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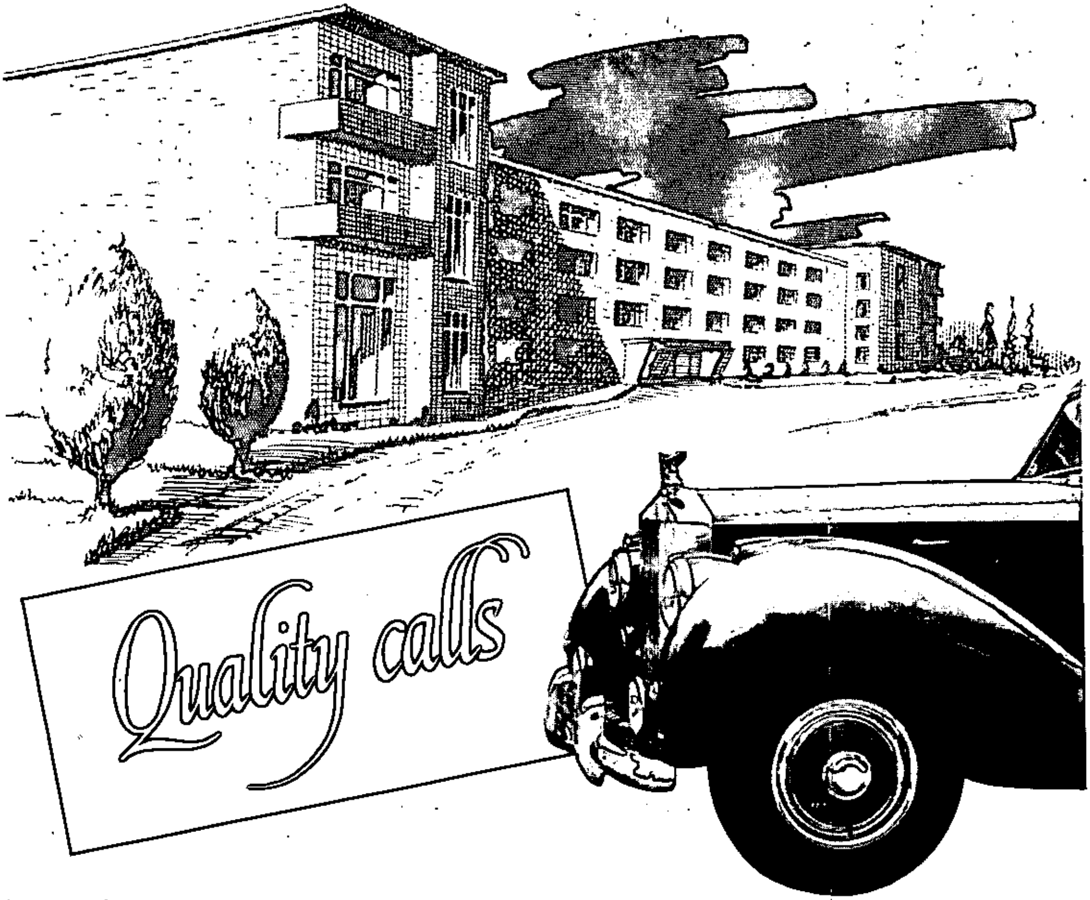
CONTENTS



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THE HOSPITAL ENGINEER

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Editorial

A NUMBER of important recommendations are made by the Committee on Hospital Laundry Arrangements appointed by the Central Health Services Council to investigate arrangements in hospital laundries with particular reference to the avoidance of cross-infection and the adequate control of stocks. In a report* received this month the Committee's work is classified under these two main headings.

The control of stocks is of less immediate concern to our readers except in hospitals where the Engineering Department is still responsible for running the laundry. Particular attention, however, should be paid to the section dealing with cross-infection. The Committee is, for instance, strongly in favour of the cessation of the sluicing by hand of all fouled linen in wards and the establishment of a central sluicing point sufficiently near the laundry where use can be made of steam and other services, but this must be separate so that sluicing can be carried out when the laundry is closed. Fouled linen should be sealed in suitable containers and delivered there. Where a laundry is non-existent or too distant, a central sluicing point should be provided away from the main ward blocks and equipped with mechanical sluicing equipment.

With further reference to sluicing machines, the expressed opinion indicates that these have not yet reached a satisfactory stage of development which will ensure that fouled linen can be automatically sluiced, disinfected and rough dried to a condition suitable for it to be passed to the laundry for washing in the ordinary way. Hospitals are advised to consider the choice of machine particularly carefully, and to ensure that a satisfactory standard of sluicing and disinfection can be reached.

Particular stress is laid upon the need to provide that soiled linen is prevented always from coming in contact with infected linen and recommend that infected linen should be disinfected before entering the laundry.

Transport comes in for comment, including the use of easily identifiable containers of a kind that can be properly cleaned, sterilised and secured against pilferage. Baskets are firmly out. Soiled linen should not, wherever possible, be carried along main corridors or lifts used by patients and food trolleys, nor should the same trolleys be used as for food and stores. Chutes, where used, must be capable of proper cleansing and disinfection. All vans and trolleys used should be disinfected after every load.

Laundry planning should aim to ensure the complete separation of soiled and clean linen, and laundry staff should be strictly controlled accordingly. Adequate washing facilities for staff should be provided and they should receive regular medical checks for their own sakes and in the interests of patients. The recommendations are comprehensive and practical, though some regarding the control of stocks may be less easy to apply in some hospitals.

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*Hospital Laundry Arrangements. H.M.S.O., 1959. Price 1s. 3d.

The Efficient Generation, Distribution and Use of Steam in the Hospital

By H. R. H. WARD,
A.F.C., B.Sc., A.M.I.Mech.E.,
A.M.I.E.E.

In this Paper, the Author, who is Regional Engineer to the Welsh Regional Hospital Board, takes his subject, the title of which is self-explanatory, into considerable detail. It is necessary, as he points out, to refer to basic principles but this is kept to a minimum and he concentrates upon analysing and dealing with the problems involved. It is regretted that we are not able to include the whole of Part I of the paper in this issue but the balance, together with Part II, will be published in February.

THE consideration of this subject falls naturally into two parts, namely, (1) efficiency in the boiler house and (2) efficiency in the distribution and use of steam once it has left the boiler house, and I propose to deal with it in these two parts. The subject is one about which very much can be said and conversely very much need not be said, at least to Engineers for whom this paper is intended, but nevertheless one cannot avoid getting down to first principles as a foundation for common sense—the basis of all engineering work. The first part of my paper will therefore be confined to efficiency in the boiler house.

A boiler plant or the boiler house can rightly be likened to a factory with fuel and water as the raw material and steam the product. As with a factory manager it behoves the engineer in charge of the boiler house to produce his finished product at the lowest possible cost. In this paper I have to consider not only the efficiency of generating the steam which is reflected in its cost, but of its distribution and use in a hospital. It will at once be realised in doing so that by far the greatest economy can be made in the boiler house. Economies made here are passed on to all the steam used, so for that reason I propose to consider the boiler plant in some detail.

1. Efficiency in the Boiler House

Steam may be generated in many ways but basically it is the result of transferring energy from one form into another, and it is a fundamental law that wherever energy is transformed from one form to another, some of it is lost in the process. In a steam boiler the stored energy in the primary body is transformed into energy in the form of heat which has been added to water, so that if enough is added, the water is converted into steam at a higher pressure than atmosphere. The primary (source) may be one or more of several. To mention a few of the more common ones in daily use and which therefore can be considered as having been rendered controllable and harnessed by man, I might refer to coal, oil, gas and other combustible substances, friction, electricity and energy produced from fission, but of the uncontrollable or almost uncontrollable sources I would mention in passing electricity in the form of static discharges, lightning, explosions, impacts, etc. The majority of hospitals use coal as the source of energy for their boiler plant, although we are now in many cases using oil instead, and my remarks will therefore be confined to those fuels, although in principle they will also cover gas and electricity where they may be used for steam raising.

Let me briefly outline the process of transferring the energy contained in the fuel to the water and the plant used in the process so that we may consider the losses—or inefficiency—likely to be encountered in the transfer. The energy in the fuel is released in the form of heat and is so released by a chemical process known as "combustion." To promote the process of combustion it is generally necessary to provide some form of heat and this may be produced in one of several ways. In the combustion of coal, oil or gas used in a boiler plant the action is usually started by applying a flame to the fuel, which, in due course, several minutes in the case of solid fuel but almost immediately in the case of oil and gas, ignites or sets up the process of combustion within itself and subsequently maintains it from the heat thereby generated.

It is appreciated, however, that to maintain that combustion certain conditions as well as the provision of heat or flame are essential. In the process of combustion the combustible elements constituting the fuel are converted into gases at a high temperature and these eventually pass away from the boiler to the atmosphere. Unfortunately these gaseous products of combustion cannot for several reasons be usefully cooled down to the temperature at which the air and fuel producing them first came together, and hence constitute quite a considerable proportion of the losses or inefficiency of the boiler.

A paper read at the South Wales Branch Week-end School.

These gases are formed by the chemical action, assisted by heat, of the union of various elements in the fuel with oxygen which has to be provided from the atmosphere. Air is composed primarily of nitrogen and oxygen in the proportion by volume of approximately 4 to 1 (actually 79% to 21%) so it is necessary to provide at least five times as much air as the weight of the oxygen required. This nitrogen plays no part in the process of combustion and is in fact a " passenger," for in passing with the oxygen through the zone of combustion or fire it is heated up, subsequently giving some of this heat back again with the other flue gases or products of combustion to the boiler, but finally escaping to the chimney containing more heat than that which it had as part of the surrounding atmosphere. This heat has been provided from the process of "combustion," i.e. from the original fuel. It is essential therefore that it be kept to a minimum.

I don't want to bother you here with the mathematics of combustion but must refer to the " results," which we can accept, to show the very important part played by proper relations between the amount of fuel and air admitted to produce and maintain combustion, and the effects that the several constituents of the fuel have on the efficiency of combustion.

The useful elements in coal for the production of heat are carbon about 75%; hydrogen about 5%; sulphur about 1% and oxygen about 5%; and of hese 1 lb. of carbon will yield about 14,450 B.T.U., 1 lb. of hydrogen about 61,500 B.T.U., and 1 lb of sulphur about 4,000 B.T.U. The oxygen merely reduces the amount that has to be supplied from the atmosphere and hence the large amount of the passenger nitrogen. The raw coal fed as fuel to the boiler also contains moisture (H_2O) some of which is inherent and some surface: this again is useless in the function of combustion and passes through as another passenger, taking with it some of the heat liberated from the fuel in the waste gases to the stack. A small quantity of nitrogen, about 1%, may be present in the fuel and is an unwanted passenger as is the nitrogen in the air. Finally there will be in the fuel a certain amount of incombustible solids known as ash, most of which should be deposited in the ashpit and which, unlike the other passengers, will give up to the boiler much of its acquired heat before being removed. Some of the ash will pass up the chimney or be collected in the dust collectors and this will carry away with it as much heat as the gas passengers.

It will now be clear that we cannot expect to get 100% of the B.T.U., in the coal transferred to the water in the boiler, but with modern appliances we can expect to retain in that water some 80% of it in the best of conditions.

I have already pointed out the essential part played by air in burning the fuel, and at the same time indicated why it is necessary to keep it to a minimum, namely to avoid as far as practicable having to convey the passenger nitrogen. It would seem therefore that all we need do is to provide the requisite amount of air (oxygen and nitrogen) to effect completely the reactions of the combustion process and decide that as we supply air and not pure oxygen, for reasons beyond our control, we cannot avoid having present an amount of nitrogen equal to about 80% of the weight of air supplied. Now comes a practical difficulty. Unfortunately it is extremely difficult, in fact almost impossible, to burn any fuel, particularly coal, with no more air present than the theoretical amount required. The nature of any firebed or zone of combustion is such that it is practically impossible to ensure that the oxygen provided gets to the element in the fuel which needs it, even when the maximum possible amount of turbulence is created, if no more than the theoretical amount of oxygen is provided. In such conditions some of the oxygen would escape as free oxygen or possibly only half consumed oxygen (CO) and some portion of the carbon (or sulphur) would remain as carbon (or sulphur) and be deposited with the incombustible solids (ash). Here then is another place where there could be a great loss of the heat available in the fuel, for as I have mentioned above, 1 lb. of carbon completely burnt would produce as much as 14,450 B.T.U. Any sulphur in the ash is likely to result in only a very trivial loss of heat and may be neglected. Carbon burnt only to CO instead of CO_2 (i.e. partially burnt) would be responsible for the loss of 10,150 B.T.U., per pound of original carbon. To assist combustion air is admitted into the zone of combustion in two or more distinct areas; one being directly into the ignition zone and known as primary air, and the other into the zone where partially burnt gases are produced and need additional air to complete their combustion, and known as secondary air. The proportions of primary and secondary air must be carefully regulated, particularly when burning fuel oils, to effect proper and complete combustion. It is into this latter zone that excess air is admitted to effect complete combustion, and the amount must be very carefully controlled to ensure the highest efficiency.

Various methods are employed for providing this air for combustion, both primary and secondary, and unfortunately in some cases very little control over its supply is provided. On the other hand in the case of mechanical stokers and some patented grates as well as oil-burners, quite a reasonable degree of control is provided, whether this air is supplied by a fan or is merely induced. I want particularly to mention those extremely wasteful appliances often provided to induce the primary air, namely jets. These are usually steam jets, but in a few cases water jets are used. Steam jets are also used in some cases to produce turbulence in the secondary zone above the firebed. The under-grate jets are provided for a second and often the more important function of cooling the fire bars and influencing clinker formation; in fact they are essential when burning some of the inferior classes of coal and are fitted as standard by stoker makers for this purpose. Such jets should never consume more than 4% of the steam being produced at the time. Steam jet orifices are prone to rapid enlargement by erosive action of the steam passing through them and may after a few weeks use double the amount of steam. Their use should be very restricted and careful watch must be kept on them to see that they are not unreasonably enlarged as to be uneconomic. For grate cooling, water sprays are to be preferred to steam jets, as having a much greater cooling effect for the amount of water used, which incidentally (as also in the case of the steam) becomes another passenger as it passes through the boiler and flues to the chimney.

We have now seen that for practical reasons there must be excess air admitted to a boiler furnace to ensure complete combustion and both too much and too little is likely to be a cause of serious loss of efficiency. How are we to know if we have too much or too little excess air? Fortunately an analysis of the flue gases will give us an excellent guide. If we assume that the moisture in the flue gases has condensed to water, as it would have if it were returned to the basic temperature of 60°F., we should find with an average South Wales coal, as may be fired in a hospital boiler, that for perfect combustion and no excess air there would be a volume of CO_2 present in the flue gases of about 18·5%. If now there is excess air present, its constituents, oxygen and nitrogen, would merely have passed through the furnace without any chemical change and have mixed with the flue gases, thus diluting them: or should I say the CO_2 present would, being the same in amount but present in a larger total, appear as a lower percentage. For example if there is present 50% excess air we shall find that the CO_2 has fallen to 12·0%. Similar values of CO_2 can be worked out for other amounts of excess air and we can draw a graph from which we could read off the amount of excess air for any value of CO_2. Such a graph would of course have to be worked out for the particular class of coal in use but there is not a great variation between them.

I indicated earlier that some heat must be lost by virtue of our being unable within reasonable practicability to reduce the flue gases to the temperature at which the constituent elements of combustion entered the plant, so that some of the heat was carried away in both the flue gases and the ash. Again we are fortunate in being able to assess accurately the amount of heat in each of these. That in the flue gases is by far the greater and therefore needs most attention. The determination of the amount of CO_2 in the flue gases gives us a very close approximation of the amount of nitrogen and oxygen also present, the SO_2 being of the order of only about 0·1%, can be ignored. With this knowledge of the analysis of the flue gases and a knowledge of the specific heat of these gases, it is an easy matter to determine the specific heat of the mixture, and hence how much heat the flue gases contain at any temperature above that which they contain at a datum temperature (in boiler practice taken at 60°F.). Graphs can therefore be drawn showing the percentage of heat loss in the flue gases over a range of temperatures.

The graphs showing heat loss in flue gases due to excess air and due to exit temperatures can be, and are, more usually combined in one chart from which can be easily read the flue gas losses expressed as a percentage of the heat in the fuel burnt corresponding to any quantity of CO_2 in the flue gases and any gas temperature. Similarly tables can be produced giving the same information. Such a chart or table is of invaluable assistance to the engineer who has a keen eye on the efficient operation of his plant. It will be realised that two instruments are essential to assist the engineer with this determination, namely one indicating the amount of CO_2 present in the flue gases and the other indicating its temperature. Care must be taken when installing these instruments to ensure that they are in positions where fair and accurate readings are obtained: for example the gas analyser should draw its sample from a point clear of all eddies or stagnant corners, and the thermometer or thermocouple must be remote from possible radiant effects of nearby bodies.

What I have said so far has related to the importance of maintaining proper combustion in boiler furnaces by stressing the loss that can occur in the flue gases. These are likely to have the greatest effect on the boiler efficiency and should be the most easily controllable. This loss can range from 10% of the heat in the fuel with 14% CO_2 and a temperature of 350°F. to as much as 36% with 7% CO_2 and a temperature of 700°F. The loss of heat in the combustible matter in the ash raked out from beneath the firebars and discarded can vary between wide limits depending on many factors such as nature of coal fired, size of coal as fired, free moisture in coal as fired, type of grate or mechanical stoker, method of stoking if hand-fired, fusion temperature of the ash and the ash content of the fuel. An analysis of the ash collected beneath the grate may show it to have a combustible content of anything from 5% to 50% and the ash in the coal may range between 4% and 10%, so the losses of heat in this ash will range between 0·2% and in the worst case perhaps 5%.

In a well designed and maintained installation burning a coal suitable for the design of the installation, it should not exceed 1·5%.

From the foregoing it will be appreciated by the engineer who is keen on maintaining a high efficiency that as far as his boilers are concerned he must pay first attention to his combustion conditions, and although I have considered the burning of coal these remarks apply equally to burning fuel oil, and if they are kept right, the greatest source of loss or inefficiency will be taken care of. I might say here that attention of this nature perhaps needs more emphasis in oil-fired installations where it is too frequently assumed that the flame which often cannot be easily inspected, is satisfactory. Very often the setting of oil burners, especially the fully modulating type, is a complicated business and when once the several compounded adjustments have been made by the manufacturers, they should not be altered. If it is considered they are out of proper adjustment the specialist serviceman should be called in.

Let us now look for other causes of inefficiency in the boiler room. Undoubtedly the greatest of these are our old friends (or enemies) the side flues and brickwork of a brickset boiler and other brickwork flues, but steel plate flue casings can cause nearly as much trouble. First of all, however, let me remind you that we are only concerned with those parts of a boiler plant up to that point where the heat in the gases can no further be transferred to the water. Such point is of course the boiler outlet, or if an economiser, air heater or other form of heat exchanger is provided, then it is the point where the gases leave it. From the efficiency angle we are not concerned with the I.D. fan, ducting and chimney, except in so far as the fact that the greater the excess air and infiltration air it has to deal with, the greater will be the power required to drive it, which reflects as a charge on the cost of raising steam. Returning to brick settings; there must be no leakage through brickwork or joints between platework and brickwork. Boiler brick settings have to undergo very strenuous conditions, being heated up to very high temperatures on one side or both and at periods cooled right down to atmospheric temperature, and are therefore extremely prone to suffer from cracks. The nature of these cracks may be tortuous and they are therefore not easy to locate, particularly cracks in the walls dividing the side and bottom flues of Lancashire type boilers. Serious leakages here result in short-circuiting the gas pass so that all the gas does not pass over the maximum amount of boiler plate surface. Such leakages are evident by an increase in gas leaving temperatures, but even these may be off-set by leakage into the side flues of cold room air. All such leaks should be detected when the boiler is down for cleaning, and stopped at once. Leaks can often be detected when plant is in use by taking gas temperatures in the flues, and of course leaks from the boiler room by our old friend the lighted taper. Besides the temperature guide, the portable CO_2 instrument can be very useful here if samples can be taken at various points in the flues; any decrease in CO_2 content of the gases as they progress towards the boiler exit or for that matter through the economiser or what have you, will indicate the infiltration of air which has, as described earlier, increased the amount of gases by the addition of oxygen and nitrogen and so reduced the percentage of CO_2.

The trouble with this unwanted air is that it is taking heat out of the flue gases which should go into the water, and causing the gases to be cooler as they enter any economiser or heat exchanger, so reducing the possible heat transfer through it, to say nothing of requiring extra power from the I.D. fan motor to handle it. In Lancashire and other brickset boilers this infiltration of air and short-circuiting of flue gases through brickwork is probably the greatest source of uncontrolled heat loss. Shell type boilers do not suffer from this complaint, but even they can draw in much unwanted air through badly fitting access doors, etc.

In the boiler and its associated heat-transfer surfaces there are also losses which in a boiler test are referred to as "radiation and unaccounted losses." These include radiation losses from all parts of the plant where the temperature appreciably exceeds boiler room temperature. For example in spite of good lagging, there is still a large heat loss through it. Pipe flanges unlagged, valves and boiler mountings unlagged, etc., all constitute sources of heat loss. These losses may be of the order of 5%.

Another loss of heat which I must mention is that carried away in the blow-down. To a great extent this is a necessary loss; it is controllable and should be kept to a minimum consistent with the maintenance of a properly prescribed water condition in the boiler. It should not be necessary for me to mention the obvious losses from leaky flanges and other joints, valves, etc., which can immediately be seen and dealt with. With such losses I should also mention losses by steam escaping from relief valves lifting. This loss can be extremely high as will be appreciated when consideration is given to the amount of steam that can escape from a safety valve lifting at say 107 lbs./sq. in. The amount of steam exhausted will be proportional to the size of the boiler and from a boiler of 10,000 lbs./hr. capacity there would be released 167 lbs. of steam per minute carrying with it as much as 189,000 B.T.U., or an equivalent consumption of 17 lbs. of coal (if of 14,000 B.T.U./lb. and fired at 80% efficiency).

(To be continued)

Air Filtration — Why and How

By G. H. VOKES

The Author of this Paper, which was read before the Northern Branch of the Institution, is a member of the well-known firm of air filtration engineers of the same name. It seems probable that, quite apart from the more specialised applications of air treatment such as for operating theatres, etc., there may be a call for the wider use of air filtration and control in the battle against cross-infection. This paper, therefore, takes the form of a review of the plant developed to meet various needs. The paper will be published in three parts.

Introduction

THIS paper was originally prepared at the invitation of the Institution of Heating and Ventilation Engineers, who requested that it should cover the subject of air filtration in a general manner, avoiding the extremes of being, on the one hand, a mere catalogue of equipment, and, on the other, a highly technical treatise having no direct bearing on practical engineering problems. My intention has been to indicate, as far as possible, the processes which determine the performance of various types of cleaning device in such a manner that those concerned with their application may be able to assess for themselves the best equipment for a given problem.

Inevitably, much of the subject matter is outside the immediate concern of the hospital engineer, but I hope you will agree, when I have finished, that it is almost impossible to draw a hard and fast line between the interests of one engineer as against those of another engaged in this rather involved subject. I am indebted to the Secretary of the Institution of Heating and Ventilation Engineers for permission to deliver this paper to your own Institution, but realising that inevitably your interests are more specialised, I will endeavour to add some remarks which are intended to put matters into perspective for you. In this connection no doubt a number of queries will arise which I have not been able to cover adequately in the paper as it exists, and I hope you will put these to me afterwards.

Just once in a while most of us stop and marvel that something we consider a necessity in our daily lives had never been heard of fifty or a hundred years ago. Air filtration is a case in point; were our ancestors all that much worse off than we in their ignorance of this science?—or maybe, has "progress" been responsible for creating the need?

It is hoped that this paper will be useful as a general guide to the subject, at least to the point where those with specific interests can pursue their more specialised studies, helped by a general "grounding."

Why air filtration? Certainly until the turn of the century "filtration" as a principle was applied almost exclusively to aqueous liquids, and as such, its beginnings are lost in the proverbial mists of antiquity. Even before man's first conscious efforts at filtration of water, wines, etc., Nature's own processes were at work, but again almost exclusively on liquids.

Natural air "filtration" as much is very limited, and almost exclusively confined to the gradual settling out of dust and other particulate matter at a rate determined by Stokes' Law. Natural sources of dust there are in plenty; some spectacular examples are provided by volcanoes. The famous 1883 explosion of Krakatoa in what is now the Republic of Indonesia is perhaps the best known. So much fine debris was produced that unusually magnificent sunsets resulted for upwards of two years throughout the world. Maybe some of that self-same dust—albeit just the odd sub-micronic particle—is in this room at this very moment. Mount Katmai in Alaska, which exploded early in the present century, is a more recent example of the same thing.

Then we have the world's deserts, the extent of which is sometimes forgotten by most of us surrounded by the green fertility conferred by our climate (or weather?). Dust there is in plenty, and just once in a while, it well and truly becomes airborne. The "fines" do not settle in a hurry (Mr. Stokes again!), and doubtless contribute to the millions of particles per cubic foot we accept as normal atmospheric "cleanliness."

Finally, there is man. So far, speaking in world-wide terms, man has not succeeded in outbidding Nature in dust production, but he is learning fast! Nuclear explosions are one spectacular example, though so far, individually at least, they cannot equal a good volcano. That is not to say that some of the stuff they do produce is not considerably more obnoxious—radioactive "fall-out" for example. Also in history we should not forget that many of the world's most dusty deserts—the Sahara, much of the Middle East and the Gobi are examples—were created as a direct result of man's vandalism in wholesale destruction of tree cover, followed by soil erosion, and ultimately a change in climate. However, that is now History, and providing we learn from the errors of our forefathers and avoid similar excesses in the future, the tide may ultimately be turned, literally, by determined schemes of re-afforestation and irrigation.

Our question " Why air filtration?" has still not been answered. General atmospheric pollution is as yet insufficient to justify action, except in very special cases. Combined inorganic and organic (e.g. pollen) pollution is usually tolerable—except to those of us plagued by hay fever!—but what about the airborne filth that soils our clothes, spoils our decorations, and costs millions a year in property depreciation alone?

The truth is that most unpleasant dust, fume, smoke, etc., is man-made, and in parallel with man's technological advance, epitomised by the nineteenth century " Industrial Revolution," so he perversely seemed to acquire unlimited capacity to produce more and yet more dirt and dust. As so often, cause and effect go hand in hand, and just as striving after higher standards of living involves a highly organised industrial system, so does gregarious man insist on crowding himself and his enterprises into densely populated areas, more often than not within dust's throw of these same industries.

We must not forget also the individual's responsibility. The cosy coal fire is a much more efficient producer of pollution than almost any industrial process. Very few of the latter could *afford* to burn their coal at 20% efficiency!

Fortunately, man's ingenuity does not stop at finding cunning methods to produce dirt and dust; their presence when produced, stimulates him into devising remedial measures. A measure of his undoubted success in producing equipment of incredible diversity to this end, is the length of this paper, which even so, barely scratches the surface of the subject.

Having disposed of the " Why " of the somewhat interrogative title of this paper—albeit rather light-heartedly—perhaps we should now proceed in more serious vein to deal with the " How."

Firstly, lest these preliminary remarks should give the wrong impression, this is not a paper on air pollution. That vast and vital subject is constantly before us, and although filtration may be an important factor, the true emphasis is on preventing contamination, rather than cleaning air. Also, numerous valuable contributions have already been made to the subject, as exemplified by the I.Mech.E. Conference " THE MECHANICAL ENGINEER'S CONTRIBUTION TO CLEAN AIR "—London, 19th to 21st February, 1957. In the present context, we shall concern ourselves largely with equipment designed to prevent dirt from ventilating air entering living or working spaces, together with some more incidental reference to air intake cleaners for machinery—internal combustion engines, compressors, etc. Some further reference may also be made to plant designed to stop dust being discharged from processes, but again " dust and fume collection " is a subject in itself, and would require the rest of this paper even to cover in outline.

It is intended to avoid classified lists of filters in this paper, but it will assist clarity to group remarks in three main headings, according to the energy form used in a given separator.

(*a*) Mechanical separation, including strainers, filters, cyclones and inertia cleaners generally, gravity separators, sonic flocculators and adsorptives.

(*b*) Electrical separation, including single and two-stage precipitators and principles based on the use of radio isotopes and particle migration in travelling electrostatic and electromagnetic fields.

(*c*) Thermal methods.

In many cases, of course, more than one principle can combine to produce the overall separating effect, but this should be apparent from the text.

Thermal Precipitation

This principle does not perhaps merit inclusion on the basis of its industrial importance, but the practical and involuntary effect of thermal precipitation is quite important, and this record would not be complete without some mention.

The staining of walls and ceilings near hot air discharge grilles and above radiators, etc., is an example. Although most of us realise that this is a perfectly natural occurrence, it occasionally causes some embarrassment when a customer puts down such staining to the fitment of inefficient filters in the air conditioning system.

" Thermal precipitation " infers the tendency for suspended dust to be repelled from a hotter surface or attracted to a colder surface, than the gas. The effect operates on all particles, however small, and as much atmospheric contamination in cities consists of very fine staining matter such as soot, capable of passing practically anything except an efficient " Absolute " filter, it is not surprising that staining occurs and it is not *necessarily* a reflection on the performance of the filters in the circuit.

The author can recall one instance where staining was produced near the discharge point in a laboratory, of absolute-filtered air (the term " absolute filter " will be defined later). This puzzling effect was later proved due to entrainment of not-so-clean air from the laboratory atmosphere by the jet pump effect of the clean air discharge itself. The solution was to reduce the velocity of the incoming clean air, and, incidentally, take steps to prevent dirt from being produced inside!

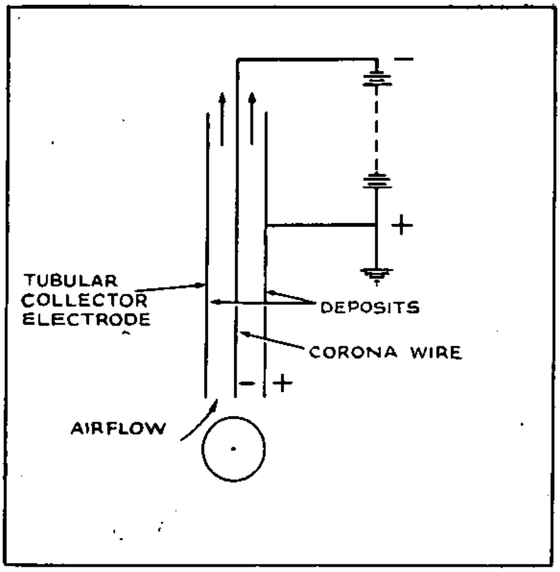


Fig. 1. Tubular Single Stage Precipitator.

The thermal precipitation principle has, of course, been put to good use in dust sampling test instruments. In this instance, the air to be sampled is passed across electrically-heated wires which, in effect, cause the total dust content to be deposited on a cold glass surface such as a microscope slide. A high thermal gradient of 4000°C/cm. is achieved and, within limits of air velocity, complete precipitation secured. This principle has not been usefully employed commercially on a large scale, although doubtless possibilities exist.

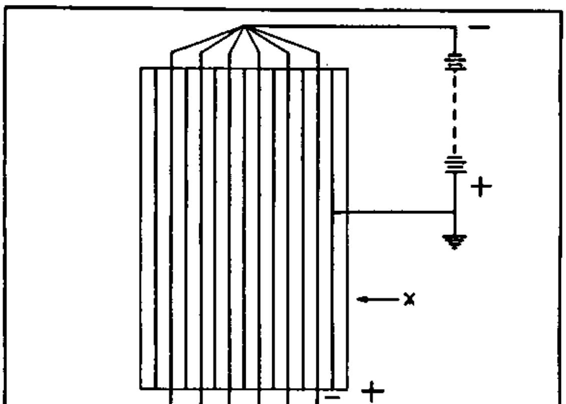


Fig. 2. Plate Single Stage Precipitator.

Electrical Precipitation

The theory of this subject is far too involved for more than general reference here, and we shall confine ourselves to an examination of the basic principles; for those who would like to take the matter further, a useful reference work is *An Introduction to Electrostatic Precipitation in Theory and Practice* by H. E. Rose and A. J. Wood (Constable).

The tendency for dust particles to move in an electrostatic field has been noted for over a hundred years, but practical application is more recent—maybe fifty years to be generous.

A well-designed electrostatic precipitator has an advantage over some mechanical methods of dust separation, in that finer particles can be almost as effectively handled as coarser ones. The basic

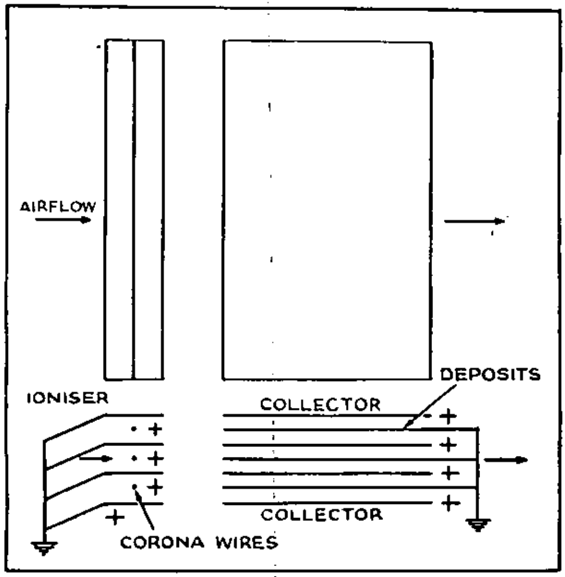


Fig. 3. Two Stage Precipitator.

reason for this is the natural surface to volume ratio increase with reduction of particle size, and the fact that the electrostatic charge held by a particle is more dependent on its surface area than on its volume.

In practice, of course, advantages may not be fully realised owing to the effects of air viscosity, turbulence, etc., and as usual in the final analysis, it is the excellence of design, combined with the ever present economic factor, that controls performance.

Electrostatic precipitators as generally understood are of two types. The single-stage precipitator is most widely used industrially. In this, the air is passed along a number of tubes (Fig. 1), usually in honeycomb formation, through each of which extends a fine central wire negatively charged to several thousand volts. The tubes are earthed, and an electrostatic field is set up. This is very intense in the region close to the central wire, so that a strong " corona " discharge is produced there. Ionisation of the gas occurs, and by a series of processes outside present consideration, dust particles are caused to migrate towards the tube walls. From this stage, mechanical means are employed to discharge the collected solids into a hopper for disposal—usually this involves either rapping or water sluicing.

Such plant is in very wide use for trapping dust in flue gases, discharge from cement works, etc., and in the metallurgical industries. Its advantages include ability to operate at elevated temperatures, but one serious defect prevents its use for air conditioning purposes: dangerous concentrations of ozone and oxides of nitrogen are produced in the corona region. This is of no particular moment for cleaning discharge gases, as atmospheric dilution will reduce concentration to a safe level long before any serious risk through inhalation can occur. Just what happens in places like Los Angeles during one of their famous temperature inversion smogs has doubtless been considered, but the author cannot recall direct reference. The single-stage precipitator is also manufactured as a " plate " type (Fig. 2) in which the earthed electrodes take the form of a series of parallel plates, between which are stretched equidistantly the fine, negatively charged corona wires.

The second conventional type of precipitator is the so-called " 2-stage " (Fig. 3). In this type, ionisation and particle charging are effected in a preliminary stage, usually comprising a series of positively charged ioniser wires stretched midway between earthed parallel plates. The " collector " stage follows, and usually consists of a series of parallel spaced plates alternately earthed and positively charged. Dust collects on the earthed plates, whence it can be removed periodically by mechanical means, or in at least one device, by discarding a complete inexpensive element and replacing—as with a throw-away filter.

Two-stage precipitators—as, for that matter, single-stage versions—can possess outstandingly good separating properties, but such performance must not be taken for granted. Much depends upon individual design, maintenance standard, and correct application. A substantial advantage is the extremely low back pressure, as the dust separating force is supplied by the electrostatic field and does not have to be provided mechanically by flow resistance.

In addition to electrostatic precipitators proper, a number of other interesting devices rely more or less upon electrostatic principles for their operation. For example, filters have been designed to operate in an electrostatic field, the effect being to enhance the intrinsic separating properties of the filter fibres by causing the dust particles to migrate towards them as the air passes through. This type of unit has one big advantage over the usual precipitator: the filter will tend to hold on to its collected solids even in the event of sudden power failure. Generally not of overriding importance, unloading of conventional precipitators can sometimes be serious, and it is not unknown for them to be followed by mechanical filters merely to accommodate this eventuality—particularly where highly toxic radioactive or bacteria laden dusts are handled, which must under no circumstances be allowed to reach the atmosphere.

The subject of A.C. electrostatic and electromagnetic precipitators is perhaps out of place in a general résumé of principles, as it is in a relatively early stage of development. The general idea is to cause dust laden gas passing through a tube or annulus to rotate rapidly under the action of a " travelling " A.C. electrostatic or electromagnetic field, following which separation of solids can be effected by conventional cyclonic means.

The so-called " self-charging " electrostatic filter should be included, as it is perhaps the only true electro*static* filter, bearing in mind that the types so far described require a definite and measurable electric *current* to operate them.

Resin impregnated wool lap filters have been widely used for high efficiency filtration in bacteriological work, and by the Atomic Energy Authority. It is usual to make them up in the form of cylindrical canisters, as by this means it is easy to control the degree of compression, and hence the bulk density of the thick laps of impregnated wool. This type of " electrostatic " filter relies more upon the maintenance of an initial charge than on self-charging properties, but despite a remarkable ratio of efficiency-to-pressure drop, more recent advances in purely " mechanical " filters have now largely caused it to be superseded.

The true "self-charging" electrostatic filter usually consists of a mat of either fibres or shavings of a high resistivity plastic or resin such as polyethylene, polystyrene, terylene, or perhaps, where cost permits and corrosion conditions demand, one of the chloro-fluoro derivatives such as P.T.F.E. or Polytrifluorochloroethylene. The theory of such filters is obscure, but it is believed that electrostatic charges are built up in the medium as a result of friction with particles passing across the fibre surfaces. Henceforth, subsequent particles are more and more attracted towards the fibres, some becoming trapped, and others increasing the charge further. Once arrested, the mechanism by which particles are retained on the fibres is even more obscure, as one would expect the dust and fibre charges to neutralise one another. Probably with the smaller particles at least, molecular attraction is the major factor, and it is a fact that smaller particles are retained much more positively than the larger ones. Very impressive and exaggerated claims have been made for these filters, particularly in the U.S.A., but such tests as I have been associated with have given disappointing results on test dusts of wide particle size range, such as those specified for filter testing by the B.S.I. and normally encountered in practice. Nevertheless, the principle is attractive, and perhaps one day a version will be produced capable of approaching the performance expected from equivalent commercial "mechanical" filters, and yet retaining the undoubtedly attractive characteristic of easy washing off with a simple hose and water.

Another possibility is the use of radiation from radioisotopes to produce ionisation in an airstream as an alternative to an electrostatic field. Patents have been published claiming to have utilised this principle to good effect and cause dust particles to migrate towards the filter which forms a second stage. Information available to date is extremely vague, and most remarks heard by the author have been discouraging. Maybe we shall hear more of this principle in the future.

(To be continued)

B.S.I. News

Abstracts from information supplied by the British Standards Institution

REVISED BRITISH STANDARDS

B.S. 2508 : 1959 Rubber-proofed bed sheeting for hospital use. 4/–

Provides details of three types of sheeting, both as regards fabric and proofing. It also includes methods of test.

AMENDMENT SLIPS

Please order amendment slips by quoting the reference number (PD...) and not the B.S. number.

	Ref. No.
B.S. 329 : 1957 Round strand and flattened strand steel wire suspension ropes for lifts and hoists. Amendment No. 2	PD 3540
B.S. 435 : 1931 Granite and whinstone kerbs, channels, quadrants and setts. Amendment No. 1	PD 3538
B.S. 1259 : 1958 Intrinsically safe electrical apparatus and circuits for use in explosive atmospheres. Amendment No. 1	PD 3511
B.S. 1972 : 1953 Low density polythene tube for cold water services. Amendment No. 3	PD 3529
B.S. 2506 : 1254 Anti-static rubber footwear for use in hospitals. Amendment No. 3	PD 3512
B.S. 3063 : 1959 Dimensions of gaskets for pipe flanges. Amendment No. 1	PD 3526

BRITISH STANDARDS REVIEWED AND CONFIRMED

The following British Standards have been reviewed in accordance with B.S.I. procedure and have been confirmed as satisfying present requirements:

B.S. 731 Part 1 : 1952 Flexible steel conduit and adaptors for the protection of electric cable (with published amendment)

B.S. 887 : 1950 Vernier callipers (with published amendments)

B.S. 957 : 1941 Feeler gauges (with published amendment)

B.S. 1643 : 1950 Vernier height gauges (with published amendment)

B.S. 1963 : 1953 Pressure-operated relay valves for use with town gas

REVIEWED AND PROPOSED FOR CONFIRMATION

*B.S. 864 : 1953 Capillary and compression fittings of copper and copper alloy for use with copper tube complying with B.S. 659 and B.S. 1386. 4/–

*Reprint marked * has had amendments incorporated in the text of the standard.*

DRAFT STANDARDS CIRCULATED FOR COMMENT

CZ 9990 Glass urine bottles (For male use). [2 pp.]

A 16 Capillary pipettes (revision of B.S. 1428. Part 4; also listed as B.S. 797). [8 pp.]

A 67 Test tubes and boiler tubes. [2 pp.]

A 150 Fire brigade rescue lines. [11 pp.]

A 151 Flanges and bolting for pipes, valves and fittings (revision of B.S. 10—Parts 2 to 5). [27 pp.]

A 594 Thermographs (bi-metallic Type) for air temperatures within the range 0°F to 140°F (—20°C to 60°C). [4 pp.]

A 1051 Reference tables for copper/constantan thermocouples. (8 pp.)

A 2066 Industrial eye protectors. Part 1—Eye protectors for general use, excluding high velocity hazards. (16 pp.)

A 2189 Tubular fluorescent lamps for general lighting service (revision of B.S. 1853 : 1956). (23 pp.)

A 2379 Outdoor uniform cloths for fire service, local authority and hospital staffs (revision of B.S. 1771 and B.S. 2551). (10 pp.)

A 2381 Tickings for use by hospitals and local authorities (revision of B.S. 2732). (4 pp.)

A 2663 Diaphragm ball-valves. (14 pp.)

A 2911 General requirements for the use of high-strength friction-grip bolts in structural steelwork. (8 pp.)

A 3062 Variable high-pressure regulators for use with butane/propane gases (9 pp.)

A 3161 Laboratory deflection pH meters. (4 pp.)

NEW WORK STARTED

Salt-glazed ware pipes (revision of B.S. 65)

Fittings for double-capped tubular lamps (revision of B.S. 495)

Dimensions of drain fittings (revision of B.S. 539 Part 1)

Dimensions of drain fittings, Scottish type (revision of B.S. 539 Part 2)

Glass (vitreous) enamelled salt-glazed fireclay pipes (revision of B.S. 540)

Schedule of weights of building materials (revision of B.S. 648)

Acceptance tests for small steam-raising plant (revision of B.S. 845)

Metal scaffolding (revision of B.S. 1139)

Salt-glazed ware pipes with chemically resistant properties (revision of B.S. 1143)

Thermal insulating materials for use within the temperature range 200°F. to 450°F. (revision of B.S. 1588)

Thermal insulating materials—plastic composition, flexible and loose-fill (revision of B.S. 1589)

Recommendations for the use of bitumen emulsion for roads (revision of B.S. 2542)

Blockboard and laminboard

Calorific value of fuel gases

REPRINTS

B.S. 381 C : 1948 Colours for ready mixed paints. 7/6

*B.S. 1382 : 1948 Portable fire extinguishers of the water type (gas pressure). 4/6

*B.S. 1557 : 1954 Polythene-insulated cables sheathed with P.V.C. for electric power and lighting up to 250 volts. 6/-

*B.S. 2929 : 1957 Safety colours for use in industry. 4/6

*Reprints marked * have had amendments incorporated in the text of the standard.*

BRAIDED TRAVELLING CABLES FOR ELECTRIC LIFTS (B.S. 977 : 1959)

This revision of B.S.977 is confined to braided cables, the design of which has been improved to give increased flexibility. A new flexibility test has been introduced and the fire-resistance test has been made more stringent. The electrical requirements are generally in accordance with those for general-purpose rubber-insulated cables given in B.S. 7.

Automatic Water Softening Plant

HARDNESS scale deposited in boilers and hot water systems is one of the chief bugbears of the hot water engineer; it reduces heating efficiency, increases fuel consumption and necessitates frequently expensive maintenance. Hard water—hot or cold—imposes many additional disadvantages in catering, laundering and domestic applications.

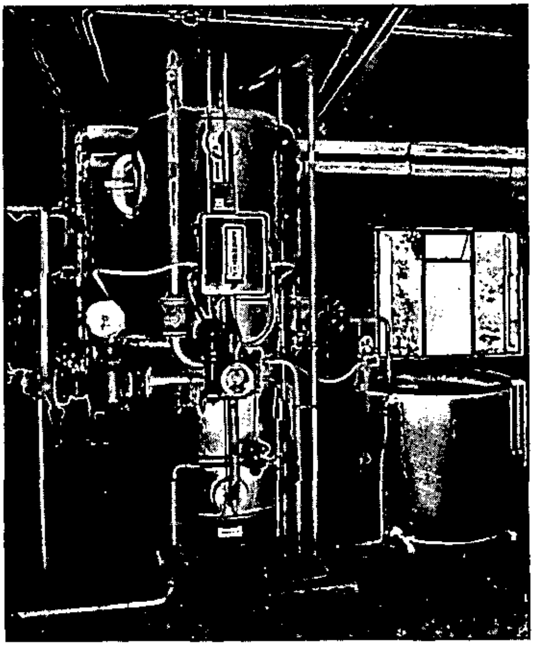
Base exchange softening, pioneered in this country by The Permutit Co. Ltd., London, provides the easiest and cheapest method of eliminating hardness in mains water in normal circumstances.

Present day standards of comfort and hygiene demand the provision of extensive hot water systems. Since skilled labour for manually operating the type of plant which such buildings necessitate is a growing problem, the installation of automatic plant—capable of trouble-free, round-the-clock performance—is desirable.

The Permutit Company claim that their Fully Automatic Softening Plant fulfills this requirement completely and is available to meet every need of those responsible for the design and equipping of large buildings of all types.

The plant is self-operating and requires no attention beyond replenishment of the brine tank. When regeneration is due the Softener automatically cuts itself out of service, regenerates and then returns to service. The brine required for regeneration is measured and injected automatically so that the entire regeneration sequence is completed without human aid. Personal supervision is thus reduced to a minimum while the risk of human error—always present where manually operated plant is involved—is eliminated. Furthermore, the output of softened water is maintained at uniform quality while wastage of salt, or danger of over-running the Softener, is avoided.

Permutit Fully Automatic Softeners are charged with polystyrene Ion-Exchange resin material noted for its robustness and durability. It has a high softening capacity coupled with low salt consumption for economy of operation.



A Permutit Fully Automatic Softening Plant installed in a large London hospital. This plant softens to zero hardness the water fed to the hospital's main boilers.

Forthcoming Exhibitions

THERE is coming to be such a veritable spate of exhibitions at this time of the year that it is not really surprising to hear the occasional remark from those who think it is being overdone. Be that as it may we review below those that are scheduled for the immediate future.

Hotelympia 1960

The Hotel and Catering Exhibition is on at Olympia from January 19th to 28th. There are over 250 exhibitors and of particular interest to readers will be latest developments in large scale cooking equipment.

Though this exhibition was covered in our October issue, we have since learnt that C. H. Blackburn & Co. will be showing their Stellex products, including several electrically-heated food conveyors of which one is a suspended model for use on sloping roadways ; a hotcupboard suitable for hospital staff dining rooms ; Calorinex insulated containers, constructed throughout of 18/8 stainless steel, for the carriage of hot or cold food and drink.

Another of this Company's exhibits is a Belgian made multi-purpose food preparing machine which includes accessories for most preparing operations and is suitable for small hospitals.

Cleaning, Maintenance & Floor Trades Exhibition

As already reported, this exhibition is the first to be devoted to this subject and will be held at the Old Horticultural Hall, Westminster, from 1st to 5th of February. Although this hall is comparatively small, there will be 12,000 square feet of floor space which has been very fully booked up. A convention will form an integral part of the exhibition.

The exhibits will consist mainly of sweeping, polishing, scrubbing and sanding machines and accessories ; degreasing machinery and agents ; flooring materials such as concrete, steel, timber, granolith, terrazzo, glass and tiles ; floor coverings ; cleansing agents, finishes and their applicators ; disinfectants, dressings and adhesives.

We hear that one firm is to exhibit a new range of plastic emulsions for floors and another will feature two special sealers and a slip-retardant which was introduced last year.

Automatic Vending Exhibition

Hard on the heels of the above is another, the Automatic Vending Exhibition, also organised by Contemporary Exhibitions Ltd. This may not appear at first sight to interest our readers much, but vending machines are already finding various applications in hospitals and we learnt recently that a Sankey "Vendo" milk vending machine has been installed in the Nurses' Home at Guy's Hospital.

This exhibition, which is the second of its kind, will be held at the New Horticultural Hall, Westminster, and will cover some 20,000 square feet, all of which has now been sold. Over forty firms will be exhibiting, covering the automatic sale of, amongst other things, cigarettes, confectionery, packaged snacks, cakes, etc., soft drinks, tea, coffee, ice-cream, bottled drinks and even portrait-photographs !

The date : February 15th to 18th.

Industrial and Commercial Refrigeration Exhibition

Running concurrently with the Vending Exhibition, though from February 15th to 17th only, will be this Refrigeration Exhibition which will be held in the Old Horticultural Hall, Westminster. (For the benefit of readers we would mention that the *New* and the *Old* Westminster Halls are very close together and lie approximately behind the Army & Navy Stores in Victoria Street.)

A variety of equipment and refrigerating machinery for cold stores, hotspitals, etc., can be seen, together with equipment for the storage and transport of meat, milk, fish, ice-cream, etc.

Complimentary tickets for this exhibition are available upon application in writing to us at 45, Great Russell Street, London, W.C.1.

"Gas at Work in Industry" Exhibition

An exhibition illustrating "Gas at Work in Industry" will be held at the Horticultural Hall, Westminster, from March 1st to 12th.

It is the second of its kind, the first having been staged in 1957, and proving so successful that there have been many requests for another on similar lines. As in 1957 the exhibition is sponsored by four of the Area Gas Boards—Eastern, North Thames, South Eastern and Southern.

How gas continues to meet the demands of modern industry will be demonstrated by working plants, models, photographs, films, etc. Atomic energy, radar, television, aircraft, rockets are among the industries which make use of gas.

There will be demonstrations of metal melting, tinning, diecasting, and special purpose plant for the clean heat treatment of metals. Another feature will be the vitreous enamelling of aluminium, of special interest as it will employ plant of new design. Drying operations by means of direct and indirect plant will be seen, and an infra red plant will carry out paint finishing operations.

Processes used in the clothing industry will be demonstrated and a model bakery will be producing both bread and confectionery. Catering, heating and hot water appliances will be well represented, with a special feature demonstrating new types of incinerators.

Electrical Engineers Exhibition (A.S.E.E.)

A preliminary announcement says that, yet again, a bigger-than-ever Electrical Engineers Exhibition is forecast for April 5th to 9th at Earls Court.

Earlier bookings indicate that around 450 manufacturers will take part. The large number of new exhibitors has made it necessary to increase the quantity of first floor stand sites and the show will have nearly five miles of stand frontages.

Bromham Hospital Extensions

OPENING OF NEW KITCHEN AND RECREATION HALL

DECEMBER 17th saw the opening by Mr. Kenneth Robinson, M.P., of the new central Kitchen, Staff Dining Room and Recreation Hall at Bromham Hospital near Bedford. Major Simon Whitbread, Chairman of the Management Committee, was unfortunately prevented by illness from attending the ceremony.

The buildings have been erected at a cost of approximately £70,000 by the North West Metropolitan R.H.B.

The Central Kitchen replaces a system of cooking in eight separate ward blocks and in a separate kitchen for staff. The new dining room will release accommodation needed for other purposes in the main administrative building.

The Recreation Hall provides a new amenity for the hospital.

Central Kitchen

The building has a flat roof with clerestory lighting and ventilation to the central portion. A light multi-coloured brick has been used with a contrasting dark brick below at plinth level.

The central area measuring 25 ft. by 64 ft., has a height of 12 ft. 6 ins. and is surrounded by a lower building 8 ft. 6 ins. floor to ceiling, comprising the preparation areas, wash-up, cold rooms, stores, office, kitchen staff dining room, toilets, trolley bay, etc.

The main kitchen area, preparation areas, wash-up and larder, are provided with quarry tile floors and the walls have a glazed tile dado to a height of 7 ft. 0 ins. Ceilings have been treated with anti-condensation paint.

The equipment is principally heated by steam, but the ranges and fish fryer are automatically oil-fired.

Electrical equipment includes food mixers, slicer, potato peeler, potato chipper, grill, pastry oven, proving oven, mincer, etc.

Hot water is supplied through a calorifier in a chamber forming part of the new building.

Staff Dining Room

This has been provided as a continuation of the main kitchen building to the east with a pleasant outlook to the south.

The floor is of Muhuhu West African hardwood blocks. The decorations are generally in emulsion paint in a varied and attractive colour scheme. Exposed concrete columns, beams, etc., are faced with a reconstructed stone aggregate. Mount Sorrel exposed aggregate precast panels have been used as a cladding to the east wall of the Staff Canteen in the Central Kitchen Block. This aggregate has also been used to form contrasting paving to the terraces generally.

A service counter has been provided between the kitchen and dining room which includes hot closets, bain marie and hot water and coffee sets.

The dining room has been furnished to seat fifty people. There is a separate entrance from a terrace with a lobby and toilet facilities.

Recreation Hall

The new hall is built adjacent to the main drive—Chestnut Avenue — overlooking the recreation ground. A light multi-coloured brick has been used, except in the gables which are in dark facing bricks. The building has a pitched slate roof which has provided a high curved ceiling 18 ft. 6 ins. from the floor to the centre.

The hall, 40 ft. by 65 ft., has been designed to seat 400 people. The floor is of Sapele West African hardwood strips laid as a multi-purpose floor to cater for dancing, recreation, etc. The entrance hall and cloakroom floors are in terrazzo, a marble aggregate floor highly polished and in contrasting colours with ebonite dividing strips.

A general purpose room and projection room is situated over the entrance hall. A balcony is divided from this room by a sliding folding door which can be opened to any desired extent.

A small servery is provided off the hall in order to supply refreshments, etc., during functions. The servery, also the stairs to the projection room, are shut off from the entrance hall by a glazed screen in order to restrict entry to these areas.

The hall will also be used for the holding of religious services, and an altar recess has been constructed at the rear of the stage. The altar has been given by Mr. W. J. Bushby. During secular occasions the altar will be shut off from the rest of the hall, but can be brought into use either generally, or merely within the confines of the stage area.

Advantage has been taken of the fall in ground levels, and dressing rooms and a chair store have been incorporated under the stage. Access is provided to both sides of the stage and hall from the lower level and an entrance opens directly on to the playing field.

Doors in the hall window units upen out on to terraces constructed along both sides of the building.

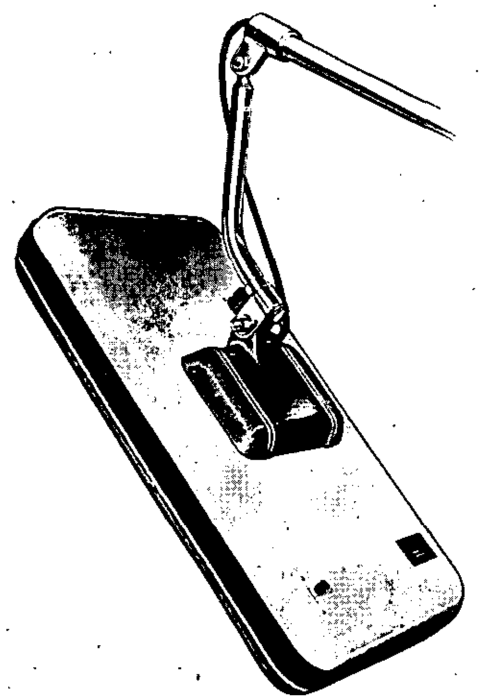
The building is warmed by convector heating cabinets, the supply being taken from the main heating system. Recessed lighting fittings have been installed in the main hall to secure a minimum obtrusion on the surface of the ceiling. The height of the ceiling will allow for the playing of badminton.

Boiler House Extension

The new buildings necessitated an additional steam boiler which has been installed adjacent to the existing Hospital Boiler House. This boiler is oil-fired and automatic in operation. It is hoped that this marks the first stage of new boiler plant to replace existing hand-fired sectional boilers.

On the Market

A Review of new equipment and materials and their development



The " Allen " Dental Light.

NEW LAMPS FOR OLD

A new type of mounting for the " Allen " Dental Light has just been marketed. It is called the Replacement Model and is designed to take the place of old-fashioned and inefficient lamps whilst enabling the existing arm to be used.

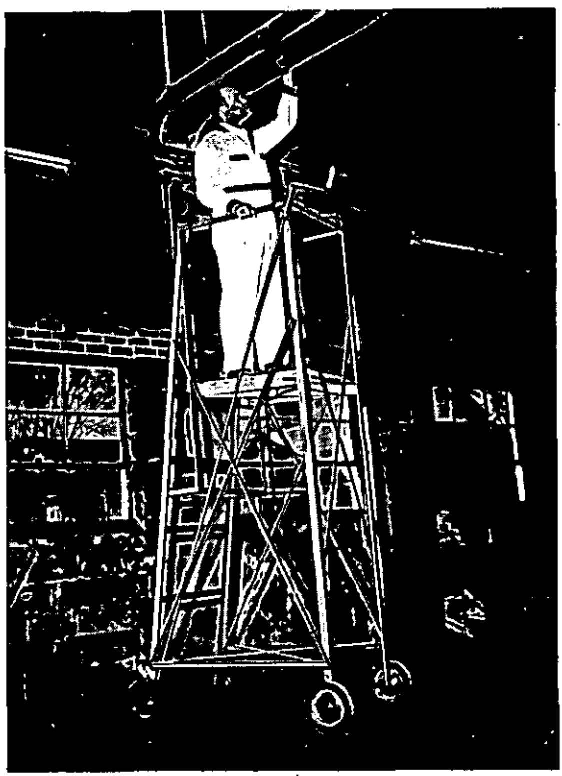
The Replacement Model comes complete with a universal adaptor suitable for all types of tubular arm. The only electrical work involved is connection to the existing wiring in the arm; the necessary connectors and cable are supplied.

The " Allen " Dental Light is a fluorescent operating light designed to illuminate the whole working area—mouth, instrument table and chair surroundings, so that eyestrain is reduced to a minimum as there is no undue contrast in the visual field. The large area of the light source gives shadow-free illumination without glare. Due to the high output of fluorescent tubes the light is cool, ensuring both operator and patient comfort, so unlike the old-fashioned multi lamp high wattage lights which it is designed to replace.

The lamp is 24 in. × 13 in. and contains four 20 watt " Daylight " tubes within a moulded Perspex case. To fit ⅞ in. to 1 in. diameter tubular arms, with swivelling and tilting mountings, the price complete, with tubes, cables and connectors, is £39 10s. The manufacturers are **P. W. Allen and Co.**, 253, Liverpool Road, London, N.10.

SELF-MOVING PLATFORM FOR MAINTENANCE

For jobs which could be done more quickly with some form of moveable staging, the " Move-on," a form of adjustable staging, is available which is not merely mobile but self-propelling. Introduced by **Anderston Clyde (Midlands) Ltd.**, the " Move-on " has a platform which can be set in six different positions between 2 ft. and 5 ft. from the ground, allowing access to working heights of up to 12 ft. and is suitable for general maintenance, cleaning, painting, decorating, fitting electric lights, etc.



Self-propelling " Move-on " adjustable Staging.

By rotating a handle situated on the platform rail, the operator can move himself forward or backward. A second handle works the Ackerman steering gear. By means of these controls the operator can move about the job without assistance. The standard machine will pass through any doorway 6 ft. 6 in. × 2 ft. 6 in.

A fixed handrail ensures complete security for the operator, and access to the platform is by means of suitably positioned rungs. The unit has rubber-tyred wheels, and is fitted with a safety brake which holds it in place whilst work is in progress.

Maintenance-free, and galvanised completely against rusting, the " Move-on " and its container together weigh only 94 lbs., and the complete cost is £27 10s. ex. works.

A fully illustrated leaflet is available from the makers whose address is Irk Vale Works, Chadderton, Manchester.

" COLORCOTE "

One of the newest products of **British Bitumen Emulsions Ltd.** of Dundee Road, Trading Estate, Slough, Bucks, is " Colorcote," a paint which gives a decorative and hard-wearing finish to wood, brick, stone and concrete floors. It can also be applied to the interior and exterior surfaces of asbestos, brick and concrete walls for decorative purposes.

Applied by brush or roller, in one application, to the cleaned floor surface, the floor is ready for use overnight. The " Colorcote " surface, which is semi-matt, can be given lustre and protection by an occasional dressing of wax polish.

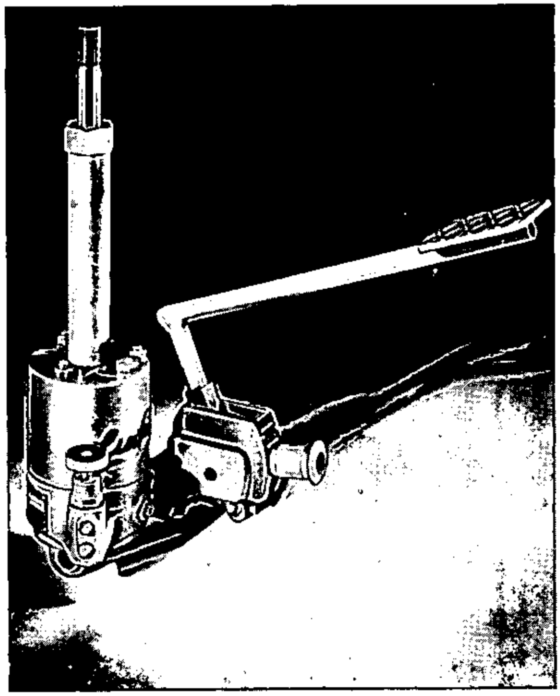
Coverage is 25/30 sq. yards per gallon. It has a storage life of a minimum of six months in good storage conditions.

Colours are Beige, Light Stone, Mid-Brown, Tile Red, Green, Grey, White, Black. Price, 10 gallon drums at 41s. per gallon.

NEW FOOT-OPERATED PUMP-RAM UNIT

Designed basically for the mechanical handling field, a foot-operated hydraulic pump-ram unit now being manufactured by the **Linford Engineering Co. Ltd.**, of Baker Street, Birmingham, 11, is adaptable for special applications such as barber's chairs, dentist's chairs and operating tables. Our illustration shows the unit to be compact.

Due to the necessity for a spring return lever, the pump is single acting. No external pipework is required which simplifies and cheapens installation. Five sizes are available, from 1,100 to 4,400 lbs. and, in response to demand, the unit has been developed from the earlier hand-operated model.



The Linford Pump-ram Unit capable of wide adaptation.

It will be appreciated that the capacity and stroke of the ram component is supplied to individual requirements and the basic price of £19 17s. 6d. is subject to a small addition according to the ram specification nominated.

NEW CHLORIDE HIGH PERFORMANCE PLANTE CELLS

Chloride Batteries Ltd. announce the introduction of a new range of Plante batteries which give a higher performance from a smaller, lighter cell.

The outstanding features of these new cells are a saving in space of up to 50%, compared with cells made to BSS.440, with a reduction in weight. They have a lower internal resistance and an improved performance at high rates of discharge, ranging from an increase of approximately 14% at the 1 hour rate to an increase of 100% at the 3-second rate of discharge.

The cells are supplied fully assembled, and in the British Isles they are despatched filled with acid and fully charged ready for immediate service.

These new Chloride cells have been specially designed for standby duties entailing discharge rates between the 3-hour rate and the very high rates demanded for switch-closing purposes. They are ideal for trickle-charge operation and from now onwards will be fitted in all Keepalite emergency lighting units. Other applications for which they are suitable are switch-tripping, telephones, supervisory and signalling duties and all standby duties requiring a reliable D.C. supply.

There are fourteen different sizes of cells in the new range, with capacities ranging from 15 Ah to 400 Ah at the 10-hour rate of discharge. For duties requiring extra high currents the cells can be supplied with copper inserts in the pillars to increase conductivity.

Trade Notes

BAKER PERKINS EXPANSION

Expansion at Baker Perkins Ltd., Hebburn-on-Tyne, County Durham, has led to three new appointments.

Mr. W. H. W. Howes is now Assistant Sales Manager, Mr. A. H. Hawke is Technical Representative in the hospital laundry field, Mr. C. G. Chadwick is representative for sterilisation equipment.

Mr. Howes, who has been with Baker Perkins for many years, was until recently the Company's London representative. His appointment follows Baker Perkins' declared policy of expanding their activities with the utmost vigour in the laundry, dry cleaning and hospital sterilising equipment fields. A typical example of this policy of expansion is the manufacture of the Movemaster series of conveyors which has been added recently to the Baker Perkins' range of equipment. A conveyor department has been formed at Hebburn to deal with this side of the business.

Mr. Hawke returned to Britain this year from the Far East, where he had been manager of the Singapore Steam Laundry since 1945. In Singapore he had considerable experience in laundering for hospitals, and his company was the first in the Far East to install a Carousel Contra Flow Washing Unit. With Baker Perkins, he will be a consultant for the design, layout and operation of complete plants in hospital laundries. Mr. Hawke will act as advisor not only to hospitals, but also to consulting engineers. He will maintain the closest possible liaison with officers of regional hospital boards and boards of governors of teaching hospitals throughout Britain.

Mr. Chadwick will be consultant and sales representative for the various types of sterilisation equipment now being marketed by Baker Perkins. From 1948 to 1954 Mr. Chadwick was Deputy Group Secretary of South Manchester Hospital Management Committee and was responsible for the administration of Wythenshawe Hospital. He followed this with four years as Group Secretary of Burton-on-Trent Hospital Management Committee. Mr. Chadwick's address is 41, Town Road, Burton-on-Trent. Telephone: Burton-on-Trent 5789.

OXYGEN

Oxygen has widespread industrial and medical application and is made available for use compressed in cylinders or from a liquid source. Whereas its value is recognised by all who use it, not all appreciate its potential as a fire raiser. Not only does combustion depend upon oxygen, but the intensity of combustion is increased in proportion to the amount of oxygen available and the temperature at which many combustibles burn is reduced where the concentration on oxygen is increased.

The F.P.A. Technical Information Sheet *Oxygen* No. 3013 is intended as a guide to those using oxygen either from cylinders or piped from a central reservoir. It discusses some of the properties and uses of oxygen and offers practical advice on the care and storage of the cylinders. Those concerned with the re-charging or decanting of liquid oxygen tanks are reminded of the precautions they should observe.

Copies of this Technical Information Sheet can be obtained free of charge on request to the Fire Protection Association, 31/45, Gresham Street, London, E.C.2.

SPIRAX THERMODYNAMIC TRAPS

There has been a substantial reduction in the prices of two sizes of Spirax Thermodynamic (T.D.) traps.

In particular the ⅜" T.D. trap has been reduced in price from £3 5s. 0d. to £2 10s. 0d. and the ½" T.D. trap, which incorporates an integral strainer, has come down from £5 15s. 0d. to £4 15s. 0d.

The demand for these traps has enabled the Company to install special-purpose machines which are now coming into operation and they have felt it right to pass on these advantages to our friends.

In addition, from the 1st November, 1959, they will be reducing the price of the ½" T.D. 350 flanged trap from £14 10s. 0d. to £11 10s. 0d. and the ¾" T.D. flanged trap from £18 10s. 0d. to £15 10s. 0d.

KODAK "EKTACOLOR" PAPER

The material formerly known as "Kodak" Colour Print Paper Type C has now been re-named Kodak "Ektacolor" Paper. Its properties remain unchanged.

PHENOLIC RESIN FOAMS

Bakelite Ltd. announce the publication of Advance Information Sheet B.36 entitled "Bakelite Phenolic Resin Foams." This gives details of a low-density cellular material recently developed for use in thermal insulation and as a lightweight core material for building panels. Information is also given on the special machines which have been developed for rapid mixing and dispensing of the foams.

Bakelite supply the phenolic resin, foaming agent and hardener, which can be mixed and then poured into a mould for making into large blocks for cutting into slabs ; alternatively, the mix can be poured into cavities for foaming *in situ*. The complete mixing and foaming process takes less than ten minutes and the foams, which are unique in the plastics foam field because they do not support combustion, can be made into densities from 1 lb./cu. ft. upwards.

Copies of the leaflet are obtainable, free of charge, from Bakelite Ltd., 12-18, Grosvenor Gardens, S.W.1.

PHILIPS NEW SOUTH WEST REGIONAL HEADQUARTERS

Philips Electrical Ltd. has recently opened a new and enlarged headquarters for their South West Region at 51, Victoria Street, Bristol (Telephone 93311).

"WANDSWORTH" CHANGE ADDRESS

As from 11th January, 1960, the London Office address of the Wandsworth Electrical Manufacturing Co. Ltd. has been changed to Portman Chambers, 7/9, Baker Street, London, W.1. The telephone number is HUNter 3201.

Correspondence

29th December, 1959.

The Editor.

DEAR SIR,

I have read with interest the two letters published in the December issue of the magazine, and heartily endorse all that has been said *re* the findings of the Industrial Court on salaries of Hospital Engineers.

I do feel that a fact finding Commission is required to enquire into the responsibilities of all engineers in the Hospital Service (Superintendents, Senior and Assistant Engineers).

As we all know, there is no comparison between the Administative Staff salaries to-day and that of the Professional and Technical Staff, also we must not forget that not a day goes by but that some hospital somewhere up and down the country is not having more and more mechanical aids installed, to speed up and lighten the burden in one department or other, all of which is under the control of the Engineer's Department.

Lowering the standard of qualifications is not the answer. The correct remuneration for the responsibility borne by the department will attract the right men into the Service.

Perhaps the Members would like to express their views on this matter, which I am sure will be of interest to all concerned.

Yours faithfully,

D. S. MARSH-JONES,

A.I.Mar.E., M.I.H.E.

" Sunset,"
128, Straight Road,
Colchester, Essex.

28th December, 1959.

To the Editor.

DEAR SIR,

May I thoroughly endorse the remarks of Mr. Robert W. Allen and Mr. W. A. Galt, in the December issue of our JOURNAL, concerning the ridiculous salaries of Hospital Engineers.

The comparison of salary awards in A.C. circular 67 with those suggested in the Industrial Court Award for engineers, have no relation whatsoever with the qualifications required, skill and responsibility of the engineer and his opposite number in the A.C. world.

It means that in the majority of Groups, the Superintendent Engineer will be on a lower salary scale than that of the Secretary, Deputy Secretary, Finance Officer, Deputy Finance Officer and Supply Officer, whilst the Senior Engineer can never hope to be financially on a par with any of the types in his hospital who are graded " General Administrative " and as for the poor old Assistant Engineer, he would be better off as a bus conductor.

It means that each time we engineers sit in Committee, we are the lowest paid of all the hospital officers present, yet, sitting around that table, we often have to make some of the heaviest decisions.

Not only is this bad for the pocket but also for prestige. Slowly but surely our departments will be pushed into the background, instead of rising from the normal conception of the *General Handyman*.

How can we expect to recruit the right type of man in our ranks when we advertise, stating qualifications such as M.O.T. Certificates, O.N.C. and H.N.C., etc., then offer such salaries. No man in his right mind would enter this Service to make his career as an engineer, rather would he take a correspondence course and apply for a clerical position, bearing in mind that anyone of Higher Clerical Grade is paid equally to a Senior Engineer of the average hospital.

In my Group, for instance, the Group Secretary's Secretary is on a higher salary scale than my Senior Engineer, and the Finance Officer is not merely just above my scale, it is a matter of hundreds of pounds annually. Even the Deputy Finance Officer has a top scale of £200 more than mine.

This surely is not a fair rating of our respective responsibilities and does not make for good cooperation and feeling between the various departments. The time has come when our salaries must be viewed in their correct perspective and on no account must we recruit sub-standard material in order to fill our ranks.

Yours faithfully,

V. A. T. WADE,

Lt.-Comdr. R.N., M.I.Mar.E., M.I.H.E.

Superintendent Engineer.

Book Reviews

PROFESSIONAL ENGINEERS (Choice of Careers Series No. 92). Central Youth Employment Executive. H.M.S.O. 8½ ins. × 5½ ins. 56 pp. 1s. 9d.

This booklet differs from the one reviewed next in that it is designed to convey as completely as possible within its capacity, and in the form of general information, a broad picture of engineering as a career. It is, of course, primarily a guide to the beginner but it is, as stated in the Introduction, " intended to help you to decide whether the career of a professional engineer would appeal to you, whether you could reach the standard required and, provisionally, in which branches of engineering you are most likely to find the greatest interest."

The contents include chapters on how engineers are trained ; the work that engineers do ; some different kinds of engineering ; prospects ; how to become an engineer, and appendices covering the professional institutions and fields of training and employment for engineers.

Although aimed at the school leaver, this booklet will be most useful to the older man having some years of practical engineering experience who intends now to obtain technical qualifications. To him, both booklets are well worth the few shillings involved.

(*Continued on page 18*)

(Continued from page 17)

ENGINEERING EDUCATION IN THE REGION, 1959. Regional Advisory Council, Tavistock House South, Tavistock Square, London, W.C.1. 8½ ins. × 5½ ins. 36 pp. 3s. 6d.

This booklet, of which the issue reviewed is the seventh edition, has been produced to assist young people in London and the Home Counties who wish to follow a recognised course in some branch of engineering.

No attempt is made to advise the would-be engineer as to what particular branch of engineering he should follow and intending students are recommended to seek the guidance of an expert to enable them to select the course appropriate to their requirements and capabilities. However, the introductory notes include a valuable summary describing the four main headings under which trained people in the engineering industries can be classified, i.e. " professional engineers," " technologists," " technicians " and " craftsmen."

The bulk of the booklet is devoted to lists of courses available and their nature as follows :—Degree and Diploma courses ; courses in direct preparation for professional examinations ; Higher National Certificate courses ; Technicians and senior craft courses ; courses for Ordinary National Diplomas and Certificates ; craft courses.

Addresses of colleges and professional institutions are included, and a subject index.

Notes for Members

News of I.H.E. activities, etc., and items of interest from Branches

The late James Forsyth.

OBITUARY

Mr. J. Forsyth

We regret to announce the death of Mr. James Forsyth, Hon. Treasurer of the Institution, on December 26th last.

Mr. Forsyth began his engineering career with a five year apprenticeship served with the North British Locomotive Company, Glasgow, during which time he obtained a 1st Class Diploma in Mechanical Engineering. He followed this up with a short spell as a lift engineer with A. P. Stevens & Co., of Glasgow, and then a further spell with the Beardmore Company. In 1925 he took up an appointment in Guatemala, Central America, as Chief Engineer on a coffee plantation. 1929 found him in Canada as Chief Maintenance Engineer to the Ford Motor Co. in Montreal.

Mr. Forsyth returned to this country in 1931 and joined the staff of the Chemical Engineering Department, University College, London. He was appointed Engineer - in - Charge of the Royal Southants Hospital in 1941 and promoted Superintendent Engineer to Southampton Group Hospital Committee in 1949.

We have received the following appreciation :—

With the passing of Jimmy Forsyth at a comparatively early age, the Institution has lost another of its founder members, and there were few, if any, of its facets with which he had not at some time been actively concerned. He had been a member of Council since the early days, had sat on numerous committees, including B.S.I. and Whitley Council, and had held office as Vice-Chairman, Chairman and latterly, as Hon. Treasurer. In all these tasks he invariably gave of his best—he knew no other way—and was held in the highest esteem by everyone with whom he worked.

Where the Institution was concerned nothing was too much trouble. He visited branches all over the country, never sparing himself, and some will recall an epic all-night drive from Dundee to Southampton in his little Ford 10 to cover two meetings on successive days. Of such stuff was he made. His handwriting was typical of the perfection he sought in all he did.

Jimmy was not a man who talked about himself and few will know that he joined the Royal Flying Corps in World War I well under age. Fewer still will know that he was involved in the serious earthquake in Guatemala in 1929 when the plantation of which he was Chief Engineer was wrecked within minutes and destroyed by fire. Having lost everything, including his livelihood, he obtained a horse and rode from Guatemala to Vancouver, B.C., paying for his needs by cutting keys and doing odd jobs in the places he passed through en route.

A merry twinkle and endearing friendliness made him popular in all walks of life, and his generosity knew no bounds. His after-dinner speeches will have been enjoyed by many, but less well-known was his ability as a conjuror.

He was an active church worker and took a leading part in the restoration of church furnishings at the Presbyterian Church in Southampton following war damage.

Jimmy will be sadly missed by all, but although he is no longer with us, he lived to see the furtherance of an ideal that was very dear to him. The highest tribute that we can pay to him is to ensure that goal for which he worked so hard does not become obscured through the difficult years ahead.

Mr. J. Aitken

We regret to announce the death of Mr. John Aitken on November 18th last, after an illness of several weeks' duration.

Born in 1900, Mr. Aitken obtained his engineering training at Holt Technical School, Birkenhead, from 1914 to 1921, during which time he was apprenticed to Cammell, Laird & Company. He took a further course at Liverpool Engineering College in 1923. He served at sea from 1922 for ten years and in 1934 was appointed Engineer-in-Charge at Ribchester Institution. He moved to Brookhall Institution in 1937 and again as Chief Engineer to Christie Hospital and Holt Radium Institute, Withington, in 1940. In 1947 he was appointed Chief Engineer at Altrincham General Hospital and Group Engineer to the North and Mid-Cheshire H.M.C. upon the formation of the Service.

Mr. Aitken was one of the early members of the Institution, being elected in 1943.

BRANCH OFFICERS, 1960

The following details have been received at the time of going to press of elections of Branch Officers for 1960.

We hope to be able to include similar details regarding the remainder of the branches in our next issue.

CHESHIRE & STAFFS BRANCH

Chairman: H. Dean.
Vice-Chairman: A. J. Copeland.
Hon. Secretary: L. Hunt.
Representative to Council: L. Hunt.
Hon. Secretary's address: 27, Moat Road, Walsall, Staffordshire.

LANCASHIRE BRANCH

Chairman: E. Heald.
Hon. Secretary: N. J. Webb.
Representative to Council: H. Roberts.
Hon. Secretary's address: The Villa, Astley Hospital, Astley, Nr. Manchester.

LONDON BRANCH

Chairman: H. Wright.
Vice-Chairman: R. F. Daglish.
Hon. Secretary: P. C. Vedast.
Hon. Assistant Secretary: W. M. Woolsey.
Hon. Membership Secretary: R. S. Adlington.
Representative to Council: H. Wright.
Deputy: R. S. Adlington.
Hon. Secretary's address: 59, Oakfield Gardens, Edmonton, N.18.

GLASGOW BRANCH

Chairman: J. Crawford.
Vice-Chairman: R. Black.
Hon. Secretary: J. L. Steel.
Hon. Minute Secretary: G. Grieve.
Representative to Council: A. M. Bain.
Social Committee: S. R. Penman, J. Ure, J. Strachan.
Hon. Secretary's address: 562, Bilsland Drive, Glasgow, N.W.

WEST OF ENGLAND BRANCH

Chairman: R. L. Hanks.
Vice-Chairman: S. R. Williams.
Hon. Secretary: G. G. Smith.
Hon. Programme Secretary: W. L. Williams.
Hon. Minute Secretary: R. Skuse.
Hon. Deputy Minute Secretary: L. Coles.
Representative to Council: H. A. Adams.
Deputy: R. L. Hanks.
Hon. Auditors: G. Houghton and H. Partington.
Hon. Secretary's address: 25, Bromley Drive, Downend, Bristol.

NORTH-EAST BRANCH

Chairman: G. C. Elliot.
Vice-Chairman: W. B. Ward.
Hon. Secretary: R. H. D. Hood.
Representative to Council: R. H. D. Hood.
Committee: W. E. Elfert, L. Thomas, A. J. Blagburn, A. Brewis, J. H. Morgan, O. Ritchie.
Hon. Secretary's address: 149, The Broadway, Tynemouth, Northumberland.

SOUTH WALES BRANCH

Chairman: T. H. Platt.
Hon. Secretary: To be appointed.
Representative to Council: V. Riley.
Hon. Secretary: W. G. Owen.
Hon. Secretary's address: Cefn Coed Hospital, Cockett, Swansea, South Wales.

The gathering at the Rembrandt Hotel, London, on the occasion of the London Branch 7th Ladies' Festival. The event was described on page 267 of our December issue.

YORKSHIRE BRANCH

Chairman: K. O'Rourke.
Vice-Chairman: H. F. Pickering.
Hon. Secretary: G. R. Thwaites.
Hon. Treasurer: J. J. Richardson.
Representative to Council: J. D. Lewis.
Deputy: J. Tomlinson.
Hon. Secretary's address: Chapel Allerton Hospital, Leeds, 7.

EAST MIDLANDS BRANCH

A Joint Meeting of the East Midlands, Yorkshire and Lancashire Branches was held at Middlewood Hospital, Sheffield, on 14th November, 1959. Mr. H. Adams, Chairman of the Institution, attended the meeting, as the principal speaker.

Mr. Adams gave a full account of the recent negotiations for a salary award. He detailed the steps taken, and set-backs suffered throughout by our representatives on the Whitley Council, leading to our decision to go to arbitration, and culminating in an offer which, Mr. Adams freely admitted, was most disappointing.

Mr. J. Green spoke of misunderstandings and apparent variation between the views and resolutions of Branches and the attitude taken by their representatives to Council, and the need for more information regarding Council policy. He said that the award had been low because our demands had been too modest.

Mr. S. G. Gilmore, Chairman of the East Midlands Branch, expressed on behalf of his Branch their appreciation of Mr. Adams' courtesy and consideration in making the journey in poor weather and at personal inconvenience in order to explain matters which had caused members much concern. He referred to the disappointment felt at the low award, but said that there was no doubt in his mind that all concerned—Council Members and Whitley Council Representatives alike—had done all that was humanly possible to bring about satisfactory results. No blame could be attached to anyone on our side for the failure to obtain just salary scales. The cards were stacked against them, and events had only gone to prove, in Mr. Gilmore's opinion, that hospital engineers were not accepted at their proper valuation and much more than negotiation was now needed. He was convinced that the only possible solution to the deadlock would be the setting up of a Commission of Enquiry to enquire into and make recommendations regarding the responsibilities, conditions of service and salaries of officers in the whole of the engineering structure of the Health Service, on the lines of the Sir Noel Hall Report. Then, once and for all, hospital engineers would have their responsibilities realised and be placed at their proper valuation. The apathy complained of was caused by frustration.

Mr. Adams, replying, said that in the light of recent events he was himself wholeheartedly in favour of the setting up of such a Commission to set matters on a proper basis, and would do all in his power towards that end. Mr. Tomlinson also spoke of misunderstandings and expressed himself in complete agreement with the suggestion. It was resolved, unanimously from the East Midlands, Yorkshire and Lancashire Branches that in the opinion of these branches steps should be taken immediately to ask for a Commission of Enquiry to be set up to enquire into and report on every aspect of the engineering structure of the Health Service.

An interesting and instructive paper "Situations Vacant" was read by Mr. W. C. Jeffries, Regional Engineer—Sheffield Regional Hospital Board, and Mr. Jeffries replied to the many questions asked afterwards. The talk was felt to be an invaluable aid to those members seeking promotion with another authority.

SOUTHERN BRANCH

The 85th meeting of the Branch was held at the General Hospital, Southampton, on November 21st, 1959.

The proceedings began with a Paper by Mr. E. C. Rogers—"A Review of Oil Firing on Sectional Boilers and recent developments in industrial plant."

The Meeting agreed to hold the Branch Annual Dinner on a date some time before Easter and, it is hoped, at the Polygon Hotel. Progress regarding arrangements would be reported at the January meeting.

The latest salary award was discussed and it was agreed that the feelings of the Branch should be made known to Council. It was felt that Engineers should be allowed to present their own case to the Minister on the lines of the Hall Commission.

WEST OF ENGLAND BRANCH

The Branch held a meeting at Torbay Hospital, Torquay, on November 21st, 1959, with Mr. W. L. Williams in the Chair. The meeting started with a discussion on the paper which was read to the Welsh Week End School by Mr. H. R. H. Ward, on "The Efficient Generation, Distribution and Use of Steam in the Hospital" (the first part of which is published in this issue on page 2). The earlier part of the discussion was on the efficiency in the Boiler House, with particular emphasis on the proper control of the fuel used, and the use of steam jets for the cooling of firebars. Great detail was given to the flue gas losses and the result on boiler efficiency caused by poor brickwork in brickset boilers, also the inner cleanliness of the boiler and the amount of blowdown required.

The discussion then went on to deal with the boiler house meters and the size of the boiler for the load required and finally the cost of producing the steam. The latter part of the discussion went on to deal with what the Engineer can do to economise in steam throughout the distribution in the hospital and the advice he should give to the "users."

The Industrial Court award was discussed at considerable length and was very much deplored. Strong action was called for and every practical means recommended to bring the position to the notice of M.P.s and the public.

It was reported that the question of bulk purchase of engineering supplies had been taken up by the Regional Engineer and a report would be given to the Branch at a later date.

Arising from the discussion on boiler plant it was suggested that the future planning of Boiler Houses should be put on the next Superintendent Engineers' Agenda.

MIDLAND BRANCH

A meeting of the Branch was held at Good Hope Hospital, Sutton Coldfield, on November 28th, 1959, with Mr. R. K. Benge in the Chair.

Members heard papers, "Building Paints" and "Colour in Hospital Decoration," given by Mr. H. Lawrence, Mr. H. Haines and Mr. R. W. Golder, all of Messrs. Hadfields. There was considerable discussion upon a number of suggestions made in the papers and several contrasting views were expressed.

The Branch subsequently proceeded to conduct their normal business and appointed Officers for 1960.

The Meeting took the opportunity provided by the presence of Mr. W. Bullivant, an honoured senior member of the Branch, to present to him a certificate of Fellowship in recognition of his past services to the Institution. The presentation was made by the Chairman amid loud and long applause. It was clear from Mr. Bullivant's expression of appreciation that he was considerably moved by the warmth of members' support.

YORKSHIRE BRANCH

The Annual General Meeting of the Branch was held at St. James's Hospital, Leeds, on December

5th, 1959, and the afternoon was confined to business matters. The election of Officers for the ensuing year took place.

The following dates, etc., were selected for meetings in 1960 :—

February 16th—Harrogate General Hospital.
March 12th—Dewsbury General Hospital.
April 9th—York (details later).
May 14th—Middlewood Hospital, Sheffield.
July 2nd—Scarborough Hospital.
September (*date to be agreed*)—Castleford General Hospital.
October (*date to be agreed*)—Bradford Royal Infirmary.
November 12th—Leeds General Infirmary.
December 3rd—St. James's Hospital, Leeds.

NORTHERN BRANCH

A meeting of the Branch was held on December 5th, 1959, at South Shields General Hospital.

A talk, together with a colour film on the subject of Small Bore Heating, was given by a representative of Messrs. Sigmund Pumps.

Later in the meeting the following motion was debated : "That this Branch deplores the practice of allowing fully automatic oil-fired boiler plant to operate unattended." A vigorous debate took place and the motion was eventually carried decisively.

LANCASHIRE BRANCH

The Branch held a meeting at Burnley General Hospital on December 12th, 1959. The Chair was taken by Mr. Norris in the absence through illness of Mr. Heald.

A talk was given by Mr. J. Hudson, of Messrs. Joseph Lucas, on "Oil-Fired Boiler Plant." He was assisted by three colleagues.

Mr. Hudson opened by saying that his firm had gained a lot of experience over a number of years on burners as used for gas-turbine engines. The firm had now turned its attention to oil-fired plant in order to exploit fully the technical knowledge it had acquired. Slides showed the development and present day design of the firm's burners. An important feature appeared to be the very thorough atomisation obtained. The "turn-down" feature, which was based directly upon experience derived from aircraft engine work, was very interesting and it was claimed that high efficiency was maintained throughout widely varied burning rates.

Many questions were asked and the whole session was most interesting and profitable.

Arising from the minutes of the joint meeting held at Middlewood Hospital, Sheffield, on November 14th, a number of questions were asked as to why the arbitration award had been so small. The reasons given by the Chairman of the Institution at that meeting were repeated but were considered to be so unsatisfactory that Mr. Roberts was asked to raise the matter at the next Council meeting.

MR. M. McN. GRAY

A canteen of cutlery and a wallet of notes were presented at Whiteabbey Hospital, Northern Ireland, on December 8th last, to Mr. Mathew McN. Gray upon the occasion of his retirement as Superintendent Engineer to Newtownabbey H.M.C.

Mr. Gray was appointed Engineer to the Belfast Municipal Sanatorium in 1930 and to his present appointment in 1955. He was elected a Fellow of the Institution in recognition of his work on Council. He is a founder member of the Northern Ireland Branch.

In his younger days "Mat" Gray was a keen footballer. He obtained an Irish Junior representative cap in 1921-2 and various cup medals with Forth Rover F.C. in the Intermediate League. He played for Glenavon and Belfast United from the winter of 1916 to the winter of 1920, in the Irish Senior League.

Mr. H. R. Janes has been appointed Superintendent Engineer to St. James H.M.C. He is at present Senior Engineer at the Royal Portsmouth Hospital.

The new appointee as Senior Engineer at the West Cumberland Hospital is Mr. J. R. Fletcher who is at present a Second Engineer with Messrs. Alfred Holt.

NEW EXPANDITE SUBSIDIARY COMPANY

Premier Bitumen & Asphalte Co. (1959) Limited, Western Road, Bracknell, Berkshire, has been formed within the Expandite Group, to manufacture and market a range of Bitumen Compounds and other Specialised Products used in the Building and Civil Engineering Industries.

GAS COOKER FOR THE HANDICAPPED

This cooker, which has been specially designed for use by physically handicapped people, is now beginning to come into commercial production. The initial deliveries are being used by Area Gas Boards for extended trials and demonstration to their staffs. It will not be available to the public until a later date, when a further announcement will be made.

PHILIPS VALVE VOLTMETER (TYPE 6012)

Research and Control Instruments, sole distributors in the United Kingdom, announce that the price of the Philips Valve Voltmeter (Type GM 6012) has been reduced from £94 to £70.

(*Continued from page A22*)

NOTTINGHAM No. 2 HOSPITAL MANAGEMENT COMMITTEE

ASSISTANT ENGINEER

Applications are invited for the post of Assistant Engineer at the Nottingham Children's Hospital and the Nottingham Hospital for Women. Conditions of service and salary will be as laid down by the Whitley Council, i.e. £575 × £25 (5)—£700 (salary scale at present under review).

Applicants must have completed an apprenticeship in mechanical engineering and have sound knowledge and experience of Steam Boiler plants, heating and domestic hot water services and electrical installations. The successful candidate will be responsible to the Superintendent Engineer for general maintenance at the hospitals. Preference will be given to a candidate who has studied for the ordinary National Certificate or its equivalent.

Applications stating age, qualifications and experience, with names of three referees should be forwarded to the Group Secretary, Sherwood Hospital, Hucknall Road, Nottingham, by not later than the 3rd February, 1960.

UNITED CARDIFF HOSPITALS
LLANDOUGH HOSPITAL, PENARTH

Applications are invited for the post of Engineer (non-resident) at the above Hospital (378 beds). Grade of post will depend upon qualifications of successful candidate, and salary scale will be based on 10½ to 20 points.

Candidates must have a sound knowledge and experience of steam boiler plants, heating and domestic hot water apparatus, air conditioning plant, electrical installations and will be required to take charge of building maintenance work.

The appointment is subject to the National Health Service Superannuation Regulations and to Whitley Council conditions of service.

Applications in writing, stating age, qualifications and experience, and with names of three referees, should be addressed to the Secretary, United Cardiff Hospitals, Cardiff Royal Infirmary, Cardiff, not later than 5th February, 1960.

SOUTHAMPTON GROUP
HOSPITAL MANAGEMENT COMMITTEE
Tremona Road, Southampton

Applications are invited for the post of SUPERINTENDENT ENGINEER. The person appointed will be responsible for the satisfactory operation, maintenance and co-ordination of the engineering services and activities, including both mechanical and electrical, of the hospitals in the Group. He will be directly in charge of the engineering services of one of the hospitals. Applicants must have passed an examination in engineering technology and hold one of the following qualifications : Ministry of Transport and Civil Aviation (ex Board of Trade), First Class Certificate of Competency in Marine Engineering or Certificate of Service as First Class Engineer. City and Guilds full Technological Certificate in Plant Engineering (First Class). Further particulars on request. Salary scale (increase pending) £1,145 × £35 (2) × £40 (1) × £45 (2)—£1,345 (superannuable). Applications, stating age, qualifications and experience and giving the names of two referees to be forwarded to the Group Secretary at the above address not later than 5th February, 1960.

ROYAL NATIONAL ORTHOPAEDIC HOSPITAL
234, GREAT PORTLAND STREET, W.1

ASSISTANT ENGINEER required to assist the Superintendent Engineer in the supervision of the engineering services of this teaching hospital. Applicants must have completed an apprenticeship in mechanical engineering or have otherwise acquired a sound practical training in mechanical engineering and should have some knowledge of electrical installation. Preference will be given to candidates who have studied or are studying Engineering Technology. Post subject to terms and conditions of appropriate Whitley Council. Salary scale £545—£670 per annum, plus £30 London Weighting Allowance for Officers over 26 years of age. Increased salary scale now under review. A starting salary up to two increments above the minimum may be awarded in respect of relevant experience since the completion of practical training. Applications in writing giving details of age, previous experience and the name and addressess of two referees should be sent to the House Governor and Secretary at the above address within 7 days.

MISCELLANEOUS

HOSPITAL CASTORS and WHEELS.—All kinds Supplied—Also Repairs and Rerubbering. Grosvenor (Castor) Mfg. Co. Ltd., Beales Street, Aston, Birmingham, 6.

The Publishers can accept Classified Advertisements for inclusion in any issue up to six days before the date of publication. Ring MUSeum 0131.