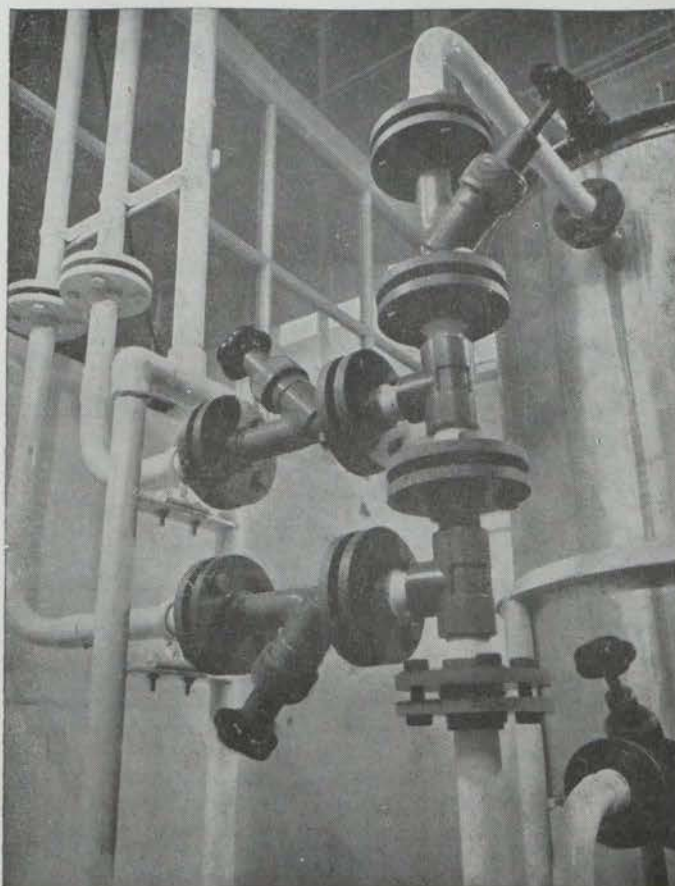
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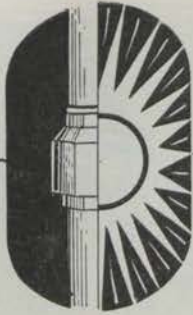
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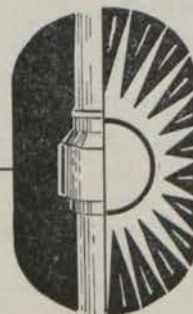
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AUGUST, 1961



THE IRISH PLUMBER & HEATING CONTRACTOR

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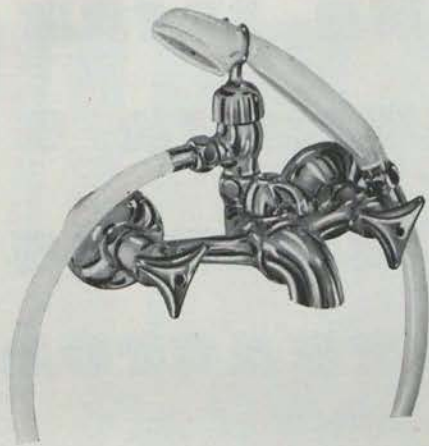
SPECIAL SURVEY: Sanitary Ware, 13-22.

We regret that, because of space limitations, we were unable this month to present the third part of our series, 'Plastics in Plumbing', by Mr. D. C. Coyle, M.E., M.I.C.E.I., M.I.P.H.E., A.M.I.C.E., A.M.I.W.E. We will resume the series next month.—Ed.

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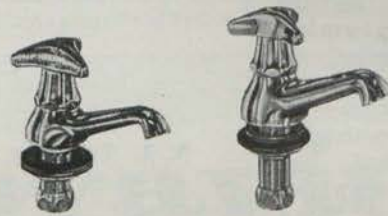


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thermal insulation

By A. L. TOWNSEND, A.M.I.P., M.R.S.H.

FUEL costs and a growing demand for improved comfort conditions emphasise the need for better thermal insulation of buildings and their plumbing and hot water services.

The basic principles of thermal insulation and some of the important properties of thermal insulating materials were outlined in last month's special survey of ventilation and insulation.

Insulation materials take a wide variety of forms. Each has its own particular uses and in order to discuss these more fully it will be convenient to deal with pipe and similar applications separately from the application of insulation to building structures. The first is more readily seen to be related to domestic hot and cold water services. The latter, to the economic improved usage of space heating equipment by reducing heat losses from a warmed room or building, or, alternatively, in summer to keep a building cool by reducing heat gains from without.

Thermal insulation for pipes, storage vessels, etc.

Type:

Loose Fill (in granular form)—Infil to preformed cavities, e.g.: Between storage vessels and timber or other encasement. Around pipes, etc., in chases or timber casings.

Flexible (in strip or blanket form)—Wrap around conformation to curved surfaces, e.g.: Pipes, cylinders, tanks, etc.

Rigid (in pre-formed "ready to fit" sections)—For use on pipe-lines.

Plastic—For plastic application to irregular shapes, e.g.: un-

cased boiler surfaces, cylinders, valves, etc.

Applications:

Loose fill.—This is not popular for tanks and cylinders possibly on account of the need to construct some form of cavity to enclose the vessel and to retain the loose material in position. At one time sawdust was much used as a cheap infill material. Its use is now generally discontinued because it compacts with time and fails to completely protect; it harbours vermin, is an added fire risk in a roof space, and is messy when disturbed as in repair work.

Nowadays, purpose made "ready to fit" cylinder jackets and tank lagging sets are more effective and much more convenient for this purpose. It should be borne in mind, however, that modern infill or loose fill thermal insulating materials are in no way messy, neither do they harbour vermin, nor constitute a fire risk. These materials are made from long fibred rock wool from igneous rock (mineral wool), expanded polystyrene, gypsum particles, pelleted slag wool, or granulated cork chips.

Plastic Compounds.—85% Magnesium lagging is useful for covering irregular surfaces such as uncased sectional boilers, pipe bends, valves, etc. The water mixed compound is messy in application and though well known and still much used in large boiler house installations, it is seldom used in work of a domestic scale.

Where it is adopted the metal surfaces to be covered must be wire brushed to remove loose scale. The system water content should be heated to about 130°F and kept at that until the lagging has completely dried out.

A "keying" coat of $\frac{1}{2}$ in. thickness is first applied and allowed to dry. Sometimes this first coat is put on by kneading lumps of composition about the size of a walnut and then throwing them on to the surface to be insulated. Alternatively the first coat can be "rubbed" on by hand. This also ensures close contact and good adherence of the coat. The finger tracks which result form good keys for the next coat.

Finished thickness

ADDITIONAL layers are added until the required thickness has been built up, $1\frac{1}{2}$ in. to 2 in. being a usual finished thickness. A reinforcement of galvanised wire netting is carefully wired over the last but one coat, and the final coat then applied and tooled smooth.

Though quite good in all other respects, the messy nature of this material and the disadvantage that it cannot be easily removed and replaced in repair, will be clear. And it should be remembered that the application of this plastic compound is a highly skilled job demanding considerable practice and "know how."

Flexible Materials include hesian backed hair felt, the more hygienic up to date fibre glass and slag wool in strip or blanket form, and the hot store cylinder jackets mentioned above. All of these are easily applied without need of special skill. The only point that needs care—and this is important—is that there is complete continuity of wrapping. Gaps must be avoided at all cost, otherwise the effectiveness of the insulation will be severely impaired.

continued overleaf

from previous page

According to the diameter of pipe being treated, the flexible materials may be spirally wound or they may be cut to convenient length and then wrapped axially with the pipe and secured by lacing with galvanised M.S. wire.

For external work or situations subject to damp, the flexible insulating material would be over-wrapped with bitumenous felt securely held in place with wire or preferably galvanised wire netting, and finally painted with bituminastic paint to seal the laps and to ensure longer life.

Rigid Materials include the purpose made pre-formed sectional pipe laggings. These might be of moulded asbestos, mineral wool, or glass fibre. They are light in weight but quite strong. The sections are split in half longitudinally and covered with a cotton canvas or cotton scrim cloth. This covering is adherent to the sections and forms a hinge along one of the cut lines so that the section can be easily engaged around the pipe. An overlap of the covering laps over the closed section and is secured in place by non corrosive staples.

They are available in thicknesses of 1/2 in. to 2 in. and selected according to the standard of heat insulation required.

Another material for this type of insulation comprises concentric rings of corrugated asbestos board, similar in appearance to corrugated cardboard. You will note the aim here to enclose still air as an effective heat insulator and it is interesting to note that certain brands of glass fibre contain no less than 98% by volume, of still air which is a bad conductor of heat.

Summary

THE advantages of rigid section pipe insulation materials may be summarised as follows.

1. It is neat and not unduly obtrusive.
2. It is easily applied. No special skills are needed, just ordinary care and an appreciation of what the insulation is being applied for and why.
3. It is of uniform thickness and therefore of uniform, known insulating value.
4. It is quickly and simply removed in repair work, and just as easily refixed in re-use.

Cold Store Tank Insulating Sets.—

Good plumbing design would avoid the siting of cold pipes and vessels in places liable to freezing air temperatures. There are, however, the odd occasions when this cannot be avoided and then the need for frost protection is clear. Pipes may be protected with any of the flexible or rigid materials previously described. Tanks may be protected by casing and infilling with loose fill material or by wrapping with flexible materials such as mineral wool or glass fibre mattresses.

Purpose made tank lagging sets are convenient, effective, and not too expensive. They are easily applied and easily removed in case of repair work.

Insulating Cylinder Jackets are obtainable tailored to suit B.S. cylinders or may be made to order. They are available in a wide variety of mattress material and in many different covers ranging from brown calico to washable plastic. Fibre glass, mineral wools, or anti-vermin treated sheep's wool are some of the insulating fillings used for these useful and very effective jackets. All are very simple to fit. All are easily removable for inspection or repair work. All are reusable, and all are reasonable in price. In fact, this is one item of thermal insulation which everyone can benefit from, its first cost being quickly repaid by savings in fuel. Thereafter the monies saved in fuel economy with no reduction of hot water services, is money in the pocket.

The economics of D.H. water thermal insulation

An unlagged 20 gallon hot store cylinder maintained at 140°F. for 24 hours consumes 94,000 B.t.us.
 An insulated 20 gallon cylinder maintained at 140°F. for 24 hours consumes 18,700 B.t.us.
 Nett saving in B.t.us... 75,900 B.t.us. per day.

Assume electricity used as heating medium and heater thermal efficiency 100%:

Saving in electricity:
 =75,900 B.t.us. per day heat loss to surrounding air.
 3,415 B.t.us. per unit of electricity.
 =24 units approximately.

The application, then, of thermal insulation in any circumstance, with any fuel will show commensurate savings in fuel cost.

Bord na Mona take delivery of Mobile Display

A specially built 22-foot caravan, which will be used by Bord na Mona throughout the country for the exhibition and display of turf-burning appliances, has been handed over to Mr. D. C. Lawlor, Managing Director of Bord na Mona, by Sprite (Ireland) Ltd., of Sherrington, Shankill, Co. Dublin.

The most striking aspect of the caravan is the fact that Bord na Mona are able to exhibit in it a range of their turf burning appliances and show them in actual operation. The appliances cover the small domestic water heaters up to the larger domestic oven and boiler.

One side of the caravan opens up to form a canopy while the lower section of the same side opens down, forming a ramp. Taking into account the ramp and floor width, Bord na Mona have a display area of 12ft. x 22ft.

The caravan will be on circuit around Ireland until next October.

Company Development Announced

THE latest step announced by Powell Duffryn Limited in its programme of development in the field of heating and air treatment is the formation of a new company—Powell Duffryn Heating Limited.

This new company, formed last month, will operate the businesses previously conducted by Hurseal Limited, Gulf Radiators Limited, Janitor Boilers Limited, and Powell Duffryn Modulair Limited. The existing trade names will be retained.

Chairman

The Chairman of the new company will be Mr. M. Reid, and Mr. A. C. Hazel and Mr. K. M. D. Johns will be Joint Management Directors. Other members of the Board will include Mr. W. H. Sharland, Mr. R. C. Saloway, Mr. R. Turner, Mr. H. H. Holleson, Mr. R. H. Stewart and Mr. E. B. Overton.



AS has already been said, elements are substances in their simplest chemical form. If atoms from two or more different elements join chemically together in definite proportions, a new kind of molecule, and a new kind of substance, is formed. There are two important points to notice. First, the substance formed has quite different properties from any of the elements from which it is made. Second, it is formed by what is known as a **chemical change**. A chemical change can be distinguished from a physical change in that:

- A new substance is produced.
- The properties of the new material are different from those of the elements from which it was made.
- The result of the chemical change is permanent in that the new material cannot be changed back to its constituent elements by mechanical means—for example, crushing or straining. (Later you will see how a second chemical change can reduce the now complex compound to its simple constituent elements).
- Heat is produced when a chemical change takes place. (It is interesting to note that heat will hasten a chemical change or will help to bring one about. Again, we shall soon see how very useful this knowledge is in plumbing work).
- The compounded elements are in definite and unalterable proportions.

Let us follow a simple chemical change, and see how usefully plumber's chemistry shorthand can be applied.

Water is a chemical compound of hydrogen and oxygen. It can be made by burning the gaseous element hydrogen in the gaseous element

oxygen in the proportions of two volumes to one.

- Note i. The definite proportions of the element going into the compound.
- ii. The production of heat in this chemical change by the burning of H_2 in O_2 .
- iii. A new substance, the liquid water, is formed from the chemical compound of two gaseous elements.

This could be written as follows:—

two molecules of hydrogen (two volumes) gas	plus	one molecule of oxygen (one volume) gas	(burns and produces heat)	to become	two molecules of steam which condenses to form two molecules of liquid water.
---	------	---	---------------------------------	--------------	---

Or, in plumbing chemistry "short-hand": $2H_2 + O_2 + \text{heat} = 2H_2O$ (Steam) or 2 molecules of water (H_2O).

Mixtures

IN considering the composition of plumbing materials, it is vital to remember that elements can also exist together in simple mixtures, which are quite different from chemical compounds.

Sand stirred into water forms a mixture. The sand particles do not chemically unite with the water, but "float" in suspension in it. The

A. L. TOWNSEND, under the heading, "THE MAKE-UP AND BEHAVIOUR OF PLUMBING MATERIALS," this month deals with the Chemical Composition of Matter and the reduction of Metallic Ores.

sand can be clearly seen in the water, and if the mixture is allowed to stand, the tiny sand particles will settle at the bottom of the container, leaving clear water above.

Whatever the proportions of sand and water mixed together, you would still have a mixture. Notice how this differs from a chemical compound, in which the constituents are present in definite and unalterable proportions.

Solder is a mixture of lead and tin

in proportions differing according to the purpose for which it is to be used.

Concrete used in building work is a mixture of cement, sand and coarser material called aggregates. When the concrete is set, the sand and aggregates are clearly visible, and if the concrete is crushed they come apart and can be separated. Notice how this differs from the chemical compound, where the constituent parts lose their individual qualities in the new substance that is formed, and cannot afterwards be separated by such mechanical means as crushing.

Mixtures, then, have the following characteristics:—

- i. No new substances are formed although the mixture may have somewhat different properties from

continued page Nine



Luxurious home heating... with THE RYAX WARMHOME SYSTEM

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of the RYAX WARM-
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- Warmhome Firebricks
- Four Warmhome Radiators
- Twelve complete Warmhome Radiator Brackets
- One Ryaland Noxi Circular Pump
- One "Ryax Warmhome" neon Control Switch
- Warmhome Towel Rail complete with Control Valve.

The boiler is suitable for installation behind any normal standard 16" open fire. It has sufficient output for the four radiators and one towel rail. and in addition will give an ample supply of domestic hot water. The cost of installation is approximately £160/170 complete.

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from page seven

Make-up and behaviour of plumbing materials

its ingredients. For example, a concrete wall is very different from its ingredients of sand and aggregate. These ingredients have, however, in no way changed; they have simply been stuck together by cement.

- ii. The proportion of ingredients in a mixture can be varied.
- iii. The ingredients of a mixture are not chemically combined, and are each visible in the mixture.
- iv. The ingredients of a mixture can be separated mechanically; that is, without chemical means.
- v. Heat is not essential to the making of a mixture. Although lead and tin have to be heated to make them melt and mix, no such heat is needed to mix concrete, or linseed oil and whiting putty.

Reduction of metallic ores

THROUGH the ages, metallic elements in the earth's crust have chemically combined with other elements, usually oxygen, carbon or sulphur. In this way, new substances have been formed which are generally rock-like in character, and are called metallic ores, though in this state they do not resemble metals at all. It is from these ores, however, that metals are obtained. The process by which they are extracted is called "reduction," and is a special and important kind of chemical change.

First it is necessary to understand the make-up of the ore. It may be mixed with earthy matter and other material which does not bear metal, and these waste substances are called gangue (pronounced gang). Before anything else is done, the ores are crushed and the worthless gangue separated from the parts that are rich in metal.

Metallic ores may be oxides, carbonates, sulphides, or sulphates, according to the substances with which the metal has combined.

Oxide ores are metal plus oxygen.

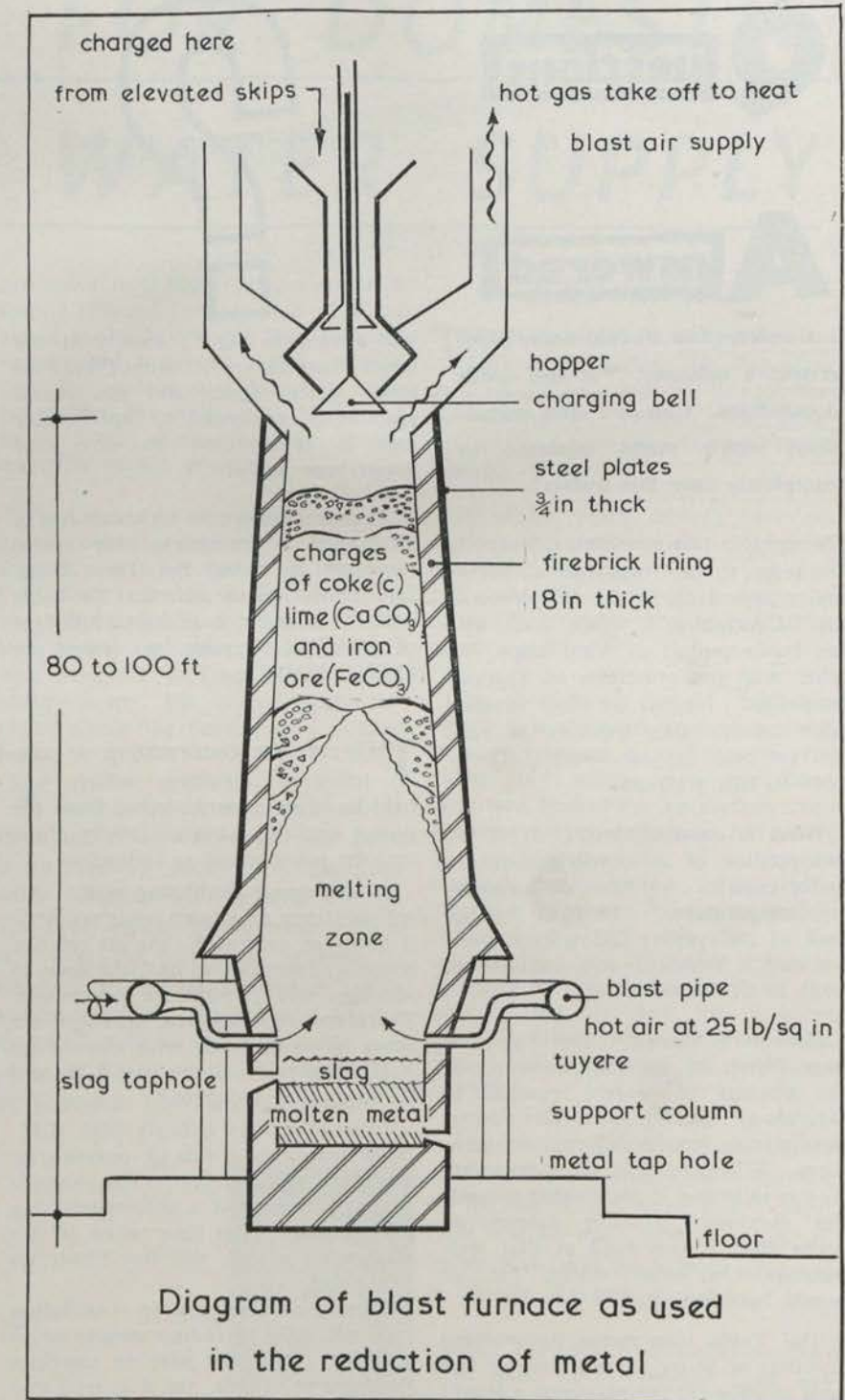


Diagram of blast furnace as used in the reduction of metal

(see text)

Carbonate ores are metal plus carbon and oxygen.

Sulphide ores are metal plus sulphur.

Sulphate ores are metal plus sulphur and oxygen.

Table A illustrates the chemical composition of some of the ores of

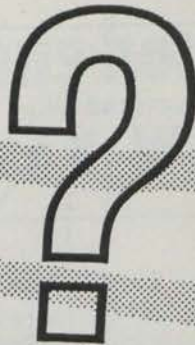
the more common plumbing metals.

One can readily work out the composition by using chemical shorthand together with the above information. For example, aluminium, it will be seen, is obtained from an ore called bauxite. This is a hydrated aluminium oxide. "Hydrated" simply

continued page twenty-seven

Q

uestions



A

nswered

Each month this column will solve some of the everyday problems of the plumbing and heating engineer when our consultants deal with queries directed to "Questions Answered." All queries will be replied to and the most interesting published.

Condensation on cold water pipes creates a nuisance. It also spoils decorations. Can you offer suggestions which might minimise or completely cure this bother?

IN reply to this question, it is apt to refer to our two Special Survey topics appearing in the July issue of the "Contractor." One dealt with the fundamentals of Ventilation, the other with the principles of Thermal Insulation. Neither of these touched upon condensation troubles as such and yet both suggest possible alleviations to this problem.

What is condensation? It is the precipitation of atmospheric moisture under certain conditions of **humidity** and **temperature**. Dewfall in the cool of an evening following upon a hot day is a well known example of large scale condensation.

How is it caused? The Table on page fifteen of the July issue shows the amount of water required to saturate air with aqueous water vapour (an invisible gas) at different temperatures. When air at a given temperature is saturated it means that it holds the maximum possible amount of water that it can hold at that temperature. In other words, the air would be 100% humid.

The Table also shows the varying amounts of water vapour that air can hold at different temperatures. It will be seen that at higher temperatures its water-holding capacity increases. At 62°F. for example it can hold twice as much water vapour as it can at 42°F.

The converse is true. Water at 42°F. can hold only half as much as maximum as can air at 62°F.

Therefore, supposing air at 62°F. was at or near saturation and then it

was cooled to 42°F., clearly at the lower temperature it cannot hold so much water vapour and the excess amount is condensed to liquid water and is precipitated on any cold **impervious** surface.

The temperature to which air has to be cooled to precipitate this excess moisture is called the **Dew Point**. Incidentally, please note that the Table referred to above should read "Weight of WATER Vapour in grains per CUBIC FOOT, or Ft.³."

THE cure for condensation or contributory measures which will help to effect a cure, derive from the points outlined above. Briefly these may be summarised as follows:—

1.—**Adequate ventilation rate.** Air will continue to absorb moisture until it becomes saturated. As its relative humidity increases so its inclination to absorb more moisture decreases. Therefore condensation troubles are more likely to occur with air at high R.H. than with air at low R.H. and "hungry for moisture."

Even if air has a fairly high R.H., large quantities of this air passed over moisture will absorb it. The example of good drying on a dull windy day as opposed to the time taken to dry clothes on a dull, still day illustrates this point.

Clearly an increase in ventilation rate will help to reduce condensation troubles. It is not easy to convince the layman of this, yet it is true that a moisture laden newly built house will dry out more quickly, even in damp weather, if all windows and doors are opened to accelerate air movement through the building. And what is good for new buildings is good for existing ones too.

2.—**Adequate air temperature.** It has been shown that air at higher temperatures can absorb and hold more water. It has been shown that

condensation is due to the lowering of air temperature to saturation point.

Clearly, an increase in temperature will increase the water-holding property of air and thus reduce tendency to precipitate condensation.

3.—**Avoidance of impervious surfaces.** Precipitated moisture from air will settle on any surface. If the surface is absorbent, e.g., papered plaster walls, the condensate will be absorbed into the surfaces of these walls and will be re-absorbed back to the air from the walls as the air temperature later increases or its R.H. decreases.

Where condensation troubles persist or are to be expected, impervious surfaces such as painted walls should be avoided.

4.—**Prevention of local air cooling.** Air at any temperature will retain its moisture content unless the air is cooled to dew point. If air is permitted to contact cold surfaces, e.g., cold water pipes, then local cooling and local condensation will occur.

Applicable

NEITHER 1 or 2 above might not be conveniently applicable cures. 3 above certainly will not be in the case of a water pipe otherwise there will be water on its surface and not from condensation!

The cure in this case is simple—prevent air contact with the cold pipe surface. This is easily and effectively done by applying **thermal insulation** to all offending pipework.

The same principle could be usefully applied to unavoidable cold impervious wall surfaces. If these are thermally insulated from the cold wall mass, the surface temperature will not be so low and the cooling

continued page thirty-four

BOILERS FOR DOMESTIC HOT WATER SUPPLY

BOILERS for hot water supply installations can be primarily divided into two classes—those of the fire-back type suitable for fitting into open fireplaces, and the independent type which is free standing and usually installed in a tiled alcove or small recess.

The choice of a boiler will, of course, depend on many factors, e.g., output of hot water required; the class of water to be used in the system; type of fuel to be used; period between re-fueling, etc.

If the boiler is to be used in a soft water area, such as may be the case in many cities and towns, precautions must be taken to prevent corrosion occurring and so resulting in rust-coloured water flowing from the taps.

The extent to which this corrosion may occur will depend to a large degree on the metal the boiler is made from. In the case of the small fire-back boiler we have a choice of copper or welded steel. Copper, however, is invariably selected, so corrosion problems do not normally arise with this boiler.

Not so, however, with the independent boiler—here we must decide between cast-iron or welded steel, copper being out of the question owing to cost, and other factors.

Cast-iron is the traditional choice as it is considered by many to be less susceptible to rusting and the corrosive action of the fuel, but nevertheless rusting will still occur to some extent and the only satisfactory way to prevent it is to specify that the boiler will be supplied bower-barffed.

Bower-barffing

BY this we mean that the cast-iron boiler will have had a magnetic oxide coating formed over the surface, so making it very resistant to rust. This process is carried out by heating

the boiler to a high temperature in a special furnace for a period of from six to twelve hours and then blowing superheated steam or carbon dioxide over the surface so that a fine scale (somewhat like mill scale) is formed in the pores of the iron and further corrosive action prevented.

The success of this process and the quality of the protection provided will depend to a large extent on the time the boiler is in the furnace, and on the temperature in the furnace. If this is not controlled, the thickness and hardness of the coating will suffer—hence the occasional complaint about the failure of a barffed boiler.

In hard water districts, rust trouble does not, of course, arise, and there is no need to specify bower-barffing when selecting iron or steel boilers. The lime already in the water puts a skin over the iron and protects it, although at the same time it raises another problem: the removal of the lime at intervals. All boilers for use in hard water areas must therefore be provided with cleaning doors.

the author



JOHN G. BOLTON, Lecturer in Plumbing and Heating at the College of Technology, Bolton Street, Dublin.

Favourites

THERE have been many sizes and shapes of boilers in this class, one recalls to mind the copper toe-boiler and its partner, the boot-boiler—long time favourites in the old kitchen range.

In recent years, boilers have become more standardised. The modern open fire back-boiler being simply made of quarter-plate copper to form a rectangular box brazed at the seams.

For better-class work, especially where it is intended to work a towel rail or radiators in addition to providing hot water, there are many improved boilers on the market, each claiming larger output of hot water due to the provision of corrugated surfaces, fins, and so forth, which present a larger surface and so absorb more heat from the fire. To achieve this result the boiler is usually designed to occupy the whole of the back of the fire, and the grate is normally fitted with a front extension plate, etc., to assist in overnight burning.

The heat to the boiler from the fire is controlled by means of a damper on the top of the boiler flue. Most fuels can be used with this type of boiler grate, but the highest efficiency is usually obtained with coke.

Most fire-back boilers are provided with side inlet tappings, and are generally reversible to allow for the pipes to enter from either side. This type of inlet also gives better protection from soot corrosion to the flow and return pipes. Soot, when slightly damp—an occurrence which may happen due to condensation when the fire is out—has a very corrosive action on copper, particularly

continued page thirty-three

Eleven

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MODERN TRENDS

THE Editor has invited me to comment on modern trends in baths, showers, washbasins and w.c. pans. Before doing so, I take this opportunity to make brief reference to the terms commonly used to describe these things. For instance, one well known manufacturer in a lavishly produced catalogue refers to them as "sanitary appliances." What a totally inadequate and inappropriate description of the gracefully curved and delicately coloured products which will adorn the homes of this new age. And yet, what other group heading can he give them?

It is indeed difficult to find a description which would be acceptable to manufacturers, plumbers and the public alike. Perhaps readers have their own views in this matter and I am sure that the editor would welcome them.

The real difficulty lies in the fact that we are ready to refer without embarrassment to the plain straightforward uses of the bath or washbasin, but not of the w.c. pan or the bidet. However, we must be careful not to put ideas into people's heads, otherwise the current tendency to label articles with classification symbols might cause the w.c. to be called an "Excretory Disposal Unit" which I am

afraid would be less acceptable than some of the cruder descriptions now in common use!

May I leave the matter with you for reflection and, I hope, suggestions?

Tribute To The Manufacturers

Now to deal the real purpose of this article. First, I pay tribute to those manufacturers who are constantly trying to improve the design and quality of their products, even although the present demand is such that they could sell without difficulty baths, washbasins and w.c. pans of less attractive appearance and of poorer quality.

There has also been a tremendous improvement in presentation and publicity which has, at last, made the general public conscious of the importance of the bathroom in the modern conception of standards of living. In fact, in an advanced country like America, the motor car is beginning to lose its importance as a status symbol and is being replaced by the home, in which the bathroom is becoming the showpiece.

The bathroom

THERE is now a scintillating array of baths manufactured in glorious hues. I find the sales appeal description of the colours fascinating. One

continued page fifteen



This special survey—the second in a series on important aspects of the plumbing and heating trades—has been compiled by the well-known authority, James M. Haig, A.M.I.P., A.M.I.W., R.P. (General Secretary, Registered Plumbers' Association).

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SANITARY WARE

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catalogue refers to Corallin, Ivoire de Medici, Ming Green and Regency blue. Such words conjure up pleasant, warm thoughts of subtle hues.

Whether they be cast iron, pressed steel, fibre glass or plastic, the best baths are beautifully designed and finished. Controls of superb shapes are conveniently placed. The new designs have chromium-plated safety rails, specially designed for children and aged, which can be adjusted to any position, three tap positions, wide flat bottom and shallow depth.

The range of washbasins is equally entrancing and the new shapes no longer present problems of cleaning around taps which was so frustrating on the old basins. The new style vanitory basins, set in a formica surround, are extremely attractive and can be made to fit in with any decorative scheme. A manufacturer of vitreous china washbasins now produces a basin of ample proportions which has a similar function. It can be obtained in duo-tone with a choice of colours.

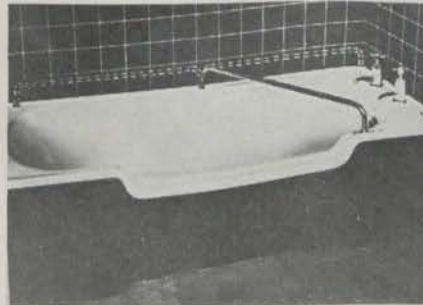
The bidet is at last finding some favour in the British home and perhaps will become standard equipment a few years hence. For personal hygiene, particularly for females and invalids, it has much to commend it. In the new type there is a safe hot and cold spray and the seating rim is heated by hot water.

An innovation worth developing is the idea of a bathroom laundry. Dirty linen has no place in the kitchen which is used primarily for the preparation of food. Why not then a bathroom fitted with a cupboard in which may be stored the washing machine, spin dryer with perhaps the addition of a heated drying cupboard?

Plumbing in the bedroom

THE shower cubicles and vanitory units, mentioned above, may in time become standard equipment in the family and guest bedroom. One manufacturer is projecting a unit in formica which will contain dressing table, drawers, cupboard, wardrobe and washbasin. A sensible, practical trend, well in keeping with the new

continued overleaf



● A new product of Allied Ironfounders Ltd., manufactured by Planet Foundry Co. Ltd., Audenshaw, Manchester, is the Vogue Royal Bath featuring a low front and an alternative-position safety handrail, specially designed for invalids, elderly people and young children which steadies and supports the bather.

The bath itself is shallower than most. A special anti-splash roll formed on the inside of the dropfront helps to prevent a wet slippery bathroom floor and the resulting increased width of the roll provides a comfortable seat. The overall height with a standard 1½" seal trap mounted above the floor is 1' 8¾" (above).

The special space requirements of architects planning residential quarters for students, have led to the design and production of an entirely new washbasin by Allied Ironfounders Ltd., of London, known as the College Basin, and made of cast iron with white Duramel finish (below).

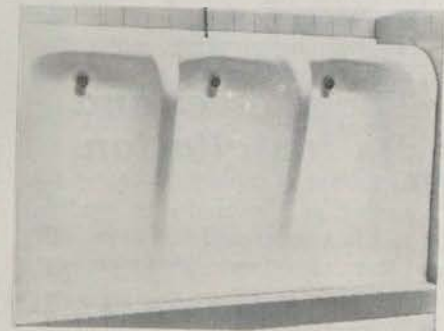
The basin, developed at Falkirk by M. Cockburn & Co., Ltd., a subsidiary of Allied Ironfounders, has a deep flat bottomed bowl and wide surround, making it especially suitable for the washing of clothes.

The overall length is 30" with an overall width from front to back of 17". The depth of the basin is 9½".



● The "Ovadale" pedestal washbasin indicates a new trend with its concentric oval shaped basin.

The "Ovadale" pedestal, from Nua-style Series 3, is one of several newly designed pieces of sanitary ware by Armitage Ware Ltd. It is made of vitreous china and is available in primrose, orchid, grey, green, coral, fawn, cream, turquoise, sky blue and Armitage blue.



● Recently moulded in Perspex at the Dunstable, Luton Road works of Thermo Plastics Ltd., a new 'U' Stall. Illustrated literature and price list will be available from the manufacturers in the near future.

Other products from Thermo Plastics in Perspex are their acrylic sinks and draining boards, ranging from 36" x 18", available at £4/7/6 per single unit to the trade to the Perspex sink and double draining board of 63" x 21" overall measurement at £7 19 0 per single unit.

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SANITARY WARE

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attitudes toward design and decor in the modern home.

The W.C. compartment

THERE is a need for the modern w.c. compartment to be insulated against sound, and the fittings therein as quiet as possible in operation. The gushing noise of a cistern flushing and closet emptying is annoying, especially at night. The new low level cistern and siphonic w.c. pan reduces noise to a minimum, and if the floor is also insulated the compartment is satisfactory in every way.

Building Research Digest No. 7 deals at length with bathroom and w.c. noises and suggests preventive and remedial measures. The Digest should form part of every plumbers' library.

There is now a simple system for ventilating the w.c. pan by an extract fan discharging into the open air. This appears to be quite a sensible idea and it is claimed that it removes a potential source of danger caused as direct result of the flushing action, which apparently produces an aerosol containing bacteria. The extract fan can be operated by a ceiling switch or a door operated switch, the latter being preferred because it ensures that the fan will be working while the w.c. is being used.

The shower and its installation

THE shower is rapidly becoming regarded as a necessity in modern life. It is a water and fuel saver and has other advantages too numerous to mention.

It is the installation of the shower, however, which finds even experienced plumbers sometimes at fault, and a few words of caution might not be amiss at this point. There are certain factors essential to the functional success of a shower installation. The shower rose should not deliver less than $\frac{1}{4}$ and not more than 2 gallons per minute. To achieve this on low to medium pressure, the shower installation rose should be 1", 2" or 3" diameter pinhole type, according to the volume required.

Maintenance of the desired temperature without fluctuation is even more important. In a small domestic installation, this can be achieved by mechanical means when the propor-

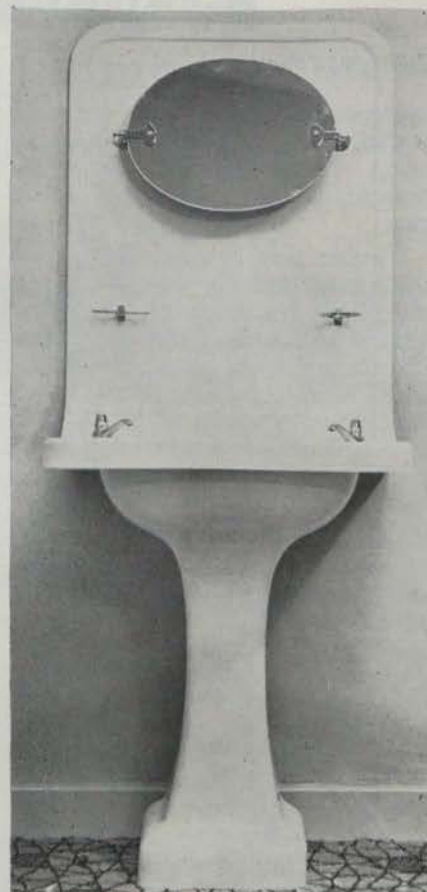


● A revolutionary style for vanity unit has been introduced with the designing of the new Fishlow basins, for bedrooms and bathrooms. Supplied complete with template, polished stainless steel surround, sealing strip, clips, chain stay assembly and installation instructions it presents an easily fitted job.

Each basin is available pierced for either pillar or combination taps, with or without pop-up waste. An integral overflow is also incorporated. The overall dimensions are 15 $\frac{3}{8}$ " x 24 $\frac{3}{8}$ ". They are available in white, cream, green, blue, primrose and coral pink (above).

Also coming from the Birmingham factory of Fisher and Ludlow Ltd., is a new model "L" range of stainless steel sinks which have been expressly designed for smaller kitchens and offers a choice of four attractive sizes from 18 $\frac{1}{2}$ " x 36" to 18 $\frac{1}{2}$ " x 72" (below).

Back ledges are pierced 7" centres to take pillar or mixer taps. Bowls are available pierced either for 1 $\frac{1}{2}$ " standard waste fittings or 3 $\frac{1}{2}$ " to take basket strainer waste or an electric food waste disposal unit.



● Pictured here is a wash basin, splashback and pedestal manufactured by K. D. Reinforced Plastics Ltd., at their factory in Abbey Mills, Collooney, Co. Sligo.

The principal lines being manufactured by K. D. Reinforced Plastics Ltd., at present are the beautifully finished fibre glass sinks and wash basin units, which are completely new to Ireland.

If required they can be supplied with a timber unit consisting of presses, cupboards, etc., in which they may be incorporated. The units are indestructible and are available in nine bright colours—any housewife's dream.

This type of kitchen sink was introduced into Ireland two years ago following a visit made by the directors of the firm to the London Building Exhibition where they saw fibre glass units of this kind on view. After extensive research and personnel training abroad the Sligo company launched into this field. A move that has proved very successful.

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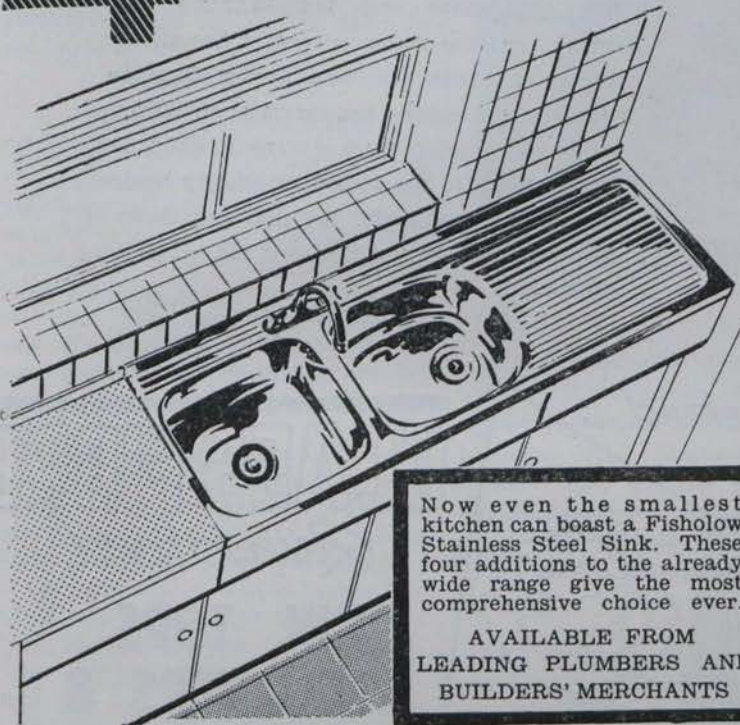
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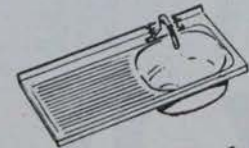
stainless steel sinks for small kitchens



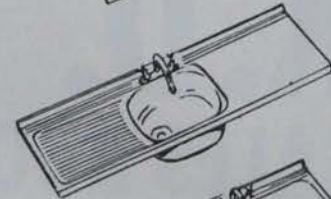
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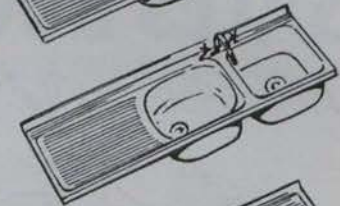
MODEL L
18½" x 36"



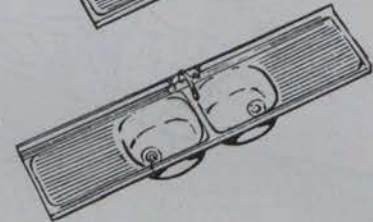
MODEL WL
18½" x 54"



MODEL DL
18½" x 54"



MODEL TL
18½" x 72"



FISHOLOW

Basins fit into the plan



These **FISHOLOW** Basins have started a new fashion in lavatory basins . . . combining contemporary design with character and distinction. The modernly styled basin, made of finest vitreous porcelain enamelled steel, is surrounded by a polished stainless steel rim.

It brings the bathroom right up to date, and gives extra level space for toilet articles. As a dressing table with running water, this Basin adds elegance to the most superior bedroom, and its neatness and simplicity of installation enable it to be fitted into any style of furnishing.

THE BASINS have integral overflows and are supplied complete with Template, Polished Stainless Steel Surround, Sealing Strip, Clips, Chain Stay Assembly and installation instructions. They are available pierced for standard pillar taps, 4" centre mixer taps or modern combination taps and for standard 1¼" waste fittings. Overall dimensions 15½" x 24½"

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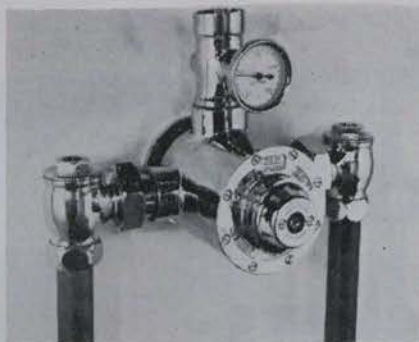
from page sixteen

tions of hot and cold water may be controlled by two stop valves, or by a mechanical mixing valve. In both these cases it is essential that the supply pressures shall be nominally equal, i.e., both shall originate from the cistern. It happens all too frequently that the hot water connection is made from a gravity system fed by a storage cistern and the cold water from the mains. Apart from the unequal pressure it is bad practice and prohibited in many areas because it could give rise to contamination of mains water.

In some installations multi-point gas water heaters having mains water supply are used, in which case, of course, the cold water to the shower mixer fitting must also come from the mains supply. Every gas water heater has a mechanism which will cut out the gas as soon as the hot water flow is reduced to a certain point and unless the heater is adjusted and dimensioned correctly, the shower installation will not work. Temperature stability by mechanical mixing depends on there being no other draw-offs from the system when the shower is at work. Alternatively, the dimensions of the hot and cold water supply pipes throughout the house should be adequate to ensure that the shower fitting is not starved of water if any other appliance is being used, i.e., a mixing fitting at the kitchen sink. Quite obviously the set temperature of the shower fitting will vary as soon as water is drawn at a second or third point in the house.

A thermostatic mixing valve may be used to compensate for fluctuations of pressure and therefore of temperature in either supply. If such a mixing valve is used, it is not essential that the supply pressures are equal in the hot and cold supplies. Thermostatic valves however, do not respond well to low pressure conditions. An absolute minimum of 5ft. head of water, measured to the shower rose is needed, and the target minimum might well be 10ft., particularly in private houses.

continued page twenty-one



● Gummerys Ltd., of Rotherham, are manufacturing a number of interesting fittings at their Effingham Valve Works. Typical is the attractive R749 Security Thermostatic Mixing Valve illustrated above.



● Two of the latest bathroom sets manufactured by Twyford Ltd., of Stoke-on-Trent, Staffordshire, in 'Cerament' vitreous china are illustrated here.

Available in white and six colours they comprise the "Sola" pedestal wash basin—23" x 17" and the 2668P/3 washbasin which measures 25" x 20"; the syphonic action Unitas-Silent W.C. Suite and a bidet.



● A sanitary-ware unit of advanced design only recently introduced into Ireland is marketed by Shires (Ireland) Ltd., Stanaway Drive, Cabra, Dublin. Called the "Uni-Lynx" it is the first close-coupled toilet suite in the world to combine a plastic cistern with a pottery wash-down pan.

The Shires "Hydromatic" action has been incorporated. This is a design of ducts and channels which directs the water in correct volume to the right places to effect controlled maximum flushing efficiency.

The "Uni-Lynx" is extremely quiet in operation and is fitted with the non-corroding Shires "Kingfisher" polythene syphon mechanism, which ensures a positive action flush first time. Cistern capacities are 2, 2½/3 gallons.



● A new one-piece vitreous china unit incorporating a central wash basin with soap recess and slot overflow, and flat 'dressing table' surfaces on either side is being marketed by Ideal Boilers Ltd., of Hull. Called the "Princess" the unit is available in the five 'Standard' colours, and in luxurious duo-tone, combining Pearl Grey with each of the other four colours.

The World's **FIRST** All-Plastics Cistern In Pastel Colours - **VIKING**



Years in advance, only the 'VIKING' provides these distinctive features . . . whisper quiet, finger-tip flush . . . colourful, elegant, streamlined design . . . light . . . tough . . . won't crack or chip . . . won't corrode, and is perfectly hygienic.

The 'VIKING' works so smoothly that even the youngest child can operate it. Once filled, it requires no attention . . . no replacement . . . no painting; it cannot rust and so eliminates stains and unsightly rust marks on the walls and w.c. pan.

The 'Viking' is made from 'TUFOLENE', the rich-in-colour plastic . . . tough and virtually indestructable.

Its hygienic hard-gloss surface needs only an occasional wipe over to keep it clean and sparkling.

Another unique feature is the 'FLOMASTER' syphon which produces an extra powerful flush, ensuring complete clearing and cleansing of the B.S. W.C.

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SANITARY WARE

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With mechanical mixers the pressure might be as low as 2 feet head.

The shower as a complete unit

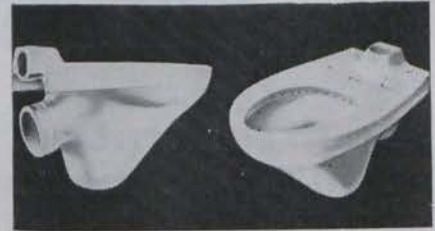
THERE are now available completely prefabricated shower cabinets made from metal or glass fibre. They can be set anywhere in the house—even in the bedroom—and only need connecting up to the hot and cold water supplies and waste pipe. They can be purchased in dismantled sections for ease of transport and moving to their final position. I particularly like the model which contains a small washbasin, soap recess, mirror and spotlight. It is possible that a shower cubicle or two might well be standard equipment of the house of the future. It could be in or adjacent to the kitchen or garage.

continued overleaf



● The 442 "Exe" wash down closet comes from Johnson Foreclay Co., Ltd., Excelsior Works, Cliffe Vale, Stoke-on-Trent, England, and is fitted with a unique cleaning eye and brass inspection cap visible at the right hand side of the "S" trap.

15" high, the closet has seat lugs and is solid back to wall with a vertical inlet. It is suitable for plastic seats to B.S. 1254. An additional model, the 443 "EXE" has hardwood seat pads fitted instead of the seat lugs.



● A new wall-mounted closet made of vitreous china has been introduced by Ideal Boilers and Radiators Ltd., of Hull. It is the 'Standard' Sanwall 12" model intended for primary schools, children's hospitals, etc.

In shape the Sanwall 12" is similar to the recently introduced full size model. Differences are that the rim is tapered towards the front of the bowl and that the inlet is raised. It is available with either a back horizontal or top vertical inlet.

The Sanwell can be mounted on a concealed cast iron chain-bracket for building into the wall and floor or the cast iron bracket only for building into the wall.



STAINLESS STEEL SINK BOWLS

Obtainable in various sizes, with or without overflows, fitted with standard or basket type waste. Single and Double Bowls are easily fitted and are adaptable to any surround desired. Suitable for Private Houses, also Corporation and County Council House and Flat Schemes.

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SANITARY WARE

from previous page

Maltreatment of plumbing fitments

WHENEVER I am able—all too infrequently these days—to visit building sites to look at the plumbing, I am sometimes appalled to see baths, basins, w.c. pans, sinks and chromium fittings unprotected from the ravages of building operations. The fitments—particularly baths—are often just dumped on the site, and I have actually seen baths out in the open the right side up. After fixing, the fitments are not adequately protected and it is an all too common sight to see their surfaces speckled with plaster and paint and the inside of a bath littered with screws, nails, pieces of cable and wood chippings. On one job I visited the front edge of the w.c. pan had been scratched by the boots of some person—or persons—who found it a convenient substitute for a “hop-up.”

This outrageous treatment of finely

finished articles which left the factory unblemished is criminal and a drastic form of preventive action is long overdue. Every plumbing specification should contain a rigid clause to ensure, under penalty for non-compliance, that every fitment and fitting should be protected against damage.

The plumber himself is often to blame, particularly in the matter of chromium fittings, on which unsuitable tools have ruined the plating.

I would add that this careless treatment of plumbing work is not confined to any one part of the country. It is unfortunately, common to all parts and is a blot on the building trade.

Suggestions for the future

IF I can offer some suggestions for the future, I would first stress the importance of the shower-bath and its extension to other parts of the house, rather than just the bathroom.

Secondly, the corner position for bath taps might be encouraged, because it certainly simplifies the fixing of the service pipes. We might also agitate for the elimination of the overflows from baths, basins and sinks.

Perhaps the manufacturers will consider providing some form of film to protect glazed surfaces until the house is ready for occupation. It would justify the increased initial cost, and the householder would be assured of his goods being in factory condition when he took them over, and not, as might well be the case to-day, already subjected to the equivalent of years of hard wear.

Finally, in this enlightened age, we should be turning our attention to the flushing valve as a natural progressive step forward. I would add the rider that the flushing valve should only be permitted subject first to the removal of all clanking cisterns in w.c.'s adjacent to bedrooms in the hotels of this country!



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TRADE ENQUIRIES INVITED.

*The second article of a two-part series by
W. H. JOHNSON on . . .*

planning a shower

THE substance of last month's notes may be described as the basic technology, which a brief study of special cases will not alter, though it can introduce some complications. But even the complications are resolved by attention to principles which are already well known, so an attempt is made here to show not only the solutions, but the reason for them.

The Mains System.

Rule 7 last month referred to a single exception to the regulation that all supplies must be cistern fed. This, in the bylaws, means that a common service pipe may feed a water heater of less than 3 gallons capacity, and the cold side of a mixer whose hot water comes from the heater (Fig. 7). The most common form of such a heater is the instantaneous gas water heater, in which, generally, the gas valve is opened by releasing the water pressure through the opening of the outlet; and closed as the closing of the water outlet restores the water pressure.

Thus, there is a critical point in flow restriction which must not be reached during working, so the object must be to select both the mixing device and the shower rose for their free-flow qualities. They must allow the hot water to come away from the heater in a quantity greater than the minimum rate of flow. To take the subject further than this would lead to particularising, and it is safer to consult the appliance specialists. But here is a tip. You can improve the flexibility of an installation by reducing the gas rate to the heater, hence the hot water temperature, hence the proportion of hot water in the mixed water. And since the total volume of mixed water is decided by the installation itself the manipulation will increase the volume of hot water taken.

Multiple Showers.

The general notes were compiled with the single domestic shower strongly in mind. For a range of showers there is one possible relaxation, and more than one danger signal.

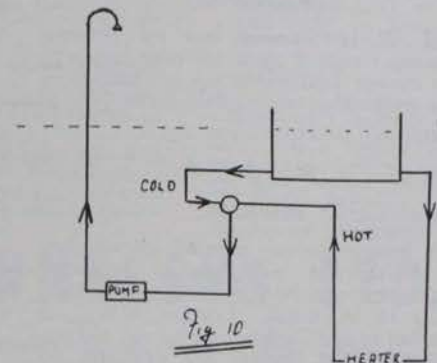
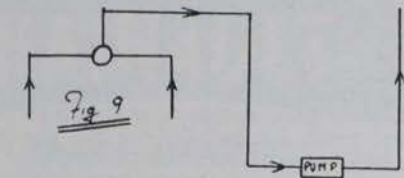
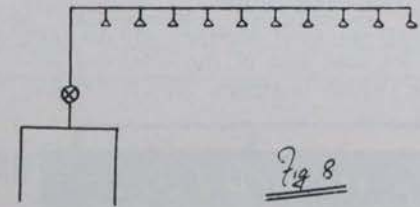
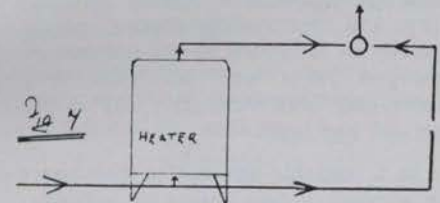
First, the relaxation. The users cannot collectively achieve the fussiness of a single user, hence the minimum head for some (but not all) thermostatic mixers may be reduced to 5 feet, but positively no less. The target figure should be higher.

Method of volume control is important. The easiest one to treat is the institutional or "run-through" system, in which there is only one flow control valve for the lot (Fig. 8). In such a case the number of separate roses is immaterial, and only the total volume of water discharged matters. There is, of course, a single mixing point, and the method of mixing may be determined by the total volume required. Mechanical mixers in very large sizes are rare, so the choice may rest between the elementary mechanical method of two stopvalves, and the thermostatic mixer. Rules (8) and (9) apply in making the choice.

When each shower in a range has its own volume control, i.e., stop valve, the considerations are less simple. First, what is the "load factor" or "diversity?" On an average will all the showers be in use together, or half of them, or a third?

The importance of this information (or guesswork) lies in the fact that, in sizing the essential equipment you should aim to satisfy the average—most of the people most of the time—at the possible expense of the outsiders.

For example, if the average use in a range of eight is six showers, the important calculations should assume that it is a range of six. At times there may be eight or four in use, but the relative disproportion from the norm is less than if, say, four were in use in a system based upon the full eight.



continued overleaf

Temperature control is a ticklish problem, too. A thermostatic controller to each shower in the range is undoubtedly the best, though, of course, the most expensive. Individual mechanical controllers must be inefficient by the guiding definition, that there are unquestionably other draw off points on the services to cause pressure fluctuations. This condition may be alleviated to an extent by deliberately oversizing the manifold pipes (and lagging the hot pipe), thus creating a reservoir at the inlet to each mixer.

Group control of temperature by mechanical means is seldom satisfactory, and thermostatic control, which usually is, is limited in the number of grouped items one controller will serve and keep control. Six is the normal top limit.

In a laudable attempt to give users in a range a free choice of temperature, it is sometimes proposed to reduce the hot temperature to, say, 120°F. with a thermostatic controller; to feed this water to mechanical mixers at each shower; and to take to the cold side of the latter the service which supplies the thermostat

from previous page

planning a shower

also. In rare cases this arrangement works, but it must be written off as bad practice because of the many cases when it does not. The final cold water pressure, being higher, may either stop the hot flow through the rose restriction, or set up oscillations and therefore temperature fluctuations.

For very extensive installations the alternatives are individual thermostatic control, thermostatic control in sub-groups, or even the generation and circulation of hot water only, at 105°F. Each installation is capable of having special features which may influence the final choice.

When any form of group temperature control is considered, the physical planning of the showers should take "dead leg" into consideration, the advantage of ring main over long spur, and of feeding a manifold near its middle, not at one end; and whether lagging is worthwhile.

The Use of A Pump.

Sufficient has been said about minimum heads, and heads generally, to make it clear that cistern fed systems present a recurring problem in this country, and if the cistern could be hoisted up a flag pole above the house we should have an easier life. The use of a pump is a more practical solution, however, and there are four classes of installation in which it is the proper solution.

1. Where the customer demands a brisk shower from a system which has a low head quite incapable of forceful delivery.
2. Where conditions, though suitable for mechanical mixing, are below the minimum for thermostatic mixing, and the latter is required by the customer.
3. Where simultaneous and adequate delivery is required from different vertical levels in a low pressure system. A body spray (needle shower) with overhead rose is a typical case of this.
4. Where there is no head at all, or a negative head, measured from cistern to shower rose.

When choosing a pump for any of

these duties, the rating must be considered from two angles: what volume it will deliver, and at what head.

The rated volume must not exceed the volume which the system will deliver freely to the pump inlet. It is the function of the pump to push, not pull, and if arranged otherwise troubles like cavitation may be set up. Some "pull" is possible in urgent cases, but the expert advice of pump and temperature controller manufacturers should be sought at the planning stage.

In deciding the rated head one can afford to be generous, allowing, say, fifteen to twenty feet head on top of the compulsory head for vertical lift and resistance of pipework, rose, etc. If a pump performs too vigorously the water may be throttled on the outlet side without harming the pump.

The installation of a pump on a normal (i.e., positive head) system presents no special problems. Though it is not wrong to have two pumps, one on each supply before mixing, such a practice is expensive, and desirable only in cases so extreme as not to deserve mention. A single pump on the mixed water will be fixed in the way shown in Fig. 9.

When pumping a negative head system, the principle already mentioned, that the pump is not there to pull, must be maintained. This means in practice that the cistern or source of pressure must feed the mixer by gravity, and the mixed water must then flow downhill to the pump (Fig. 10).

There occurs sometimes the case in which the hot and cold water pressures are very different, and would benefit from equalising-cisterns on different levels, for instance. In such a case the low pressure supply (it may even be at negative head to the shower) only may be pumped before mixing, but this is a five star exercise, not suitable for beginners. The factors accountable in reaching equality, and the safeguards against the contents of either cistern finishing up in the

continued opposite page

in brief . . .

NEW CATALOGUE

Oil Burner Components Ltd., Vines Lane, Droitwich, Worcestershire, have issued a completely revised 224 page catalogue for the 1961/62 heating season.

Notable additions are sections listing a comprehensive range of oil, gas, and solid fuel boilers, radiators, and fittings. Control panels are included for the first time together with the most complete range of circulating pumps ever listed and stocked by a single organisation.

★ ★ ★

RESIGNED

Mr. R. H. Stewart has for personal reasons resigned from his positions with the Powell Duffryn Group of Companies. His resignation took effect from July 31 last.

★ ★ ★

MANUAL

A comprehensive manual giving data on the thermal insulation of pipework has been published by Stillite Products Ltd., 15 Whitehall, London, S.W.1., a member of the Turner and Newall Group. Copies of the Manual are available on request.

TENDERS

BALLINASLOE

In connection with the building of a new dining hall and renovations to the existing Hospitals at the Pines Division, Ballinasloe Mental Hospital, tenders have been invited by the Hospital Board from heating contractors for the mechanical installations.

Drawings and specifications may be inspected at the offices of the Consulting Engineers in Dublin, Messrs. J. A. Kenny at 44 Kildare St., or at the office of the architect, J. R. Boyd Barrett, A.R.I.B.A., F.R.I.A.I., 5 Camden Place, Cork, from whom tender documents may be obtained.

Tenders should reach the Chief Clerk, Ballinasloe Mental Hospital, Ballinasloe, Co. Galway, not later than noon on August 26 next.

TRIM

THE Office of Public Works have invited tenders from heating contractors for alterations and additions to the L.P.H.W. heating installation at the St. Mary's Convent, National School, Trim, Co. Meath, in accordance with the plans, specification and conditions of the contract exhibited at the Office.

Plans and specification may be obtained from the Secretary on deposit of £1 refundable on return of the documents. Tenders should reach the Secretary, Office of Public Works, 51 St. Stephen's Green, Dublin 2, by noon on August 24 next.

NORTH DUBLIN

THE latest date for the receipt of tenders by Comhairle Chontae Atha Cliath, for the North Dublin Regional Water Supply Scheme filtration plant has been extended to 12 noon on Friday, September 29 next.

ENNISCORTHY

THE Wexford County Council invites tenders from plumbing contractors for the plumbing installation at the Public Health Clinic, Enniscorthy, in accordance with Plans and Specification prepared by Messrs. Nicholas Mathews and Co., Consulting Engineers, 42 Fitzwilliam Place, Dublin.

Contract documents may be inspected and obtained at the offices of the Consulting Engineers. Tenders must be enclosed in sealed envelopes addressed to the County Secretary, Wexford County Council, County Hall, Wexford, and endorsed "Tenders for Plumbing Installation, Public Health Clinic, Enniscorthy," and must reach the offices of the County Secretary not later than 12 noon on Saturday, September 9, next.

from previous page

other cistern, require the most careful study.

With this exception, the business of fitting a thoroughly satisfactory shower bath is simple enough, whatever water supply conditions one may meet, and an attempt has been made here to cover most of the conditions likely to be met.

To conclude (on a relaxed note), let us think for a moment of the pipe between the mixer and the rose. It is usual to consider that the overhead shower, at 6ft. 6ins., is for men, the shoulder height at about 5ft. is for women, with some reduction in each height for children. It is almost proverbial that you cannot suit everybody, but by using a flexible shower arm you can go a long way towards it. Not just any shower arm, though. It must include some means of fixing the rose rigidly at any height and pointing in the right direction. And as well, the rose end must be easily unfixable, for hair washing.

When calculating the available

pressure head, measure from the rose fixed in its highest position.

There are very few situations so obstinate that they cannot be made, or adapted, to yield a fully satisfactory shower installation.

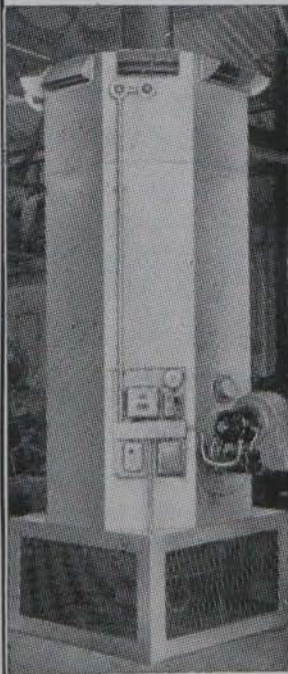
RYAX HEATING

In last month's issue in our report on the appointment of Messrs. P. Donnelly and Sons Ltd., 20 George's Quay, Dublin, as agents for Ryax Heating Ltd., of Manchester, we stated that the approximate cost of the installation of the Ryax "Warmhome" system was £170. The figure is, in fact, considerably lower—approximately £160.

The boiler stocked by Messrs. Donnelly's is suitable for installation behind any standard 16" open fire.

NEXT MONTH

A. L. Townsend will discuss Heat and its Measurement; Thermometers; The British Thermal Unit, and Specific Heat.



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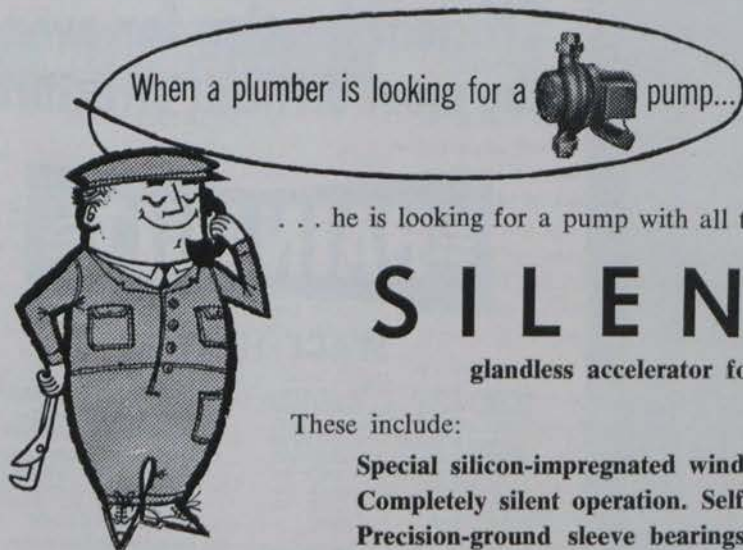
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means that water is chemically combined in the compound ore. More simply, one might say that bauxite is a chemical compound of aluminium, oxygen, and water.

The chemical symbol for this ore is $Al_2O_3 \cdot 3H_2O$. This formula simply states that one molecule of the compound contains 2 atoms of aluminium, 3 atoms of oxygen and 3 molecules of water.

Once you grasp this chemical build up, you can see that if these elements are separated then the metallic aluminium can be removed and processed into sheets and equipment for plumbing work.

The chemical composition of ores of other metals are perhaps easier to follow. Do try to separate them into their constituent parts, for then it is easier to understand how the reduction process works.

Oxygen combines readily with metals, hence the oxide, carbonate and sulphate ores, but under suitable conditions, usually at high temperatures, the oxygen content of a metallic ore prefers to re-combine with some other element, for example carbon.

Earlier it was mentioned that heat could hasten or produce a chemical change, and that there is the possibility of a second chemical change reversing an earlier one.

These pieces of information fit together to explain some of the mysteries of plumbing materials; how they are made and how they may be expected to behave.

Thus, when an oxide ore of a metal is put together with sufficient carbon in the presence of enough heat to bring about a chemical change, the oxygen content of the ore will leave to form a new compound with the carbon. The molten metal will be left behind, and can be collected and used.

The extraction of tin from its oxide (SnO_2) ore may be taken as an example.

tin oxide plus carbon
(a rocklike ore) (in the form of coke)

from page nine

The make-up and behaviour of plumbers materials

TABLE A.

Metal.	Name of Ore.	Chemical Composition		Chemical Form.
		Chemical Name.	Chemical Symbols.	
Aluminium.	Bauxite.	Hydrated aluminium oxide.	$Al_2O_3 \cdot 3H_2O$	Hydrated oxide.
Copper.	Copper pyrites.	Copper and iron sulphide.	$CuFeS_2$	Sulphide.
Iron.	Haematite.	Iron oxide.	Fe_2O_3	Oxide.
Lead.	Galena.	Lead sulphide.	PbS	Sulphide.
Tin.	Cassiterite.	Tin oxide.	SnO_2	Oxide.
Zinc.	Blende.	Zinc sulphide.	ZnS	Sulphide.
	Calamine.	Zinc carbonate.	$ZnCO_3$	Carbonate.

Notice how the coke (carbon) serves a double purpose; it burns to produce the temperature necessary to bring about a chemical separation of the elements tin and oxygen, and it acts as a "blotter," soaking up the oxygen to form a new compound of carbon and oxygen (CO_2). The molten tin is left on the bottom of furnace.

One can sum up by noting that oxidation is the result of a chemical change in which the element oxygen combines with another element, a metal. Reduction is the result of a chemical change artificially brought about to separate the oxygen from the metal.

By this Reduction, or reverse chemical change, a chemical change can quickly be undone, and useful metal extracted from seemingly useless pieces of ore.

The extraction of iron from its ores follows much the same pattern. Lead, which is derived from a sulphide ore, presents additional problems. Sometimes the sulphur content of the ore is replaced by oxygen in a preliminary treatment with heat. The ore is then reduced in the same way as those of tin or iron, in a blast furnace.

Thus $PbS + O_2 = PbO_2 + SO_2$ and $PbO_2 + C = Pb + CO_2$.

The blast furnace in which this reduction process of smelting the ores takes place, is a tall circular furnace of steel plates lined with firebrick. It is in continuous operation, and charges of ore, coke, and fluxing material (usually limestone), which help in the chemical change, are fed into the top of the furnace. The burning of the coke is assured by a powerful air blast, which enters the furnace near its base through blast pipes and

(heat is produced by the burning of the coke) the oxygen content of the ore, combines with the carbon to form carbon dioxide gas, and leaves the metal tin behind.

Or: $SnO_2 + C + Heat = CO_2$ (escapes as a gas) + Sn (Tin).

continued page thirty-four

The Irish Plumber and Heating Contractor.

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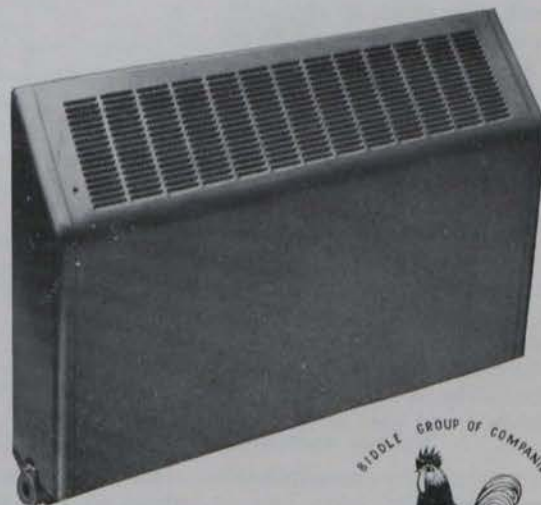
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- Cabinets removeable for protection during decoration, and for access to elements.
- Cleaning only requires a wipe with a damp cloth — no dust traps.



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Annual General Meeting

Hammond Lane Foundry Company

AT the Annual General Meeting of The Hammond Lane Foundry Company Limited, held last month, the Chairman, David D. Frame, presided. The other directors present were: James J. Davy, Samuel W. Aitken, Thomas P. Hogan and Mrs. P. F. McDonagh.

Proposing the adoption of the Annual Report and Statement of Accounts, Mr. David Frame said:

Before commenting on the results of the year under review, it is my sad duty to refer to the death, on 30th December last, of our Vice-Chairman, Mr. Gerald J. Rowe, then in his fifty-first year of service with the Company.

During the year, Mr. Thomas P. Hogan, B.E., A.M.I.E.E., a Director of several important engineering and manufacturing Companies, was co-opted to the Board. I welcome him on your behalf and am confident that his services will prove a valuable acquisition to the Company.

I am also pleased to inform you that Mr. Patrick J. Mitchell has been appointed Secretary of the Company, in succession to the late Mr. Rowe. Mr. Mitchell had been Assistant Secretary to the Company for many years and is a Director and Secretary of other Companies within the Group.

SUBSIDIARY AND ASSOCIATED COMPANIES

Last year's Report recorded the continued progress of your Subsidiary and Associated Companies and emphasised the need for future expansion, involving considerable capital outlay. I am pleased to inform you that current needs in this respect have now been substantially satisfied.

HAMMOND LANE IRON-FOUNDERS LIMITED

The installation in the Foundry of a new continuous type vitreous enamelling furnace, of modern design, was completed during the year and the Company is now admirably equipped for the production of all classes of enamelled goods, with capacity sufficient to meet all foreseeable demands. Sales of the Company's products generally, including exports to Northern Ireland, have

been maintained at a high level. It is worthy of note that the well-known "Jubilee" Cooker still remains in great demand and that the recently-introduced "Elite" has met with favourable comment.

HAMMOND LANE INDUSTRIES LIMITED

The new plant for the production of Stainless Steel products, referred to in my statement of last year, has been installed and the Company is now in a position to manufacture stainless steel sinks, draining boards and table tops for domestic use, together with special equipment of a kindred nature suitable for hotels, hospitals and similar institutions.

HAMMOND LANE METAL COMPANY LIMITED

In the Metal Company, the financial year just ended was a very successful one.

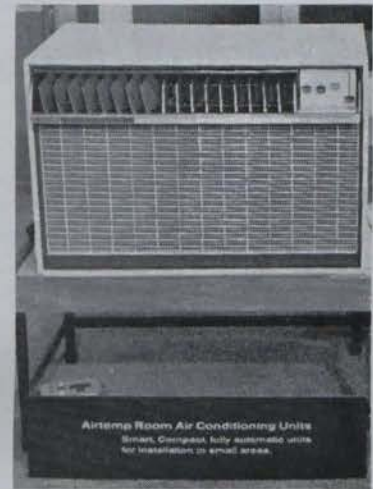
INDUSTRIAL GASES (I.F.S.) LIMITED

Industrial Gases continued to progress and trading results for the year disclosed new records. In order to cope with the continued expansion of the Company's business it has been decided to install additional Liquid Oxygen and Nitrogen plant, thus giving the Company the capacity to meet the increased requirements of industry as far as we can estimate.

FYFFE COUPLINGS (IRELAND) LIMITED

The Plumbers' Brass Ware manufacturing programme, undertaken by Fyffe Couplings (Ireland) Limited last year, concluded during the year, the complete manufacture of all component parts from raw material to finished product being effected. Sales of these products were continually in excess

For Olympia Exhibition



A CHRYSLER Airtemp room air conditioning unit which is among the many items of refrigeration, air conditioning and heating equipment featured on the stand of Chrysler Airtemp Limited at the Heating Ventilating and Air Conditioning Exhibition at Olympia from September 26—October 6.

Ten main product ranges, now marketed in Britain by Chrysler Airtemp Limited, an associate company of Chrysler International S.A., will be represented on the Company's stand.

Everton Sheet Metal Works Ltd. of Newtownabbey, Co. Antrim, recently signed a marketing and distribution franchise with Chrysler Airtemp Ltd., and is now Sole Irish Distributor for this Company's range of heating, air conditioning and refrigeration equipment.

of target and an appreciable increase in the demand for Instantor Couplings was also experienced. Special machinery and tools for making Gate Valves have now been acquired and bright nickel plating is contemplated in the future. Exports of Hot Brass Pressings are continuing and appear capable of considerable expansion in the coming years. The national "Water Drive" and the resurgence in the building industry are other factors which will instil confidence in the future.

A vote of thanks to the Chairman, Directors and Staff was passed.

Dangers of lead poisoning cannot be over emphasised



LEAD POISONING gives rise to internal complaints and skin disease. Its dangers cannot be over emphasised, and scrupulous care with personal hygiene is essential in all work connected with lead in any form.

To the plumber working in lead, the need for care will be well known. On the odd occasion that he may use lead paint, then the need for care is not quite so apparent, but nevertheless the need is there. Rubbing down of old lead paint surfaces must be done with a wet technique to avoid inhalation of lead dust particles.

In all works involving lead, operatives should be allowed five minutes in which to wash hands before taking food. Facilities such as hot water, soap and towels, preferably of the disposable kind, must be provided.

EXCAVATIONS or work in trenches claim far too many victims. Lack of understanding of earth movement due to climatic changes or natural earth movements leads to inadequate shoring and eventual collapse of trench walls. Timbering to trenches should receive high priority of installation technique and supervision. Timbers in long standing open trenches must be examined weekly and any loosening of wedges, walings or struts due to drying shrinkage of the timber must be rectified.

Deep trenches should be enclosed by a clearly seen safety fence to prevent others falling in. Heavy loads should be kept well clear of trench edges otherwise the imposed load may collapse the trench wall.

SCAFFOLDING. — Modern steel scaffolding has done much to reduce accident risk from this source. Yet in the simplicity of this new scaffolding technique there lies the danger that anybody might feel competent to erect it. This is not so and scaffolding demands a reasonable knowledge of mechanics if a stable and safe

scaffold is to be provided.

Look out for "traps," i.e., where a scaffold board is not properly lodged at its ends.

Toe boards should be used to prevent unguarded loss of footing over the outer edge of the working platform and to avoid accidental falling of materials from the platform. Good practice will ensure a clear platform except for essential "in hand" materials and labour. A guard rail should be provided at all times.

Scaffolding materials and equipment should be inspected frequently. When not in use it should be cleaned, coupling screws oiled, and stored in a clean, dry place. It should never be allowed to lie around on site. Scaffolding is expensive equipment but apart from this the life or limb of every subsequent user depends to a great extent upon how well the scaffolding has been maintained.

FIRST AID.—Time to do so is not easily found but it is advisable that all have some knowledge of what to do in case of accidents. Sites on which twenty-five or more are engaged should have at least one person who is knowledgeable in first aid treatment. Really large jobs now tend to merit qualified safety officers whose duty it is to be hypersensitive to building accident risk and probable causes.

His trained eye can spot an accident prone situation and his training will enable him to advise immediate precautionary measures. Accident avoidance by these means are best and operatives would do well to cooperate to the full with any person appointed to watch out for their

safety and the safety of all others on the job.

FIRST AID KITS should be issued to a responsible person on sites of ten men and over.

Contents should include:—

A First Aid Instruction Booklet.

A minimum of 12 sterilised finger dressings; 6 ditto hand (or feet) dressings; 6 ditto larger dressings for other parts of the body.

A sufficient number of sterilised burn dressings, large and small.

A quantity of sterilised cotton wool. This is better kept sterile in a larger number of smaller packets.

A solution of iodine or a 1% solution of gentian violet.

A bottle of sal-volatile, with dose measurer and instruction on how to dispense.

Eye drops and eye dropper.

On sites employing twenty-five or more the above list should be increased at least twofold. The following should also be provided.

Splints for leg and arm injuries, with adequate cotton wool for padding.

Adhesive plaster.

Twelve roller bandages each size 2 in. and 3 in.

Six triangular bandages.

Safety pins.

Three tourniquets (to arrest arterial bleeding).

Sounds gruesome, doesn't it? But then accidents are gruesome.



Conclusion of series

Reporting

The Esso "Home Heat Plan"

● A typical Esso "Home Heat Plan" display.



THE householder of to-day demands a standard of living comfort undreamt of by previous generations. These higher standards are encouraging householders to give serious consideration to the obvious advantages of a centrally heated home.

From the considerable research which has been made into the advantages and disadvantages of different fuels for central heating installations, the primary fact emerges that oil is the truly modern fuel, offering advantages of cleanliness, simplicity and economy.

Let us take a look at some of the advantages which an Esso oil fired central heating systems offers:—

Cleanliness—It is free from dirt, dust and ash. It produces no soot, smoke or odour. Clean air means clean paintwork, window curtains and loose covers.

Work Free—It is completely automatic—fuel is fed directly from storage tank to boiler. There is no stoking, no raking out, no ash-emptying, no fuel-carrying. And there is far less cleaning and dusting.

Comfort—It gives smooth, even heating without draughts. Finger-tip control gives almost instantaneous response to temperature adjustments.

Economy—Oil is the most economical fuel for several reasons. First, there is no waste. Every drop of oil produces heat. Secondly, oil has the cheapest running cost of all automatic fuels.

Safety—Correctly installed and maintained by specially trained staff,

In forthcoming issues a Contractor reporter will review the domestic heating plans operated by the major oil companies in Ireland.

installations are both safe and trouble free.

Reliability—Every drop of Esso heating oil is of the same consistently high quality. You can rely on it. And you can rely on a prompt fuel delivery service from Esso wherever you live.

In order to promote the idea of oil fired central heating in the home and to bring its obvious advantages within the immediate reach of those who had previously looked upon it as a luxury, Esso introduced their "Home Heat Plan." When the details of this plan were first announced the response was immediate and enquiries came from all over the country.

The Esso Home Heat Plan links together the members of a marketing team that will develop the trend of

oil-fired heating into every type of home.

THE CUSTOMER

By special arrangement with an Irish finance concern, Esso can make available these attractive terms for "pay-as-you-warm" oil fired central heating.

- (a) No Capital outlay.
- (b) Five years to pay—All equipment and installation charges taken care of by easy-to-manage monthly payments. The entire cost can be spread over a period of up to five years.
- (c) Income Tax Relief—As a further help income tax relief can be claimed on the interest charges in the loan and a tax certificate will be given for this purpose.
- (d) Free Life Insurance covering the loan—protection for the customer's family by a free life insurance covering the outstanding amount of the loan.
- (e) Free choice of equipment—The customer is not tied down to any particular make of oil-fired boiler or equipment.
- (f) Free Advisory Service—The Esso Home Heat Advisory Service will help with advice which is expert, completely impartial and entirely free.
- (g) No fuel worries—Esso will ensure

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that the customer's fuel requirements will be met throughout the year. A phone call or a post-card to Esso will ensure prompt delivery.

- (h) Regular Maintenance Service—With the Esso Home Heat Plan regular maintenance is available through an appointed Installer.

THE HEATING ENGINEER AND INSTALLER

The heating engineer and installer is a key link in the chain. It is to his recommendation that people listen, and that is why Esso are building up one of the finest teams of highly trained specialists in this country.

In addition, and recognising that many firms have difficulty in designing due to lack of facilities, a special design team of Consultant Heating Engineers are at their service.

Three Training Courses, each lasting a week, are available in the following subjects:—

- Home Heat Sales and Design Course.
- Heating Oil Practical Course.
- Domestic Oil Practical Course.

The advantages then to the heating engineer and installer in the Esso Home Heat Plan could be listed:—

Attractive easy-payment scheme ensures prompt payment to installers.

Protection against bad debts.

Design and Technical Information Service.

Joint Advertising.

Van Painting Service to standard design.

Staff Training Courses.

THE BUILDER'S MERCHANT

The builder's merchant is the important link between the manufactures of appliances and accessories and the builder, installer and the customer. In addition in most instances he has display showrooms in shopping areas. Esso therefore offers specially selected builder's merchants an opportunity to benefit from the fast increasing and profitable oil-heating market through their Home Heat Plan.

Here therefore are the advantages to the Builder's Merchant:—

Increased business due to "Pay-as-you-warm" Scheme.

Free Showroom display unit.

Free training facilities.

Advertising and Sales Promotion assistance.

Free choice of equipment stocked.

THE BUILDER

Recognising that personal recommendations given by satisfied customers using oil-fired equipment can often be a tremendous sales boost, Esso are working in close liaison with builders throughout the country and the plan offers this section a number of sound advantages:—

Co-operative advertising to promote oil-fired heating.

Co-operation with the Builder including oil-fired heating on new building estates.

Promotion of oil-fired heating through recommendations in new estate areas.

Co-operation in the running of Show-houses featuring oil-fired central heating.

THE ARCHITECT

The Architect is fully conscious of the advantages of central heating in a house, in particular oil-fired central heating, and his impartial advice on this matter will be respected and acted upon by his clients. Consequently Esso are now in contact and working in co-operation with architects throughout the country. They have produced for their information and guidance a magnificent reference book, the Esso Guide To House Heating, specially intended for architects. They invite enquiries for this booklet, which should be made to their Home Heat Department at Stillorgan.

In addition the Esso Home Heat Advisory and Design Service is at the disposal of all architects with expert and impartial advice.

THE MANUFACTURER

Aware of the importance of the Manufacturer in the development of oil-fired heating, Esso are closely associated with this important branch of the industry. Esso's policy in this sphere is to promote the availability of a selection of equipment to suit the exact need of each customer. This marketing policy allows free competition on price, quality and performance. The Esso Home Heat Plan affords the manufacturer both co-operation in advertising and sales promotion and the benefit of equipment display in national trade exhibitions.

It has always been Esso policy to act in co-operation with their friends in the trade and with their customers. The Esso Home Heat Plan has been designed with this in mind and is essentially a plan of co-operation.



- Individual winners at the International Apprenticeship Competition in Germany: (from left)—Brian Coughlan, bronze medal, third place in Senior Electrical Installation work; William Jackson, gold medal, junior plumbing; Michael McDaid, gold medal, senior plumbing; and Paddy Coates, gold medal, senior carpentry.

IRISH STUDENTS' SUCCESS IN GERMAN COMPETITIONS

AMONG the team of eighteen Irish apprentices who took part in the tenth International Vocational Training competitions held in Duisburg, Germany, were two brilliantly successful young plumbers from Dublin firms, whom we introduced to our readers last month.

Michael McDaid (21) of 4 Beacon Hill, Dalkey, Co. Dublin, won the Gold Medal first prize in the Senior Plumbing category, while William Jackson (18), Mountpleasant Terrace, Rathmines, won the Junior Plumbing Gold Medal. In all the Irish team won three Gold Medals and one Bronze. They took third place behind Germany and Spain in the overall team classification.

Teams from France, Spain, Portugal, Italy, Gt. Britain, Austria, Switzerland, West Germany, Holland and Belgium competed, representing a total of 224 boys.

Michael will finish his apprenticeship with H. A. O'Neill, 162 Lr. Rathmines Rd., next September.

William has been an apprentice plumber at Guinness's for the past 3 years. Both are students of Bolton St. Technical School.

Congratulating the members of the team on their return, Mr. J. A. Agnew, Chairman of the National Apprenticeship Board said that they had succeeded because on top of their natural abilities they had received the right educational preparation for apprenticeship. There was no longer any room for haphazard or archaic methods of training.

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Boilers for domestic hot water supply

light-gauge tube as used in modern hot water systems, and it is not unusual to see cases where the flow and return pipes, at the point where they connect to the boiler, are reduced in wall thickness to a thin skin owing to soot attack. Pipes should, in every case, be covered or sleeved to prevent this happening.

Slightly domed

It will be noticed that with side inlet boilers, provision is made for air and steam to escape by having the boiler slightly domed over the flow connection, otherwise rumbling noises would result when the water is heating. With top inlet boilers, it is usual to make way for air and steam escape, by the plumber cutting a slot or V in the protruding threads of the flow coupling. On the return coupling, a dip pipe will be sweated on so as to bring the cooler incoming water to the base of the boiler where it is hottest. With side inlet tappings, a dip pipe is not required as the lower or return pipe acts in this manner.

Where a fire-back boiler is installed as part of a hot water system and complaints arise of lack of hot water, it is often the case that the fault can be traced to the installation of the boiler and its flue set.

Trouble often occurs, for instance, when an old range is removed and replaced by a boiler and flue set. Here we have a small flue entering into an opening designed for a much larger fitment, with the result that the hot flue gases encounter a large pocket of cooler air at the main flue entrance. The remedy is to continue the building of the flue sides up as far as possible—it sounds elementary, but often it is neglected, with the result that the boiler or pipe installation is blamed for lack of hot water. Other points of a similar nature will spring to mind—air infiltration, etc., all of which tend to reduce the draught and the efficiency of the installation.

Independent boilers

It is in the field of free standing or unit boilers that the greatest improvement has taken place, due, no

doubt, to a greater awareness of the need for an abundant hot water supply in the modern home. This, coupled with the need to extract as much heat as possible from the fuel, has produced a boiler highly efficient and at the same time "a thing of beauty." To the housewife its vitreous enamel finish and plated mountings is often a bigger selling point than its heat output!

The vast majority of boilers of this type are rated below 50,000 B.t.U. per hour, and where solid fuel is used, the fire-box is formed or surrounded by a circular or square walled cast-iron or welded steel boiler which provides abundant hot water and perhaps in addition runs a towel rail and radiators.

It is opportune to note at this point that boilers are rated according to the duties they have to perform. For instance, in any boiler catalogue it will be seen that two ratings are given for each model, one for hot water supply only, and one for heating—the latter being much lower.

The hot water rating is usually based on a transmission of 10,000 B.t.u. per square ft. of internal boiler heating surface and can only be produced for short periods and at a low efficiency, whereas the heating rating is usually based on 4,400 B.t.u. per square foot of heating surface, which the boiler can produce continuously with reasonable efficiency. Where the boiler is thermostatically controlled, a figure of 6,000 B.t.u. per square foot per hour for heating is now generally used for quoting output. This is due to the fact that the thermostat controls the air admitted to the fire and so produces a boiler efficiency of between 60 and 70 per cent. The extra cost of the thermostat is well covered by the reduction in fuel used, less attention required, etc.

Independent boilers can be obtained to work with solid fuel, oil fuel, and gas. Where solid fuel is used we have a choice of hand fired, or gravity feed boilers.

Prominence

THIS latter type has gained prominence during the past few years,

Advertising, and all that

The Reeves Plumbing Journal of Los Angeles had this to say of advertising:—

"When someone starts advertising,
Someone starts buying;
When someone starts buying,
Someone starts selling;
When someone starts selling,
Someone starts making;
When someone starts making,
Someone starts working;
When someone starts working,
Someone starts earning;
When someone starts earning,
Someone starts buying."

especially for the larger jobs. Its main advantage lies in the small amount of attention required—about ten minutes per day removing clinkers and refueling once in twenty-four hours. The working principle is as follows: small anthracite beans or coke flows by gravity from a hopper inside the boiler to the fire, where its combustion is controlled by the dampers being adjusted thermostatically.

Some boilers of this design will work on natural draught, but more usually a small low consumption electric blower provides the air supply. This results in a small intensely hot fire capable of burning the fuel and fusing it into clinkers, which are easily removed without dust, etc.

The efficiency of gravity feed boilers, when compared with hand-fired, is very evident—75 to 80 per cent. is not unusual, and is one of the reasons for their popularity. They are usually rated from 35,000 B.t.u. upwards, and are therefore installed in jobs where central heating and domestic hot water supply are worked from the one boiler. Here, of course, the domestic hot water will be heated from an indirect cylinder, so the question of a barfed boiler will not arise as the two waters will not mix.

If oil is used as the fuel, a boiler with a vaporising type of burner (usually the short drum type) is very suitable as it is completely noiseless in operation. For larger installations pressure jet burners are used, but the

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boiler is then normally installed in an outbuilding owing to the noise of the burner. Again, a boiler of this size would only be installed where central heating and hot water supply are combined.

Selection of boilers

THERE are various methods used to determine the boiler power for a particular job, but for the smaller installation a very fair estimate can

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QUESTIONS ANSWERED

effect on air contacting it will be less and condensation thus prevented.

An article appearing in this edition deals with the insulation of pipework. It describes materials which can be used and to this extent may be helpful to the questioner in this instance.

Having recently moved to a new bungalow, I am disappointed to find that the hot water flows at bath and basin taps are very poor. It takes ages to fill a bath. The kitchen tap is tolerably well supplied but even so it is not all that it might be.

Any helpful comment you may offer would be appreciated along with any ideas which might improve the trouble complained of.

UNFORTUNATELY the questioner did not supply a dimensional sketch of his D.H.W. system. This would have enabled some calculations in check of installed pipe sizes and given some idea as to possible side causes of the insufficient flow of water to taps.

It seems quite clear that the questioner is the unfortunate victim of pipe sizing by guesswork—if thought was given to pipe-sizing at all.

Pipe-sizing is a "Tool" of the plumber's trade. It is not difficult to master. In a forthcoming issue we will provide an article which sets about this problem in a straightforward, simple and practical manner.

In the meantime we will invite our questioner to submit a sketch of his system for checking and recommendations arising therefrom.

be obtained by basing it on the daily demand for hot water.

For instance, a three bedroom house having a bath, two hand-basins and a sink would require at peak periods about 30 to 35 gallons of hot water. A suitable temperature for this water would be about 150°F., and with the incoming cold water at, say, 50°F., this would mean 100 degrees rise.

To calculate the heat requirements in B.t.u.'s needed to do this, the following method is used. (A British Thermal Unit is the amount of heat required to raise 1lb. of water through 1°F.).

A gallon of water weighs 10 lbs., so 35 gallons weigh 350lbs.

350 lbs. of water raised 1°F. requires 350 B.t.u. Therefore 350 lbs. of water raised 100°F. requires 35,000 B.t.u.

However, this is assuming no heat loss, so allowing 25% for this, and for inefficient stoking, where the boiler is not thermostatically controlled, we have: 35,000 plus 8,750 = 43,750 B.t.u. as the amount of heat which must be put into the water.

If this quantity of heat was required in one hour, we would need a boiler rated at about 44,000 B.t.u., but as in most cases the heating period can be extended over a couple of hours or more, a boiler of about 20,000 B.t.u. (hot water rating) would prove very satisfactory. It only remains now to select a suitable model

of this rating from the manufacturer's catalogue.

A final point to be noted when selecting a boiler is to make certain that the hot water storage cylinder is of sufficient size to take the output.

For example, a suitable cylinder for use with the 20,000 B.t.u. boiler mentioned would be one of 30 to 35 gallons capacity, and it would be possible to run a towel rail in addition if required.

Insulation of the cylinder will also improve greatly the efficiency of the system and is well worth the small extra cost.

GREENWOOD AGENTS

IN last month's special survey on ventilation and insulation we stated, under the heading "News From Greenwoods," that Irish Technical Sales Company were agents in Ireland for the two products reviewed—the Greenwood Airvac Maxadome and the Permavent window ventilator. We should, of course, have listed as agents the Dublin Glass & Paint Co. Ltd., 41 Middle Abbey Street, for these products as this company act as agents for articles for natural ventilation as manufactured by Messrs. Greenwoods & Airvac Ventilating Company.

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PLUMBERS MATERIALS

tuyeres (pronounced "twyers"). The molten metal resulting from the action of the chemicals on the ore runs to the bottom of the furnace, where it is occasionally tapped off and run into ingot moulds for any further refining treatments that may be necessary.

Our illustration shows a blast furnace typical of the sort that might be used for this smelting process.

Aluminium is produced from its ore by an electrical-chemical process.

Copper is often extracted from its ores first by smelting, and then by refining the crude copper metal by an electro-chemical process.

A detailed description of all these

processes is beyond the scope of this work. The descriptions given have been very much simplified, but perhaps you will find them of sufficient interest to follow them up by reading one or more of the books on metal production. Such books will be readily available at your technical college or municipal library.

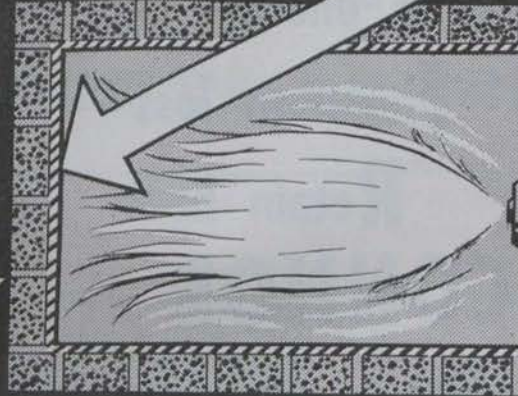
At the moment it is enough to remember that the metals which you use have been artificially produced from chemical compounds, and that these metals will try to return to their original compound state given suitable conditions.

This fact is of importance in the study of metal corrosion, and in several other plumbing techniques.

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THE method of oil firing embodied in the Colt Turbo-Static Heater is a complete breakaway from conventional methods. The combustion chamber, which is far smaller than in the ordinary types of oil fired air heater, is an integral part of the burner.

The combustion air is forced under pressure through a series of openings at three different levels in the triple skinned wall of the chamber, and "holds" the flame. Passing through the chamber walls the combustion air is preheated. As a result of this and the fact that the air enters the chamber in three distinct streams, flowing in different directions, a very high combustion efficiency is achieved. In fact combustion gas temperatures of over 3,000°F. are achieved.

These high gas temperatures and the rapid flow of the pressurised gases results in turn in rapid heat exchange to the main air stream over a relatively small heat exchange surface. Because of this the overall size of the heater is far smaller than is usual for an air heater of such capacities.

In addition to the reduction in size and weight, the advantages offered by the new form of oil firing are as follows:—

- The Turbo-Static Heaters do not require skilled attention to keep them operating at peak efficiency. The combustion chamber, heat exchanger and flue are pressurised, so that combustion efficiency is not affected by outside conditions.
- Cleaner combustion eliminates the need for frequent cleaning. The scrubbing effect of the combustion air streams which rotate round the chamber walls and over the electrodes, and the post-firing purging cycle keep the vital components free of soot.
- All burner and control components are hidden beneath the casing and cannot be damaged or cause damage.



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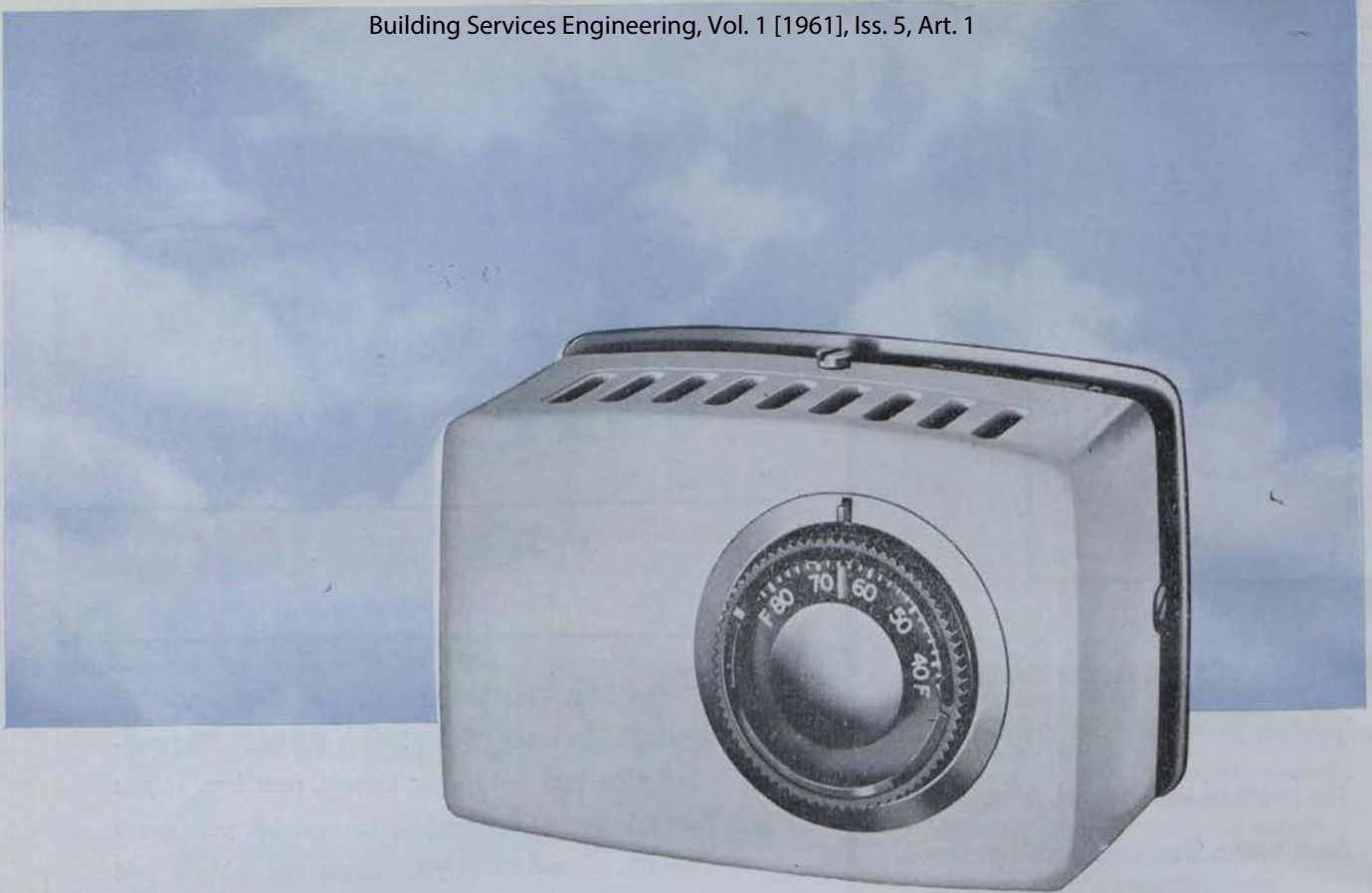
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