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Editorial

OVER £17 million per annum is spent on domestic work in hospitals in England and Wales, without taking into account similar work done by portering staff and ward orderlies. The possibility of improvements and savings in a field of expenditure as large as this is clearly a matter of great importance, and it is now the subject of a Ministry of Health report* published on 29th April. This important branch of hospital activity has a direct bearing on the comfort and well-being of patients and engages over 50,000 staff.

Economic and social changes since the War have given rise to difficulties in the recruitment of domestic labour, states the report. Costs have risen sharply. New machinery and techniques for doing the work have been developed. More stringent cleaning requirements, to safeguard against possible causes of infection, have been started by the medical staff. Circumstances may sometimes hamper the introduction of improvements, but studies have shown that substantial improvements are often possible, many at little or no additional cost.

Broadly the aims of the enquiries have been to ascertain the volume and nature of domestic work done; to suggest improvements in the planning, execution, and control of the work, and in the methods and equipment employed; to relieve nurses of domestic tasks, as far as possible, so that they may concentrate on nursing tasks; and to assess the numbers of domestic staff required.

The studies have shown that up to 80 per cent of the time spent on domestic work in hospital wards is taken up in doing four main tasks as follows—about 30 per cent of time on sweeping and polishing floors; about 15 per cent on washing and scrubbing floors, walls, baths, sluices, etc.; about 10 per cent on dusting and polishing the furniture and fittings; about 25 per cent on washing up crockery, etc. Consideration of these activities is, therefore, most likely to reveal worthwhile savings of time and effort.

The report suggests that the need to polish wood and cork floors, and some types of linoleum, may be eliminated altogether by the use of plastic floor seals. Some experts who have studied the necessity for polishing floors which have not been sealed have concluded that it is desirable only for the purpose of preserving the floor surfaces and need be done on only three to five occasions in a year. The advantages which are to be gained from the proper use of machines for polishing floors and of suitable vacuum sweepers for floors, walls and high dusting are emphasised. The key to efficient management of domestic work lies in the soundness of arrangements for training and supervising the staff, and it is necessary also to specify clearly what work needs to be done and to devise and follow a programme for its completion.

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*Hospital O. & M. Service Reports No. 4. Organisation and Management of Domestic Work in Hospitals. H.M.S.O. 2s. net.

The Practical Aspects of the High Pressure, High Vacuum Sterilizers used in Hospitals

By A. M. JONES, M.I.Mar.E. (Member)
and J. FINNEY (Member)

The Authors of this paper, which was one of those read at the recent one-day conference organised by the Southern Branch, bring forth constructive comment based upon their experience of the more critical sterilizing conditions demanded in the last few years, and the difficulties arising therefrom.
If the paper is provocative, as they suggest it may be, we hope that manufacturers and others will not hesitate to come forward with their views.

THIS title is not quite accurate, what we wish to talk about is the high vacuum, high pressure sterilizers used in hospitals for the sterilization of dressings.

During the last five or six years much has been written regarding these sterilizers and, in consequence, the mist surrounding our knowledge of them has developed into a fog! We trust that the remarks made to-day will not intensify the murkiness!

Many of the remarks may be considered provocative and they are intentionally so; we hope they will stimulate opinions of men who are more qualified to adjudicate than we are.

This paper is on the practical aspects and that means that engineering has not only to consider the technical aspects, but also the commercial and economic aspects.

In all walks of life, the wishes of the perfectionist have to be modified and subordinated to what is possible and practicable, and here, perhaps, we can pause and spare a thought for the manufacturers, for even to-day a number of the requirements of sterilizers have not been finalised and he, the manufacturer, has to search for information from different authoritative sources, usually medical, and these sources do not always corroborate each other.

Firstly, we would like to consider constructional details of the sterilizer. Should they be rectangular or circular? During the last few years the rectangular sterilizers have been favoured and the reason given is that the new type of cartons and packages can be more easily accommodated within a given volume of sterilizer—and thus increase output.

While conceding this point, we must face up to the fact that they are not so easy to construct as the circular ones—the metal must be heavier, ribs etc., have to reinforce flat surfaces usually welded on, there is distortion, and, though there are no technical difficulties within the pressure ranges we have in mind, these factors add considerably to the cost.

The circular door is easier to construct and to make airtight and, when there is a door on each end, this can be of real value. There is less distortion in circular doors—they are easier to machine, and the door joint rebates can be extremely accurate. We feel sure manufacturers are happier with circular sterilizers. The decision as to whether sterilizers should be circular or rectangular should be considered deeply. We shall come back to this later.

The next feature we have in mind is jackets. They add considerably to the initial cost and, during the course of years, faults do occur where the outer and inner casings are jointed and where pipes have to be tight between the two cylinders. To the practical engineer, however, the greatest drawback is in the need for stripping for insurance inspection. A normal inspection is not of much moment, but when hydraulic tests are required and when drilling of the metal is needed, all this is a nuisance and time absorbing. A further consideration is that jackets can de-hydrate dressings etc. and thus de-nature them. Further consideration should be given to the need for jackets.

They could be eliminated, sterilizers work satisfactorily without jackets and, at Portsmouth, a rectangular one without a jacket has been giving consistently good results for many months, and we have gone further by discontinuing the use of the jacket on a manually operated sterilizer fitted with one. It is now simply used as an air space. The initial troubles of moist dressings have been overcome and we have no fears on this account.

Obviously certain precautions have to be taken—we will come back to this point later.

Door joints can be a bother—the practice of providing heavy section rubber joints 1 in. $\times 1\frac{1}{8}$ in.

should be reviewed. Renewal of a door joint of heavy section is too often accompanied by a struggle to get it in and to close the door until it has settled down. Is there any reason why ½ in. × ½ in. is unacceptable—which incidentally is much cheaper.

Much has been written about large drains and, although this may be applicable to a sterilizer without a pump, we are at the moment considering sterilizers with vacuum pumps. Large drains mean large pipes, large traps, large non-return valves and these can be troublesome—the smaller they are the better from the engineering point of view and, really, they need not be large for the function of carrying away condensate. Non-return valves are troublesome when dealing with high vacuum and the amount of trouble seems to vary as the square of the diameter—there is more prospect of these items functioning continuously when small. Small ones are more easily removed and are, of course, cheaper.

It may be interesting here to realise that a sterilizer weighing 1,000 lb. that has to be heated from say 60°F. to 270°F. requires 25,000 B.T.Us or 25 lb. of steam, so that a large drain for that purpose is not required. When the sterilizer has been heated before the working day commences, the amount of condensate can be trifling—small outlets, then, as a talking point.

Other items are so well approved that little need be said. Interlocking of the door is essential, as is the fitting of gauges and relief valves. A pressure and vacuum recorder is, we think, essential, as is a thermometer placed in the outlet from the chamber. The timing of the automatic gear is a question to be laid down by pathologists—time temperature integrators are well established though not trouble free. Thought should be given to the placing of this mechanism. Our experience indicates that, when overheated by being fitted close on top of the sterilizer, variation in the time cycle takes place.

A further fitting which is extremely useful is a mercurial absolute pressure gauge and this enables one to check the normal dial vacuum gauge.

Much has been written regarding steam supply for sterilizers and that it must be dry; it must not be superheated and it must be at the phase boundary. We have yet to learn of any application of steam where it is to be otherwise than dry, and this requirement is a normal one in engineering. Usually the engineer has little choice—he has to take steam from the nearest available source, but if he does have a choice he should take it from a supply which is in constant use, for steam pipes which are used intermittently will accumulate condensate in spite of adequate trapping.

The steam supply should, of course, be taken from the top of the supply main and be piped downwards to the sterilizer.

There should be a separator. Our experience of separators is that the claims made are exaggerated, but nevertheless they do separate a large percentage of the free moisture and are invaluable should boilers prime.

After the separator comes the reducing valve and this also assists in further drying steam, but its affect must not be exaggerated. In practice, then, it is too much to expect that steam will be completely dry.

From reducing valve to the inlet control valve should be as short as possible, it is here that further condensation can take place when the steam is quiescent during other than the steaming part of the cycle.

From the control valve to the inlet into the chamber should be as short as possible for the same reason. In spite of all precautions, however, it is likely that the steam supplies as found in hospitals will still have a moisture content, and it is essential that this moisture when entering the chamber should not deposit on the packages. That is not easy—when steam at about 45 lb. absolute pressure is entering a chamber at 1 lb. absolute pressure, its velocity is such that it is not easy to direct in the way we require. Nevertheless, it is an important requisite and every effort should be made to attain this end, for once packages, particularly cardboard boxes, become saturated they are difficult to dry.

With sterilizers without jackets, a serious trouble has been that the dressings at the end of the process are wet and unacceptable (this has also been noted in sterilizers with jackets, which is inexcusable) and it cannot be too highly stressed that many precautions must be taken to be positively assured that this fault cannot occur.

It is agreed, therefore, that the free moisture should be directed away from the packages as well as we can, and this makes us wonder about the best point to allow steam to enter the chamber. We know that claims have been made that, in the downward displacement type, steam should enter at the top to push the air out at the bottom, but surely this is not important when we have a high vacuum, and indeed it may be better to let it enter at the bottom so that free moisture can be more easily guided to the drain. This is also where the circular sterilizer scores over the rectangular one. The large flat surface of the rectangular one is not really flat and, in practice, it is found that a certain amount of condensate is lodged in slight deformations in the bottom plate.

These could be overcome by making the bottom plate trough-like or slightly dished in section, which will considerably assist draining. We do not think there are any technical difficulties in this construction and, should a rectangular sterilizer be selected, we consider this feature to be essential.

From our experience, we think it is reasonable to say that every sterilizer has a " residual moisture content factor." That means that moisture and condensate adhere to the sides, the bottom and the angles of the cages, and in practice all this moisture has to be flashed off when drawing the post vacuum.

The amount of free liquid lying about that has to be flashed off will detract from the evaporative capacity which is available for the drying of dressings. We think it is reasonable to say too that, no matter how much water finds its way into the sterilizer, the residual moisture will be about the same.

For this reason too, thought should be given to the length and diameter of the condensate pipes before the trap and non-return valve to see that there is no lodgement of moisture because of low spots, for it is not always appreciated that this portion of the system up to the non-return valve is also subjected to high vacuum and, again, any residual moisture will flash during the post vacuum part of the cycle and detract from the evaporative capacity of the installation. We have mentioned evaporative capacity of the sterilizer a few times and we would like to consider this for a moment.

From our steam tables we see that water as such cannot survive in a vacuum of 29 in. Hg. if the temperature is above 79·6°F., in a vacuum of 28 in. Hg. it is 100°F. and at 27 in. Hg., 114·5°F. Now these are modest temperatures indeed—we have the vacuum—it is apparent from the gauge, and yet we have water hanging about—it follows that there cannot be the requisite temperature *where the water is lodged.*

We have mentioned incoming steam and the shape of sterilizers, what is also essential is that there is enough heat to flash off all condensate lying about in spite of precautions taken. We should like to name this water and call it the " inherent residual moisture factor." Every sterilizer would probably be different, but it will be established after installation. It cannot be calculated before installation.

Now, during the sterilizing process the temperature of the whole body of the metal and contents will have been raised to the temperature corresponding to the steam pressure, say 274°F. for 30 lb. steam or at 20 lb. steam 258°F. On release of the steam pressure after sterilizing, and during the creation of the post vacuum, this total heat is available for re-flashing. This heat is the product of the weight of metal, the temperature and the specific heat of the metal from which the sterilizer is constructed.

In practice, however, the moisture is on low spots and the bulk of the heat would take far too long to conduct itself from its bulk to these low spots, with the result that, in a rectangular sterilizer without a jacket, we have found that, at the end of the post vacuum period, although the body of the sterilizer is hot and near steam temperature, the bottom plate of the sterilizer is quite cool.

If time was of no account this metal would, in due time, be raised in temperature by the conduction of heat from the main body of the sterilizer, but time is an important factor and therefore some other means must be found of having heat available on the bottom to accomplish complete evaporation.

We would like to consider a sterilizer with which we have had actual experience. It is rectangular, has a door at one end, is 3 ft.×2 ft.×4 ft. long, steam is at 20 lb. although designed for 30 lb., and there is no jacket.

In our case water was lying about in the bottom of the sterilizer after completion of the sterilizing cycle and that could be taken as a fairly sure indication that the dressings were not as dry as required.

In total quantity it looked to be about one eighth of a pint, although you will appreciate that that estimate could be quite wrong. Nevertheless, on that assumption, it would weigh 2½ oz. and our problem was to flash off at least this amount of water.

The heat required to do this, at the absolute pressure prevailing, would be about 170 B.T.Us so that, again, it can be seen that we are dealing with very modest requirements. Our requirements were met by placing on the bottom of the sterilizer some cast iron dead plates weighing in total 126 lb. It was thought that during the sterilizing period this metal would be raised in temperature to the steam temperature, say 258°F. This would, of course, result in some additional condensate—theoretically about 3 lb., but if the statement that each sterilizer has an " inherent residual moisture factor " is valid, then this condensate would drain away leaving no more moisture than formerly and we would have a heat storage capacity of 126 lb. of metal at 260°F. and from which it would be reasonable to expect a temperature drop of say 130°F. The specific heat of cast iron is about 0·12 and therefore there would be available 2,000 B.T.Us—ample for flashing off the 2½ oz. lying around.

During the course of the last few months, as opportunity occurred, we have attempted to obtain more facts about condensation and re-evaporation.

We wanted to know how much moisture had to be flashed off from the drums for obviously, not having a jacket, all this heat had to come from the mass of metal forming the construction of the sterilizer, the containers and the dressings themselves.

As an experiment, a few loads were weighed before being placed in the sterilizer and then weighed after sterilizing, but before being given a post vacuum for drying process. Averaging a number of tests, it was found that the drums weighed 32 lb., the dressings in them weighed 7 lb., the gain in weight was 7 oz. and lying around the bottom of the sterilizer a further estimated 2 oz.

Without being too precise, it can be said that 1 lb. of dressings absorbed and condensed, during the sterilizing process, 1 oz. of steam. We might add that with this ounce the dressings felt quite wet! Further tests have confirmed this figure.

We wanted to know, too, how much reserve evaporative capacity was available and, with that end in view, carried out some experiments in flashing off water placed in trays in the bottom of the sterilizer.

Our trays were supplied with 1,250 c.c. of water, that is about 42½ oz., and had a total surface area of 308 square inches. They were placed in the sterilizer when at a room temperature of 60°F.—the sterilizer was as hot as possible having been subjected to 20 lb. of steam until we felt that the whole body was up to the corresponding temperature, viz. 258°F., including the 126 lb. of cast iron lying on the bottom.

The water was measured after a complete cycle and it was found that the loss in weight averaged about 350 c.c., or equal to nearly 12 oz.

The experiment was then carried out without the cast iron in the bottom of the sterilizer and it was found that the average loss was 300 c.c. which equalled 10·2 oz.

It is a fair assessment therefore to say that the storage capacity of the cast iron bars accounted for about 1¾ oz. to 2 oz. of evaporation or equal to 125 B.T.Us.

This does not appear much, but it is the difference between success and failure in providing dry dressings. We might add that we are continuing these experiments as opportunity arises.

We would like to say a word or two regarding the vacuum that is expected in these types of sterilizer. As engineers, 28 in. to 28½ in. Hg. is not difficult—28½ in. to 29¼ in. Hg. calls for everything being in excellent order, and that is extremely difficult in day-to-day application. We think the medical people have come to accept that 29 in. Hg. is adequate for the process we have in mind, and we feel fairly sure too that, in the general run of sterilizers throughout the country, 28¾ in. Hg. is the sort of vacuum being obtained and is being accepted in practice.

There are a number of pumps available that achieve this sort of vacuum day-in and day-out. Indeed considering pumps only, they can draw down to within ¼ in. of absolute pressure without difficulty. It is when they are attached to a sterilizer that the higher vacuums are difficult to attain.

We think one of the problems when needing the higher range of vacuum, say 29¼ in. Hg., is that the trip gear on the automatic system, which has been pre-set to this high vacuum, is influenced by surrounding heat or other causes and is affected slightly and fails to operate, with the result that the time taken for the pre-vacuum part of the cycle is extended quite out of proportion to the whole sterilizing cycle. Our experience is that on normal occasions this pre-vacuum might take 4 to 5 minutes and on other occasions 9 to 15 minutes or even longer. With this extended period, dressings can become de-natured and, indeed, have been known to become charred and in some cases burst into flames, so that it is necessary to instal an over-riding timing gear which shuts down the pump and destroys the vacuum should it take longer than, say, 9 minutes.

The sterilizer we have been talking about is of 24 cu. ft. and we feel that further thoughts should be given to this volume. From the experience we have gained, one half this size, or even 10 cu. ft., would be quite adequate for doing all the sterilizing of a 600 bedded general hospital. We have been running half-loaded over only half the available time of an eight-hour day.

The pump installed is 38 cu. ft. per minute and if the same size pump was fitted to the half size sterilizer, we feel sure a number of troubles of trying to attain high vacuum would be resolved.

If this reasoning is acceptable, the sizes of sterilizers to be installed in the future should be carefully reviewed. We must remember, too, that the whole hospital is going to rely on this machine—it is working probably seven days a week and therefore we feel a duplicate set is necessary. If this is provided, the size of each could be further reduced and therefore we suggest that two 8 cu. ft. sterilizers would meet the demands of quite large and busy hospitals.

The whole period of time spent on pre-vacuum and post-vacuum could be cut to a few minutes and with 30 lb. steam for sterilizing, a cycle could be accomplished in 15 minutes, and with 20 lb. steam in 20 minutes; for, after all, we are told that actual sterilizing at the former pressure takes 3 or 4 minutes and, at the latter, 10 or 11 minutes, both times allowing a 50% or so additional time as a safety margin.

We have mentioned troublesome non-return valves and we would like to mention joints of pipes and fittings to the sterilizer. On occasions when the high vacuum is difficult to attain there is at once a search around for leaky joints; and any joints not brazed or welded are suspect. Personally, we find it difficult to visualise a joint that will stand up to 100 lb. of steam pressure internally being unable to resist a 15 lb. external pressure but concede that though improbable this could be possible. It may be prudent to weld or braze all those joints that are unlikely to be broken during the lifetime of the sterilizer.

A further possible source of annoyance are the steam inlet valves. They should be as large as possible so as to admit steam without unnecessary

delay. When cam opened and spring closed they are not always as positive in action as one would wish and they need to be serviced fairly frequently.

We feel the same can be said for solinoid operated valves, although we have not had experience of them in this field. We rather favour the renewable disc type of valve, but would like to know of a type that could withstand long periods of operation without attention. Slight leaks in steam valves, as also in the relief valve, can extend vacuum drawing times considerably.

The above remarks would also apply to the vacuum break valve. It is important therefore to have first quality valves here.

I have not mentioned the air filter. It is a matter for the medical men to approve the types offered. Our one qualification is that they should not extend the period of time spent on breaking the vacuum unduly.

Now we come to the question of maintenance. In the past this has been rather haphazard and we think engineers must now concern themselves with a regular check daily, weekly and monthly. A schedule of points to be looked at should be drawn up—there is no reason why the sterilizer operator couldn't attend to some of these—such as giving a spot of oil to the door hinges, changing the chart, etc. It looks as if in the future, operators will be selected more carefully, then trained, encouraged and graded as more responsible people than in the past.

There are a number of items we have not mentioned in this paper, but we think we have covered the main features. We hope it has stimulated the engineers present to think about these things.

We also hope that we have stimulated administrators present to appreciate that it is not all plain sailing and that engineers are still harassed, and to Medical Officers and Nursing Officers that we are trying to carry out their requirements in this field with efficiency and economy.

BAILEYS INCREASE REPRESENTATION

To increase still further the efficiency of their technical representation, Sir W. H. Bailey & Co. Ltd. (Albion Works, Patricroft, Manchester) have appointed Mr. B. D. Hayes to cover the East and West Ridings of Yorkshire. He can be contacted at 1, Ashworth Close, Bakersfields, Nottingham (Telephone: Nottingham 24-8629).

Mr. Hayes has been with the company for several years, and has just returned from a four-month study tour of the U.S.A., which he visited as a winner of one of the three 1959 Nottingham Roosevelt Memorial Travelling Scholarships.

FIRE NOT EXPECTED TO DISRUPT PRODUCTION

A fire occurred at the Oldham premises of EUK Catering Machinery Ltd. on March 6th. The cause is unknown.

In an official statement, the management say that although damage was considerable they confidently expect that production of their kitchen and canteen equipment will not be affected in any way.

None of the company's 100 workers will be laid off as a result of the fire.

FURNAZE REFRACTORY GLAZES

Marketing Network Services Ltd. of 9, Blenheim Street, W.1, announce their appointment as Sole Agents throughout the United Kingdom for the new Furnaze Refractory Glazes manufactured by Crownamics Ltd. of Charlton, London, S.E.7.

This range of Refractory Glazes and Heat Insulators is available in three grades, which between them cover all known applications on all types of refractory brickwork.

Furnaze is supplied in drums of 5 gallons capacity, and the standard general-purpose grade, 12 S, is priced at 70/- per gallon, including free drum and carriage U.K.

AIR CONDITIONING

Twenty distributors from all over Britain attended the Annual Sales Conference of the " Westair " Division of Westool Ltd., held at the Regent Hotel, Leamington Spa on February 11th.

They heard Col. C. E. Mackellar, Director of the company, say that the company's chain of distributors giving installation and after sales service now almost completely covered the British Isles.

" The increasing need for air conditioning in hospitals," continued Col. Mackellar, " can be met by self-contained units providing that they are designed to operate economically and efficiently."

CAUSEWAY REINFORCEMENT LTD. SET UP A TRESTLE SALES DIVISION

As a result of the increasing demand for Causeway Multi-Purpose Trestles, Causeway Reinforcement Ltd. of Five Ash Works, Dover Road East, Northfleet, Kent, have created a Trestle Sales Division under Mr. S. J. Davies.

The Causeway Trestles are now available in the range of twelve sizes and four types for use with a 3 in. × 4 in. beam, a standard scaffolding plank, either upright or flat, or a standard scaffolding pole.

Causeway Reinforcement Ltd. is a member of the Amber Group of Companies whose headquarters are at 11a, Albemarle Street, London, W.1.

NEW LITERATURE

The 1960 edition of Londex Ltd.'s Data Book is now freely available to anyone interested in automatic electrical controls.

This new booklet, which has 48 pages, deals briefly with their range of products. There are several new items mentioned and these are clearly marked by a " star."

The address is: Anerley Works, 207, Anerley Road, London, S.E.20.

Molybdenum Disulphide as a Lubricant Additive

MODERN developments in lubrication have followed two paths: that of the so-called "multigrade" oil which maintains a more or less constant viscosity over a fairly wide temperature range, and that of extreme pressure lubrication.

Extreme pressure lubricants are of much more recent origin than is generally supposed, and it was not until the advent of hypoid gears some thirty years ago that the shortcomings of conventional lubricating oils became apparent. These shortcomings gave rise to the introduction of additives—initially lead soaps and compounds containing active sulphur and, later, active chlorine and active phosphorus. The war years inevitably speeded development but it is surprising to find that, by 1950, still only half of England's car manufacturers employed a hypoid rear axle.

Engineers and designers now appreciate that characteristics which were originally only demanded in extreme pressure lubricants are really necessary in almost all lubricating applications. It is obvious that wear and friction are inter-related and if friction can be reduced, then a corresponding reduction in wear must take place.

To appreciate the functions of an extreme pressure lubricant it is necessary to understand the nature of friction: it does not matter how finely a metallic surface may be finished—with sufficient magnification it will be seen to resemble a miniature relief map of the Alps—and when metallic surfaces are moving against one another under load it is the "high spots" or peaks which come into actual contact.

When the high spots on opposing surfaces come into actual contact with one another, enormous stresses are set up resulting in very high local temperatures. These temperatures are sufficient to melt the peaks and weld them together, and friction is, in effect, the force required to break these welds apart. The purpose of the process commonly known as "running-in" is the reduction of these high spots and the resultant increase of the *real* bearing areas of the opposing surfaces.

Early developments were mainly based on materials which react chemically with metal surfaces under the effect of the high temperatures induced by high pressures, and in such cases extreme pressure lubrication is achieved by the products of the reaction. Some distinction must be made between these materials, which lubricate as the result of chemical reaction at high temperature, and the ordinary high temperature lubricants such as fluorinated esters and silicones which work simply because they are capable of withstanding high temperatures without decomposing.

Broadly speaking, there are three groups of reactive compounds which can form the basis of chemical additives to provide oils with extreme pressure characteristics: phosphorous compounds, chlorine or other halogens, and sulphur compounds.

Much research remains to be done on phosphorous additives, although it is generally accepted that phosphites are more effective than the corresponding phosphates and thiophosphites are better than phosphites.

Chlorine compounds containing labile chlorine atoms are very effective lubricants under extreme pressure conditions, but their efficiency is adversely affected by the presence of moisture, resulting in the formation of hydrochloric acid.

Only a small number of sulphur compounds—generally di- and polysulphides—are effective and most of the conventional "E.P." oils contain polysulphides. It has been found that improved results can frequently be obtained by using a blend of chlorine and sulphur compounds.

The need for efficient extreme pressure lubrication is growing rapidly owing to the ever finer tolerances to which machinery is built and the increasing speeds at which it is run. Much can de done by the use of "dry" lubricants such as molybdenum disulphide which will coat bearing surfaces with a lubricating film of little more than molecular thickness although capable of providing extreme pressure lubrication up to some 500° C., and even higher in the presence of oil. This film, however, has little permanency and will tend to be wiped or scoured away from areas of actual contact, particularly by such action as, for instance, a piston ring against a cylinder wall. For this reason dry treatment is insufficient, although the life of the film will be considerably prolonged in the presence of a lubricating oil. It is therefore necessary to provide a constant flow of molybdenum disulphide particles between bearing surfaces so that the film can be replaced as required. Molybdenum disulphide (MoS_2) in its refined state is a soft silver-grey powder which can, by various means, be reduced to a particle size of less than 1/10th of a micron—i.e. approximately one quarter millionth part of an inch. Modern methods of refining can produce MoS_2 of a purity of 99·8 per cent and it is only this purity which makes possible its use as a lubricant. The silicate impurities found in MoS_2, which are of an abrasive nature, are removed by converting them into volatile fluorides at high temperature.

The molecular structure of MoS_2 is lamellar and each molecule comprises six atoms of sulphur on each side of six atoms of molybdenum, in sandwich form. Sulphur has a strong affinity for metal which means that molecules of MoS_2 bond readily to metal. If MoS_2 powder is introduced between two bearing surfaces, a film of MoS_2 of little more than molecular thickness will be formed on each of the metal surfaces. The outer surfaces of these two films which will, of course, be in contact with one another, will be sulphur to sulphur which has a lower coefficient of friction than ice to ice. If, therefore, these two films of MoS_2 can be maintained, friction will be almost eliminated and nearly perfect lubrication achieved.

From the above data it can be deduced that the three main virtues of a perfect lubricating oil are (1) a viscosity which is more or less stable over a wide temperature range, (2) a film strength or load bearing capacity great enough to prevent direct contact between bearing surfaces at the highest pressures which may be encountered in the particular application for which it is used, and (3) it must carry, evenly spread throughout its volume, surface active agents which will be adsorbed on the metallic bearing surfaces to provide lubrication when without their presence, local welding would take place.

Near perfection has been achieved, for instance, in an additive called "Addi-V.J." which contains both chemical reagents and a true colloidal suspension of molybdenum disulphide of the highest purity commercially available. This additive is used in the proportion of 10 per cent in any conventional oil and the first requirement of perfection, as mentioned above, should be supplied by the oil in which the additive is used if multigrade characteristics are required. Owing to its nature, however, even a substantial fall in the viscosity of the carrier oil does not affect the efficacy of the Addi-V.J. and the only limit to the thinness of the oil which may be used is the effectiveness of the oil seals.

Both the second and third requirements are fulfilled by the surface active compounds and molybdenum disulphide which combine together to produce a lubricating film which, once it is formed, is capable of withstanding pressures of over 100 tons to the square inch, even on point loadings.

We had the opportunity a short time ago of paying a visit to the headquarters of Senol Ltd. at 22, Charlwood Street, S.W.1, the manufacturers of "Addi-V.J." and, while there, saw a very convincing demonstration of the effectiveness of suitably prepared molybdenum disulphide when added to a lubricant.

The apparatus used for the demonstration consisted essentially of a wheel suitably mounted on a shaft and driven at about 500 r.p.m. by an electric motor. The wheel, of hardened steel, was of 1¼ ins. diameter and its periphery was of spherical form and polished. Provision was made for suspending an oil-bath such as to allow the lower quarter of an inch or so of the wheel to be immersed.

A hardened steel roller, of the kind normally used in roller-bearings, was mounted vertically above the wheel with its axis at right angles to that of the wheel so as to establish point contact with the wheel. The roller was held stationary, in contact with the wheel, by an arrangement comprising a system of levers through which the loading of the roller upon the wheel could be predetermined. With the load selected for the demonstration, the initial loading between the roller and wheel was of the order of 20 tons per square inch.

A quantity of a well-known S.A.E. 30 mineral oil was added to the oil-bath and the apparatus set in motion. After only a few seconds the oil film broke down, resulting in the familiar squeal that arises from metal to metal contact in such circumstances, and indicating partial seizure. Approximately 10 per cent of "Addi-V.J." was then added and this resulted in almost immediate cessation of seizure. The unit was then run for some minutes in this condition after which it was dismantled for inspection. It was immediately obvious that a considerable amount of metal had been worn away from the roller as the result of partial seizure.

The roller was then replaced with a new part of the surface in contact with the wheel and, without further change to the contents of the oil-bath, the unit was run for some further minutes. There was no sign of seizing. The roller was again examined and there was no sign of wear, point contact having been virtually maintained.

So far it had been shown that the additive could not only behave as a satisfactory lubricant under extreme pressure conditions but that it was capable of restoring at least a temporarily satisfactory condition even after the original oil film had failed.

A series of attempts were now made to destroy the value of the additive as follows.

Firstly, petrol was added to the oil bath. After a lapse of two or three minutes the petrol was ignited and allowed to burn away, considerable heat being generated in the process. Water was then added, an emulsion rapidly forming, but there was no sign of breakdown and no noticeable sign of wear.

Finally, powdered clinker grit was added—this is a particular problem with power house machinery—and the apparatus run for several minutes. Although there were unpleasant noises, the metal surfaces did not pick up.

The oil-bath was then removed from the unit and the roller and wheel were wiped dry and run in that condition for a further few minutes. There was still no sign of seizure and subsequent inspection showed remarkably little sign of wear.

We think readers will agree that it would be difficult to evolve a more testing set of conditions with which to prove experimentally the makers' claims and we believe that one must rightly conclude that the additive does provide a degree of protection far in excess of anything that could be expected from a normal commercial lubricant.

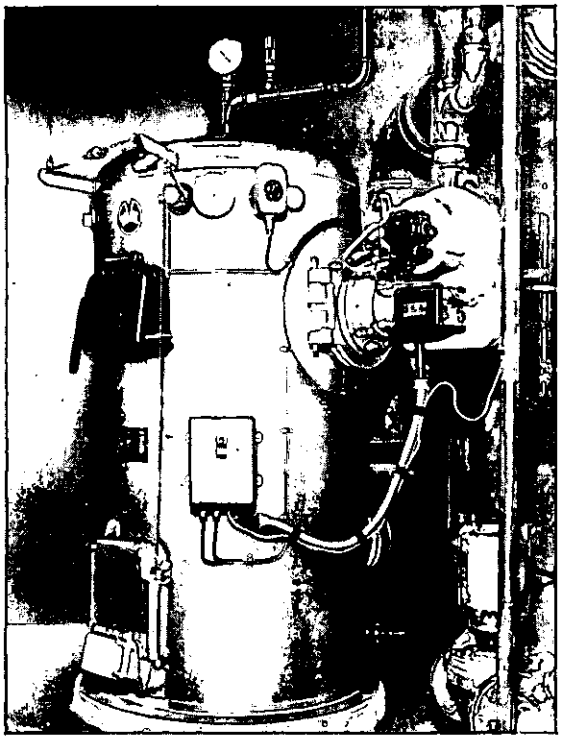
The material advantages deriving from the use of this additive in industry are manifold. It is, so far, unsurpassed in overcoming the difficulties of boundary lubrication whether they arise from temperature, pressure or close tolerances or any combination of these factors. It will permit substantial increases in the running speeds of automatic machinery and, it is said, will reduce power demand by as much as 20 per cent. It will increase the effective life of costly machinery—particularly precision equipment—and will prolong tool life and reduce stoppages for maintenance, repairs or replacements.

Addi-V.J. is only one of the products of Senol Ltd. who produce a full range of molybdenum disulphide based lubricants including oils, additives, greases and pastes. The Company also give a technical advice service and will supply lubricants blended to customers' requirements.

The front of the Wincanton Memorial Hospital.

Hoval Boiler Installation

WINCANTON MEMORIAL HOSPITAL, SOMERSET



The Type TKC. 17 Hoval Boiler Incinerator.

A VERY interesting heating installation was commissioned at Wincanton Memorial Hospital during March 1960. The accompanying illustrations show the hospital building and the latest type of Hoval Dual Fired Boiler-Incinerator.

The installation under review employs a TKC. 17 Hoval Boiler-Incinerator rated at 280,000 B.T.U.s per hour. Two separate combustion chambers are built into the Boiler, to one of which is applied a flange mounted Elco Pressure Jet Oil Burner, using 35 seconds oil, and provided with fully automatic controls.

The other combustion chamber is fitted with grate bars on which solid fuel can be burnt in the form of coke, also waste matter is consumed on this grate.

The disposal of waste matter in normal quantities is a simple routine process, and is effected without interfering with the use of the oil burning equipment.

If, and when, coke firing is used, or very considerable quantities of waste have to be incinerated, the oil burner may be switched off, and control of combustion on the grate is regulated by an automatically controlled draught door, which is fitted to the bottom door on the front of the Boiler.

The upper fire door is used for charging coke or waste matter into the Boiler.

At Wincanton, the Hoval Boiler-Incinerator accommodates the whole of the hospital heating requirements, together with domestic hot water services, including a new Physiotherapy Wing.

The Incinerator affords disposal of all the hospital waste, such as wet and dry dressings, plaster casts and waste from the wards and operating theatre.

These versatile features of operation are supported by a high level of efficiency. On this installation the Boiler is operating at an efficiency of 83%, with a weekly fuel consumption averaging 140 gallons. The equipment is in operation 23 hours per day during the heating season.

The Boiler has been operated successfully on coke, and the change-over from oil to solid fuel was made in a matter of minutes. This demonstrates effectively the Hoval change-over feature, as a practical insurance in emergencies such as power failure, or lack of oil.

This unit is manufactured by A. J. Riley & Son Ltd., Victoria Works, Batley, Yorkshire, and represents one type of the full range of Hoval Boilers which are available from this Company.

A smaller Hoval Boiler-Incinerator rated at 120,000 B.T.U.s per hour has been installed for the same Management Committee at the Merthyr Guest Hospital, Templecomb, Somerset. In this case all Maternity Hospital waste, together with all kitchen waste, is incinerated.

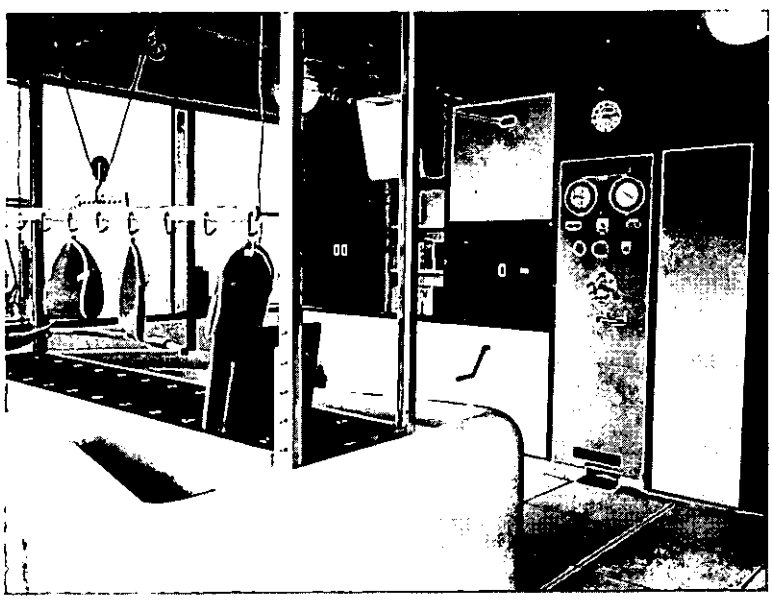
Both installations were carried out by Messrs. W. F. Knight & Sons Ltd., 13, South Street, Yeovil, Somerset, to the instructions of the South Somerset Hospital Management Committee.

Hoist at Princess Margaret Hospital

IMPROVED facilities for hydro-therapy treatment at the new Princess Margaret Hospital at Swindon feature a modified Hubbard Tank fitted with a moving platform which is operated by a special electric winch made by London Electric Firm Ltd. of Croydon. It is the only installation of its kind in Britain.

The Tank itself, which was designed by Messrs. Powell & Moya in consultation with the Consultant in charge of the department of Physical Medicine, is constructed of terrazzo and is keyhole shaped to allow arm and leg movements. There are special recesses in the side of the tank so that physiotherapists can conveniently stand in the centre of one side of the tank and direct the movements of the patient. The equipment is used in the treatment of both adults and children who, because of a congenital disease or locomotor disabilities, need assistance or training in the use of their limbs.

The winch was designed specially for the purpose of operating a movable platform and is controlled by push buttons on a control panel. Treatment is given with the patient in both horizontal and upright positions and if the platform is lowered the



The modified Hubbard Tank in the hydro-therapy department at the new Princess Margaret Hospital at Swindon. The specially designed electric winch, manufactured by London Electric Firm Ltd. of Croydon, which operates the moving platform in the tank, is behind the rear wall. The wires connecting the winch to the platform can be seen emerging from slots in the panelling.

patient slides into an upright position for exercises, using adjustable parallel bars to assist him in walking. Allowance is made for the treatment of patients of varying heights in varying depths of water. The winch had to be " made to measure " in order to fit into the space available in the structure of the hospital and the greatest attention was paid by the makers to the question of safety. One feature of the winch is an insulated shackle, which is used between the winch rope and the ropes supporting the platform, to eliminate any risk of electric shock.

Kuwait's New Hospital

A NEW hospital, which because of its situation is essentially one of the finest in the world, was opened on April 27th at Ahmadi, Kuwait, on the shores of the Arabian Gulf, by Sir Phillip Southwell, former chairman of the Kuwait Oil Company. It is to be known as the Southwell Hospital.

The hospital is designed for 250 patients but can be extended for a further 80 beds if necessary. It has two main operating theatre suites, one emergency operating theatre suite, a small fracture operating theatre, an eye theatre and two delivery suites.

The hospital is outstanding by virtue of its engineering services, valued at about £600,000, which have been installed by the Brightside Heating and Engineering Co. Ltd., of Ecclesfield, near Sheffield.

At the heart of the hospital is the air conditioning plant consisting of ten main conditioning installations with subsidiary self-contained packaged plants. These ten major units are contained in five plant rooms below ground level.

The air from the outside is pulled in through large induction fans and goes through sand eliminators and two stages of filtration, and over chilled water cooling batteries and re-heater batteries (for humidity control) before being carried in ducts through vertical shafts and roof voids to be discharged through diffusers and grilles into the many wards of the hospital.

Without this conditioning the patients, doctors and nurses would, at times, sweat in temperatures as high as 120°F., humidities of 70% R.H., and endure the effect of sand storms so penetrating that they can percolate into a factory-stoppered jar of jam.

The turbomatic compressors, built by York Shipley, are the first high speed centrifugal compressors of British manufacture in any part of the world. The 26 " Brightair " chilled water, high level units are each of one ton capacity.

Package type steam boilers fired by oil and gas, large calorifiers for hot water, filtration vessels and a pressurisation plant all fit into a well-constructed boilerhouse which is considered to be a show-piece in Kuwait.

A large underground duct, eight feet high and eight feet wide, carries the many pipe services to all parts of the hospital—hot and cold water for daily use, steam for sterilisation, cooking and laundry services, vacuum pipes to take the dust to one central collecting plant, medical gases for the operating theatres and chilled water mains without which the essential air conditioning plants could not function.

The Southwell Hospital was conceived and financed by the Kuwait Oil Company, planned architecturally by Messrs. Huckle and Durkin of London and Liverpool, and built by the C.A.T. of Lebanon.

Abstract of Reports

FOREST GROUP (No. 11) H.M.C.

In the year ended December, 1959, Wanstead Hospital saw much attention given to the improvement of the facilities available for sterilising and to the reduction of the associated problem of cross-infection. Separate sterilising rooms have been equipped in each ward unit, additional crockery and bed-pan sterilisers are being installed and it is hoped shortly to arrange for fouled linen to be sluiced centrally away from the wards.

A large building programme was undertaken towards the end of the year on the ground and first floors of the Maternity Unit.

At Connaught Hospital the main item of interest has been the completion of reconstruction work on the Old Town Hall taken over from the Walthamstow Council. The resultant additional accommodation now includes a new waiting hall for patients and relatives, with Consulting Rooms adjoining; a new Remedial Gym-

nasium and treatment room; and a new service in the form of a Remedial Workshop very well equipped for the rehabilitation of patients.

The complete rebuilding of the Operating Theatre was finished and was opened by Sir Graham Rowlandson in February. The rebuilding provided an opportunity for decorating and the introduction of new lighting schemes to the wards, corridors, etc.

Extensions to the central heating system at Chingford Hospital has necessitated the addition of a boiler and extensions to the Boiler House. Considerable progress is reported in the Outpatient Department where four additional clinics have been opened.

An Assistant Engineer was appointed in August to be responsible for all maintenance work at Harts, Forest and Jubilee Hospitals.

NORWICH, LOWESTOFT AND GREAT YARMOUTH H.M.C.

The 11th Annual Report of this Group, covering the year 1959, describes it as one of consolidation and improvement and one in which the planning of a new maternity block for Norfolk and Norwich Hospital was authorised. This is the next major rebuilding scheme to take place within the Region and the work involves the development of the slum clearance site adjacent to the hospital.

A fair amount of capital works have been completed during the year including a new preliminary training school for nurses, kitchen improvements and the adaptation of the old Operating Theatre for O.P. and X-ray work at this hospital.

A new mechanical stoker for No. 2 Boiler has been installed at West Norwich Hospital and the re-grouping of electrical switch-gear has been carried out, including linking of the Isolation Unit. Almost £5,000 was spent on electrical reorganisation at Whitlingham Hospital.

Centralisation of engineering services from the main boiler plant at Northgate Hospital, Yarmouth, is under way and this includes the linking of Estcourt Hospital. The cost will exceed £25,000.

An emergency electricity supply has been completed at both Wayland and Dereham Hospitals and a new mortuary built at the Lowestoft and North Suffolk Hospital.

Projected developments within the Group include plans for the conversion or adaptation of a number of specialist units and clinics and improvement to and construction of operating theatres including air-conditioning of the main Theatre at Lowestoft and North Suffolk Hospital.

In addition to the above, a good deal of modernising has been done to wards, etc.

DERBY AREA No. 1 H.M.C.

During the year ending March, 1959, the major building project completed was the Ophthalmic Operating Theatre Suite at the Derbyshire Royal Infirmary opened by Lady Dorothy Macmillan. This was converted from the former maids' Dining Room block which was conveniently shaped for the purpose with little additional building. The entire suite is provided with plenum ventilation with automatic control over room atmospheric conditions. Provision has been made for piped anaesthetic gases, but this will not be completed until it can be combined with the supply to the new general theatres when these are built.

Financial provision has been made for modernising the first of the main wards which have been in use for over half a century, and this involves re-planning.

Work is proceeding rapidly on the replacement of the old steam mains throughout the hospital. On account of deficiencies in the old mains, the new boilers installed in 1956 have never been able to operate at the pressures for which they were designed. It is hoped to follow on later with the replacement of the water and gas mains and, where necessary, electrical services, although much of the latter has already been dealt with.

The hospital has been under heavy pressure and it was necessary to transfer certain staff to the City Hospital to allow decoration to be done. A very considerable amount of modernisation has been carried out.

Much work is also required at the City Hospital and new steam, water, gas and electricity services will be needed to serve the expanded hospital. In the forthcoming year, contracts for this work would amount to some £40,000.

Most of the work done at Manor Hospital was of a routine kind, though an improvement scheme is scheduled to take place in the period 1960-65.

The Nurses Home at Bretby Hall Orthopaedic Hospital is now heated via a calorifier coupled to the main steam supply as opposed to the two hot water boilers previously installed. The wards have been fitted throughout with stainless sinks.

The first major part of the development at St. Oswald's, Ashbourne, has been completed. This affected the whole of the ground floor of the hospital, the kitchen, dining rooms, dispensary and boiler house and these portions are now in marked contrast to the rest of the hospital. The remainder of the development will result in an increase in beddage from 47 to 100.

Ashbourne Maternity Hospital has also been renovated throughout and patients' facilities have been considerably improved. A new range of sterilisers has been provided together with a properly equipped sluice room.

Developments at the Derbyshire Children's Hospital have resulted in an improved O.P. Dept., a new Casualty and X-ray Dept. and a new Pathological Laboratory.

At the Derbyshire Hospital for Women, a new sterilising room has been provided for the Theatre to which improvements will follow. Two new electrically driven boiler feed pumps have been installed and further lagging has been done to improve thermal efficiency.

NEW APPOINTMENTS IN ELECTROLUX

Mr. Robert J. Mant, formerly deputy divisional manager of Electrolux Ltd.'s London Division, has been appointed to the General Sales Manager's staff at the Company's Head Office, 153/5, Regent Street, London, W.1. His successor as deputy divisional manager is Mr. Ronald D. Lewis, who was formerly an area manager in the London Division.

The Annual Dinner, 1960

THE SPEECHES AT HARROGATE

THE help that hospital engineers can, and do, give to medical research and practice, in Denmark and Britain, was illustrated vividly by speakers at the 17th annual dinner of the Institution held at Harrogate on June 10th. Following an excellent meal at the Cairn Hotel, where the Annual General Meeting was also held, the guest of honour, Dr. W. Yeoman, Senior Physician, The Royal Bath Hospital, Harrogate, proposing the toast of the Institution, said:

" When I received your invitation to attend this dinner I was anxious to know the reason and Mr. Stimson (hospital engineer there) who is my guide and philosopher in these things, assured me it was solely because I had been associated with hospital work longer than anyone still in active work in this town. He also assured me that there was no question of my making a speech. Judge of my consternation then, when I had a request from your Secretary to propose this important toast.

" I have always said that after-dinner speakers may be divided into three categories: those who are born speakers; those who acquire the art after a good deal of hard work and training; and those who have it thrust upon them because more worthy and eloquent speakers have failed. I come in that last category.

" However, having accepted your invitation, I could hardly refuse your request and therefore I began to think what we, as medical men, know about the hospital engineer.

" We know of him as a man who periodically causes the hospital chimney to belch forth large clouds of black smoke! Incidentally, I am very interested to learn that your Institution co-operates with the Smoke Abatement Society. We also think of him as the man who turns off the heat on May 1st, which coincides with Arctic blasts from Siberia, or turns it on in September in the middle of a hot spell! Following on these lines, I prepared a somewhat humorous speech and then I received your literature and particulars about the Institution: its aims and objects. Then I realised that it was necessary for we medical men to revise our ideas about the hospital engineer and the change of his status.

" When I visited Denmark and was shown over the new Orthopaedic Hospital at Aarhus, I saw that, under the hospital, the whole of the basement had been turned over to a series of workshops which are supervised by the Hospital Engineer, with the assistance of experts, and in it are made all the special instruments: splints, bed frames, shoes and other requirements of the medical staff and patients. Most of the men working there are ex-patients, who, because of their disability, are not able to compete in the open labour market.

" Now, coming nearer home, we have, at the Royal Bath Hospital, an engineer employed solely by the Leeds Regional Board to assist the orthopaedic surgeons to devise better instruments and specialised apparatus to help them in their work and it is not unusual for him to attend an operation to see what is actually required. Here, at the Royal Bath, there is constant research work going on into devising new methods of giving the treatment in which we specialise. A new pump has been devised to ensure a more efficient way of giving the Nauheim bath, and Mr. Stimson is making a new type of paraffin wax bath which will be safe and as foolproof as it is possible to be.

" It is not only in the purely engineering work that the engineer is called upon to help. One of the great problems—and I apologise for stressing this medical side, but you called upon a doctor to make a speech so you cannot escape medicine and you cannot escape the particular specialty in which I am interested—of the orthopaedic surgeon is to devise a satisfactory operation for patients with osteoarthritis of the hip joint.

" Many materials have been used to fashion an artifical femoral head but, so far, nothing has proved completely satisfactory. The trouble is that the co-efficient of friction between the normal articulated cartilage is lower than anything met in a solid substance. The co-efficient of friction between the bone and any solid substance so far used, such as stainless steel or perspex, is many times inferior to the co-efficient of friction between the normal articulated cartilages. Now that might very well be a quotation from the HOSPITAL ENGINEER but, strange as it may seem, it is a quotation from a lecture which I attended last year, given by the orthopaedic surgeon, Mr. Charnley. At present he is experimenting with polytetrafluorethylene, with very encouraging results. This shows the growing co-operation between the medical staff and the engineering staffs of our hospitals, the importance of which was never more recognised than today.

" At a time when old hospitals are being upgraded, renovated and modernised, and new hospitals are being built, it is very important that hospital architects should consult with both medical and engineering sides of the hospital before any work is begun. It is only in this way that a lot of time and money can be saved.

" Here I would plead for you to be patient with the medical staff. We are not trained to read plans, and quite frequently we give our approval to operations which, when applied, are unsatisfactory and full of snags, but these snags were not realised when the plans were studied.

" Now the Institution of Hospital Engineers is fulfilling a long-felt want and is proceeding steadily

on the right lines so I ask you to rise and drink to the continued prosperity of the Institution."

Responding to the toast, Mr. H. A. Adams (Chairman of the Institution) said:

" I cannot claim to fall into any of the categories of speaker mentioned by Dr. Yeoman. My speech is going to be short!

" I was interested in Dr. Yeoman's description of work done in the basement of a Danish hospital. At my own hospital (at Bristol) about 135 gross of ball pens a day are made by the patients. You can guess I am in a mental hospital! It is part of the new training in mental hospitals to do industrial therapy. Occupational therapy seems to be on the way out. We, as engineers, can help in the manufacture of the orthopaedic instruments that the medical profession want. My job is to manufacture jigs for more pens to be turned out daily.

" We established this Institution, which was formed 17 years ago, to help the doctors and nurses and the patients in order that the hospitals can be made more comfortable and to assist, as far as it is possible for us to do so, in their recovery. We have a long way to go but we feel that in some small way this Institution has helped to achieve that end and we are now trying to set up a training scheme with the universities and other bodies so that the hospital engineer of the future can be an engineer of high standing and good training and be able to assist the medical profession and the nursing staff in the recovery of patients.

" We are not always looked upon as being important people, and in many hospitals no one hears about the engineer until something breaks down. Then he is a most important man. When things are running smoothly, I am afraid the hospital engineer is forgotten. He is the man behind the scenes.

" Smoking chimneys, we hope, will soon be a thing of the past. We can do a lot to improve the clean air of the cities of our country by using a fuel which, in our opinion, is the correct fuel for the hospital.

" I was interested to hear that your Engineer, Mr. Stimson, is making some special equipment for you. Most hospital engineers, I think, during their time in hospitals, have made some wonderful things, though they may have been ' Heath Robinson ' bits of machinery, for surgeons, but they have been the forerunners of fine pieces of machinery used in hospitals today. We have members who have designed heart machines and so forth.

" My hospital was one of the first to use radioactive isotopes and we were given the job of manufacturing geiger counters in the very early days. Then, they were very crude and often we wonder why we designed them as we did in those days but everything has got to start from the beginning. We have helped surgeons in the past and we hope in the future to be able to help improve their methods of surgery.

" When we started doing leucotomy at my own hospital we used an ordinary carpenter's brace and bored through the skull of the first patient we had. Having got the bone out of the skull we then had to remove the bone to sterilise it for the surgeon to put it back. We took this into the engineer's shop to deal with it! It was all very rough and ready in the early days before all the stainless bits and pieces were made to go into the skull.

" But these are things that engineers in the Health Service can do, and should do. They should put all their energies into helping to improve the lot of the patient. That is our most important job. Our most important job, like that of everyone else in a hospital, is to make the patient's stay as comfortable and as happy as it can possibly be made."

Proposing the toast of the guests, Mr. H. A. Sandford (President of the Institution), said:

" That you, Mr. Mayor and Madam Mayoress, should have honoured us with your presence this evening is, I think, sufficient tribute to the standing of this Institution. We are small in numbers—regrettably small in attendance here tonight—but, nonetheless, I think I may be privileged to say, of good standing. Your presence here indicates to me that you have thought sufficiently well of us to justify leaving your home and gracing us with your visit. For that, we are very grateful. We are very much indebted for the presence of Dr. and Mrs. Yeoman. Dr. Yeoman has been associated with medicine in Harrogate for many, many years and his reputation is widely known.

" It is not for me to expatiate further on the services which the Mayor and Mayoress and Dr. and Mrs. Yeoman have rendered to this admirable borough but I would recall, Mr. Mayor, that your predecessor welcomed us here some ten or eleven years ago when we were a very young Institution. Now we are celebrating our 17th anniversary. Your reception on both occasions has been extremely good and we are extremely grateful for all that has been done to make us happy and well received in this borough."

In an anecdotal response, the Mayor of Harrogate, Councillor Leonard Roberts, said:

" When I get to my feet, I am inclined to branch off into trying to sell Harrogate because I was chairman of the publicity committee until a few months ago! We try to persuade people who look my age, and are retired, to come and live here because we are selling flats to suit everybody, and we can sell you a flat at £7,000 down! I can tell you that this is the one place in which to live because we have such a lot going on."

Playing golf that afternoon, he had been wondering what to say to hospital engineers. Since he had no flair for story telling he would tell them only the truth!

When the son of a millionaire Bradford mill owner came down from Cambridge, his father asked him: " Well, lad, what are you going to do? Do you want to come into the mill? It has been good enough for your grandfather and me and we have made a lot of money." The son replied: " No, father. I want a shop." " Right," said the father, " You find a shop and I will buy it." After a week in London, the son reported that he had found what he wanted—at £2 million. So, next day, the

father walked into the board room of Harrods to complete the deal with the Chairman but, as an afterthought, enquired: "Where's the living quarters?" "There are no living quarters here," replied the Chairman. "Then the deal's off" retorted the mill owner. "I'll not buy a lock-up shop."

Councillor Roberts continued: "The young friend I engage to do my work while I do this job was staying in a Harrogate hotel when his early morning tea was brought to his room by a beautiful young chambermaid. When she had gone, he realised he had been a bit slow, and determined, next morning, to ask her to come to the cinema with him. When, next morning his tea was brought, instead, by a page boy, he enquired: "Where's the chambermaid?" Replied the lad: "In Czechoslovakia, but the cups and saucers were made in Stoke-on-Trent."

"This job of being Mayor of Harrogate is not like being Mayor of Pudsey or Camberwell" said Councillor Roberts, amid laughter. "During a year we get 180 conferences and we claim to be the greatest conference town in Great Britain. We are not like Torquay, which has got the sea, so we have to give a bit extra!

"On behalf of the Mayoress, Dr. and Mrs. Yeoman, and the other guests, I want to say how much we have enjoyed your company and this meal and we hope you will come back again to Harrogate."

National Hospital Centenary Celebrations

JUST over a century ago the beloved grandmother of Edward, Johanna and Louisa Chandler was taken ill, became paralysed and died. Her grandchildren, realising that apart from their care, no facilities at all were in existence for looking after chronic neurological invalids, determined to devote their lives to doing something about this.

Louisa and Johanna spent their spare time making and selling little ornaments of shells, beads and pearls. In the next two years they accumulated about £200. In the Spring of 1859 they approached the Lord Mayor of London, David Wire, himself partially paralysed as a result of a stroke. He was sympathetic, got in touch with his influential friends and interested them in the project. In November 1859 he called a meeting at the Mansion House where it was decided to found a special hospital for the investigation, care and treatment of patients suffering from paralysis and epilepsy. By the Spring of 1860 they found a house available at 24, Queen Square, which they leased for £110 a year.

This was the beginning of The National Hospital for Nervous Diseases, which in 100 years has become the most famous and respected postgraduate teaching hospital of its kind in the world. It is the only University postgraduate teaching hospital specialising in neurology and neurosurgery. "Queen Square," as it is more usually called in gratitude and affection, is in fact almost better known outside the British Isles than within them.

In 1939 there was hardly a neurologist in the English-speaking countries of the world who had not spent some time in the Hospital. Patients come to Queen Square from all over the world—and for the Centenary Celebrations, which started on June 20th, distinguished neurologists from all over the world came too.

The Celebrations were opened by the Rt. Hon. Derek Walker-Smith, Q.C., T.D., M.P., The Minister of Health; on the following day the Hospital was visited by H.R.H. The Duke of Edinburgh, and the week concluded with a Centenary Banquet at the Mansion House.

The National Hospital's aims are, in the first place, the advancement of knowledge by research and clinical study; secondly, teaching others to do such work; and thirdly, the treatment of the relatively few patients it can accept. Naturally the realisation of these aims is interdependent: the realisation of any one of them helps that of the others. But progress in realising all of them barely keeps pace with modern problems of human "nerves."

Here the problem is not only one of treatment, but also necessarily includes exact diagnosis, for the causes of these symptoms are manifold and include both major and minor conditions.

Since the last war neurosurgery has made striking advances in association with neuroradiology. Growths can now be located more promptly and more accurately. Surgery can now often treat certain cases of "stroke," growths, brain haemorrhage and disorders of movement (like Parkinson's disease). Radioactive materials can now be implanted in inaccessible growths. It is even possible to destroy or remove part of the brain without actually cutting it at all, and the patient can afterwards return to the family and job.

In the last 10 years progress has taken place in neurochemistry. For this science the key is the chemical make-up of the brain and its cells; and the task of relating abnormalities of human function to abnormalities in chemical constituents within the nervous system.

The National Hospital was the pioneer in much of the treatment of paralysis of the breathing-muscles by means of "pressure breathing machines." These now play a large part in ensuring recovery from "polio," tetanus, overdosage of dangerous drugs and also head injuries. It is especially successful with young people, and the very special techniques have been taught at Queen Square to doctors and nurses from all lands.

The National Hospital was the first in London to set up a special respiratory unit—a specially equipped ward with staff and apparatus ear-marked for the job.

The Beaver Breathing Machine—which superseded the clumsy, but at the time invaluable, iron lung—was developed here. The Ministry of Health got the Hospital to turn out 30 of these machines in 6 weeks for other hospitals during the "polio" epidemic of 1953.

The social workers at the Hospital work closely in with the medical and nursing staffs with the idea of restoring patients to normal life; or (if they are disabled permanently) to teach them to live within their newly-inflicted limits and to help themselves to make the best of life. The staff are frequently consulted by industrial and other organisations whose personnel suffer from various types of nervous disorder.

Not so long ago, epileptics were shunned, feared, even ostracised. Today, not only they, but other sufferers too (e.g. those with "strokes" or Parkinson's disease) can be helped, controlled and rehabilitated.

Promise of Rehabilitation

Similarly, not long ago sufferers from the incurable nervous diseases were virtually abandoned in society. Nowadays, a great deal of help is given at "The National" by way of physiotherapy and other rehabilitation treatments. Patients are taught to walk and to carry out their various functions. For many ordinary tasks, very special implements have to be devised and provided, like special knives, forks and spoons, tools and equipment, supports for walking, etc. Many of these techniques were pioneered at Queen Square.

The National Hospital set up the first nursing school in Europe for the provision of advanced instruction of trained nurses wishing to specialise in neurological and neurosurgical nursing. The 12-month course attracts intending supervisors of neurological nursing-units from all over the world, and postgraduate nursing students also come from abroad.

A Thanksgiving Service was held in the Hospital Chapel and a series of lectures concerning the Hospital's work and relevant matters were given. The week was punctuated by a number of social gatherings.

B.S.I. News

Abstracts of information supplied by the British Standards Institution

NEW BRITISH STANDARDS

B.S. 3231: 1960 Thermographs (bimetallic type) for air temperatures within the range 0°F to 140°F (—20°C to 60°C). 3s.

Deals with the design and construction of bimetallic type thermographs for use within the temperature range specified and defines limits of accuracy.

B.S. 3232: 1960 Safety requirements for medical treatment lamps. 5/–

Specifies requirements for ultra-violet lamps, radiant heat lamps, infra-red lamps, intended for operation on voltages not exceeding 250 d.c. or r.m.s. a.c. It does not include radiant heat baths or tunnels of the bed-cradle type, e.g. a framework incorporating a number of radiant heat lamps or infra-red emitters for use over a patient.

Account has been taken of the thermal contact burn, electric shock and fire risk associated with the use of these lamps and requirements for recessed emitters within the emitter housing or reflector are included. Guards are also specified for infra-red and radiant heat lamps which incorporate emitters capable of operating at a very high temperature, or emitters of fragile construction.
Guards are not specified for ultra-violet emitters, unless they are provided in housing which also incorporates an infra-red or radiant heat emitter for which a guard is specified.

B.S. 3233: 1960 Pressure steam sterilizers of small size (with independent steam supply) for unwrapped instruments and utensils. 4/–

Specifies requirements for pressure steam sterilizers of horizontal cylindrical form of 7 in. and 12 in. diameter for the rapid sterilization of unwrapped instruments and utensils in hospital wards and clinics and in medical and dental surgeries and suitable for operating with saturated steam at a working pressure of 32 lb./sq. in. gauge (225 kg/cm²) (136·0°C) (276·6°F). Provision is made only for equipment supplied with steam from an independent source.

B.S. 3234: 1960 Polythene insulation and sheath of electric cables. 4/–

Specifies the composition, physical requirements, electrical requirements and test methods for ten types of polythene insulation and sheath taken from electric cables after manufacture. It does not deal with materials based on polymer of density greater than 0·93 g/ml. at 20°C, with cellular polythene or with irradiated polythene. Tests include melt flow index, tensile stress and elongation at break, power factor and permittivity, carbon black content and dispersion, residual antioxidant, poly*iso*butylene or butyl rubber content, and colour stability.

B.S. 3236: 1960 Dressings trolleys. 4/6

Specifies dressings trolleys of tubular framed construction in one width and four lengths in 6 inch steps. The materials for the framework and shelves are specified together with constructional requirements and finishes. Illustrations are given.

NEW CODE OF PRACTICE

CP 2007: 1960 Design and construction of reinforced and prestressed concrete structures for the storage of water and other aqueous liquids. 12/6

This code, which is a revision of one published by the Institution of Civil Engineers in 1938, deals mainly with reservoirs and tanks for the storage of water, but the recommendations also apply in general to the storage at normal temperatures of other aqueous liquids and solutions which have no detrimental effect on concrete.

Extensive guidance is given on methods of obtaining imperviousness; on the control of cracking; on corrosion, and on the important subject of the design of concrete mixes. The design of reinforcement is fully covered, and recommendations are given regarding construction joints, expansion and contraction joints, and sliding joints of which the figures show typical examples.

REVISED BRITISH STANDARDS

B.S. 430: 1960 Solid drawn steel air receivers not intended for transport. 3/–

Applies only to receivers manufactured of steel of tensile strength 26 to 48 tons/sq. in. and is not intended to apply to alloy steel receivers. Specifies requirements for scantlings, inspection and testing of both material and receiver, together with minimum drain hole sizes, hydraulic test and marking requirements.

B.S. 697: 1960 Rubber gloves for electrical purposes. 5/–

Specifies requirements for four classes of rubber gloves, each of which is designated by its rated voltage, i.e. 650, 1100, 3300 and 4000 volts to earth. It applies to gloves made by a dipping process or built up from sheet rubber or moulding. Requirements concern the manufacture of the gloves, their selection for test purposes, their electrical and mechanical properties (including ageing properties), dimensions and marking.

Appendices detail the tests to be applied for compliance with these requirements, and give the essential dimensions for various sizes of gloves.

B.S. 1016:— The analysis and testing of coal and coke. Preliminary statement on 1016: Part 14. The analysis of coal ash and coke ash. Gratis. (Ref. PD 3714). Included in all copies of 1016 Part 15.

1016: Part 15: 1960 Fusibility of coal ash and coke ash. 4/6

Deals with the determination of the deformation temperature, the hemisphere temperature and the flow temperature on samples of coal ash or coke ash.

B.S. 1938: 1960 Instrument tables (rectangular and curved) for use in hospital operating theatres. 6/-

Specifies for four sizes of rectangular and two sizes of curved instrument tables. The materials for the framework and shelves are specified together with general construction requirements and finishes. Illustrations are given.

AMENDMENT SLIPS

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

	Ref. No.
B.S. 52: 1952 Dimensions of bayonet lamp-caps, lampholders and lampholder-plugs (B.C. adaptors) for voltages not exceeding 250 volts. Amendment No. 2	PD 3698
B.S. 537: 1951 Lancashire and Cornish boilers of riveted construction. Amendment No. 1	PD 3689
B.S. 559: 1955 Electric signs and high-voltage luminous - discharge - tube installations. Amendment No. 2	PD 3688
B.S. 609: 1951 Horizontal multitubular boilers of riveted construction. Amendment No. 1	PD 3690
B.S. 665: 1951 Vertical cross tube boilers of riveted construction. Amendment No. 1	PD 3691
B.S. 761: 1951 Vertical multitubular boilers of riveted construction. Amendment No. 1	PD 3692
B.S. 1125: 1959 W.C. flushing cisterns (including flush pipes). Amendment No. 2	PD 3674
B.S. 1892: 1957 Gymnasium equipment. Amendment No. 2	PD 3680
B.S. 2891: 1957 Operating table covers or pads of cellular rubber. Amendment No. 2	PD 3675

NEW WORK STARTED

Dimensions for plug part of capless photo-flash lamps, lampholder and gauges

This standard will specify the principal dimensions for the plug part of capless photo-flash lamps and of the lampholder to ensure interchangeability.

It will also give details of recommended gauges for checking these dimensions.

It is being prepared following the adoption of a similar standard by the I.E.C., and it will implement the recommendations in that standard.

Butyl-rubber-insulated cables and cords with heat-resisting fibre layer

This standard will give requirements and dimensions for cables and flexible cords insulated with butyl rubber in association with a heat resisting fibre layer. The cables and cords are suitable for continuous use at a maximum conductor temperature of 100°C. It is expected that the new standard will replace that part of B.S. 1327, "Insulated asbestos roved flexible cords" which dealt with cords insulated with rubber and asbestos.

White line road paint (revision of B.S. 2086)

The present standard is regarded as reflecting minimum requirements only and is no longer in keeping with modern developments.

The Committee will welcome information from all bodies concerned with road line paint on:

a. Accelerated laboratory tests for durability.

b. Practical results on paints showing a higher performance than that specified in B.S. 2086: 1954.

Detachable buoyancy equipment for dinghies

A British Standard is being prepared for detachable buoyancy equipment for dinghies. The standard will cover inflatable types made from unsupported PVC sheeting and rubber-proofed sheeting, and solid types made from foam material.

Means of reproduction of drawings

A British Standard is being prepared setting out the various current methods of reproducing drawings, showing the suitability of each for various purposes under temperate climatic conditions. It is intended to give advice on filing and storage conditions in relation to print life and warning on the effect of hot and of humid conditions. The terms used in the document will also be defined.

Piston ring materials (revision of or replacement for B.S. 5004)

The revised standard will specify the materials, mechanical requirements and sampling and testing procedure for four grades of cast ferrous piston ring material. Appendices to the standard will give information regarding the functional behaviour of rings in relation to the mechanical properties of the material from which they are made, and make recommendations concerning chemical composition and casting procedure.

Glass for glazing: classification and terminology (revision of B.S. 952)

The standard is being revised, taking into account recent work on standardization related to glass, e.g. terminology, methods of glazing and fixing, and processes applied to glass.

Cast iron rainwater goods (revision of B.S. 460 and 1205)

It is proposed to incorporate in B.S. 460 the same provisions for varying sockets as have been included in B.S. 416. The thickness of rainwater pipes will be $\frac{1}{8}$ inch only with cross reference to B.S. 416 for thicker walled pipes.

DRAFT STANDARDS CIRCULATED FOR COMMENT

A(BDM) 6623 Pillows for hospitals and institutions and for the needs of Government departments (revision of B.S. 1899). (7 pp.)

A(M) 6624 Hospital cupboards (wall fixing) for poisons and dangerous drugs (revision of B.S. 2881). (18 pp.)

A(SGC) 6674 Sinus forceps. (5 pp.)

A(LGE) 6712 Capacitors for use in fluorescent lamp circuits (revision of B.S. 2818, Part 2: 1957). (22 pp.)

A(ELE) 6734 The electrical performance of fractional horse-power electric motors and generators (revision of B.S. 170, 1939). (28 pp.)

CHROMIUM-PLATING SCHEME —PHASE TWO

Readers will recall the introduction last November of a labelling scheme for chromium- and nickel-plated products. The scheme, operated in connection with B.S. 1224, has already been given wide publicity in the specialised and the national press.

In February it entered its second phase with the holding of a two-day conference in Birmingham for platers and manufacturers of plated articles.

The conference, held at Birmingham's Engineering Centre, was very well attended. Talks were given on "Labelling plated goods to the British Standard" and "The value of specifications in decorative nickel and chromium-plating." An exhibition on the new labelling scheme attracted many visitors.

TULLIS OPEN IN BIRMINGHAM

A new Birmingham Office at Villa Road, Handsworth, was opened by Messrs. D. & J. Tullis Ltd. on June 8th. The telephone number will be NOR 8814. This move to larger premises has been made necessary by the continual increase in work and the need for extra staff and accommodation. At least, after months of searching, suitable premises have been found and the long planned move is taking place.

On the Market

A review of new equipment and materials and their development

DAWSON'S NEW DISHWASHING MACHINE

Dawson Bros. Ltd., of Ventnor Works, Gomersal, near Leeds, announce two new additions to their range of dishwashers. These are the " Bar " and " Car " fully automatic rotary conveyor machines. They are constructed throughout from stainless steel.

Significant advantages of the rotary design are claimed in that it eliminates the lifting of heavy racks and also allows instant visual inspection of the clean tableware before it is removed from the racks.

Only two operators are required, one to load, the other to remove the clean tableware when the racks emerge from the machine. The racks rest on the stainless steel carrier frames fitted to the conveyor chain. These carrier frames, which are fitted with nylon rollers, glide the racks through the machine at a speed which enables the operators comfortably to load and unload the tableware.

The " Bar " machine, which will wash up for up to 600 meals or 6,000 pieces of crockery and cutlery per hour, incorporates the following jetted washing and rinsing treatment which is delivered from above and below in such a way that no surface or edge of any of the items in the racks escapes the treatment.

Pre-Flush at 90°F. This removes most of the soilage, which is collected in a stainless steel scrap tray.

Detergent Wash at 145°F. The prolonged washing treatment incorporated in this section is delivered from below by a battery of spray jets, and from above by a stainless steel spray box. This solution is recirculated and, as it falls back into the tank, it passes through a stainless steel tray which collects food scraps, etc.

Scalding Fresh Water Rinse at 190°F. This stage of treatment not only rinses and sterilises the crockery but also leaves it hot for self-drying, thus eliminating the need for tea-towels.

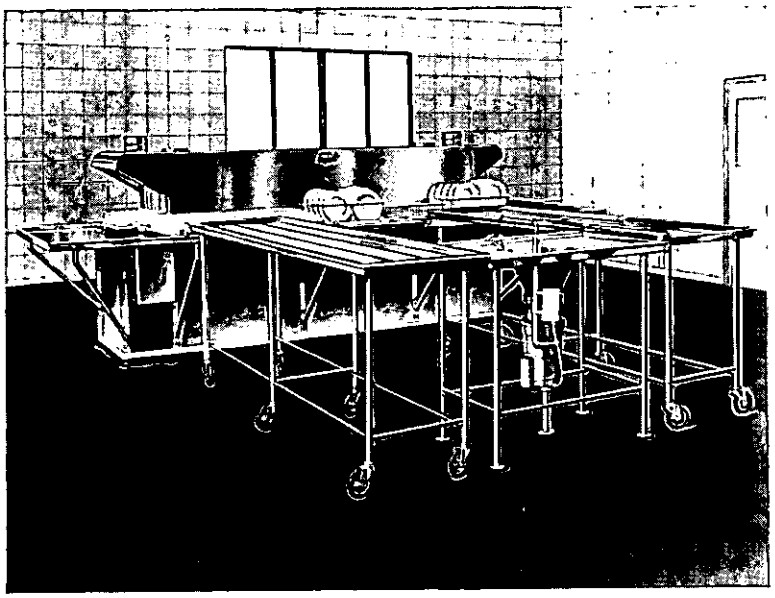
The " Car " machine handles up to 1,000 meals or 10,000 pieces of crockery and cutlery per hour. The treatment delivered by this larger machine is similar to that of the " Bar " but there is, in addition, a recirculated hot water wash at 160°F. between the detergent wash and the final rinse.

P.V.C. covered wire metal racks, 20 in. × 20 in. square, are supplied with the machines in the following quantities:—

The " Bar ": ten racks—seven plate, two cup and one cutlery.

The " Car ": eleven racks—eight plate, two cup and one cutlery.

Additional racks can be supplied as required.



The Dawson " Car " Automatic Rotary Dishwashing Machine. The castor mounted tabling and the waste dispenser unit are not provided with the machine but they can be supplied as extras.

Large sliding glass windows give an uninterrupted view of the washing and rinsing processes from start to finish and provide easy access to the jet pipes, spray boxes, filter trays, drain stand pipes, etc. Removable stainless steel inspection covers are fitted on the lower sections of the machines to protect the motorised pump units and other equipment located there, as well as to provide easy access to these parts. If required, the machines can be fitted with an automatic wetting agent injector unit as an extra. This is connected to the rinse system to facilitate spot free drying.

THE KENT "JETSTREAM"

After carrying out research into the practical aspects of industrial cleaning, the Kent Co. Inc., of New York, has developed the "Jetstream," now being manufactured in Britain by the **Kent Floor Machine Co. Ltd.**, of Speke, Liverpool.

It is adaptable for the wet or dry cleaning of walls and floors and can also undertake a variety of other duties where a powerful and mobile suction unit is required.

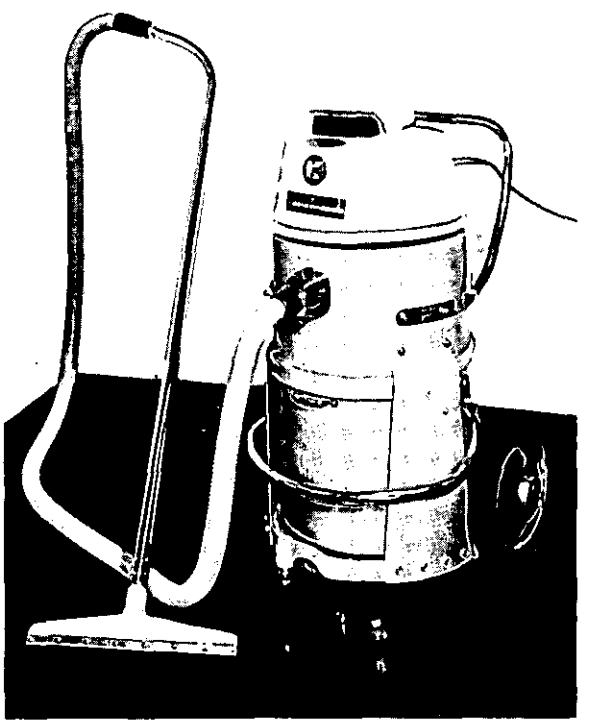
A flexible hose and nozzle type unit is standard on the Kent machine.

A newly-developed 1 h.p. by-pass universal motor is provided in conjunction with a three-stage fan system giving an air flow of 144 cu. ft./min. and a vacuum of 75 ins. (closed) or 51 ins. with a $\frac{5}{8}$ ins. orifice at the end of a ten foot hose. A special wet shut-off device is incorporated, but even if the machine is mis-used on wet work no moisture can reach the enclosed motor which is cooled by a separate air stream.

In order to preserve the performance rate over very long periods of continuous use, an exceptionally large filter surface area of 1,200 sq. ins. is provided. This is contained in a relatively small area of the machine by the use of a newly devised system of filter housing. For dry work the standard filter has a flannel cloth base; for wet work a new type of plastic-impregnated cloth is provided, while special filters are also available to meet unusual conditions.

Retained waste—dry or wet—is housed in a 16 ins. diameter tank of 18 gauge seamless construction lined with Plastisol to resist acids, rust and detergents. The tank is mounted on ball bearing runners and is automatically separated from the machine by a simple hand lever, making disposal extremely easy and straightforward. Capacity is ten gallons.

Where required—particularly in hospitals, nuclear research establishments, pharmaceutical laboratories, etc., where relatively aseptic and dust-free conditions are desirable—the Jetstream is fitted additionally with the Kent Micro-impaction filter. Numerous



The new Kent floor cleaning machine.

industrial and medical tests have confirmed that this glass fibre filter retains essentially 100 per cent of particles down to sub-micron size.

As all visible particles are removed by the standard first-stage filter, and retained in the tank, the Microstatic filter is left free to deal with microscopic particles and bacteria which would otherwise be exhausted into the atmosphere. In practice, the Microstatic filter retains its full bacterial efficiency for its entire life and only requires to be changed after months of use when the build-up of bacteria, etc. begins to have a restrictive action on the air flow. The Microstatic filter is essentially a physical trap and is not chemically impregnated.

NEW SILICONE GREASE—M.494

A new silicone grease, M.494, has been added to the rapidly growing range of I.C.I. Nobel Division silicone products. The outstanding electrical qualities of M.494, coupled with the silicone characteristic of intense water-repellency, give it exceptional efficiency as a sealing agent for electrical equipment, and as a general agent to protect surfaces against moisture.

Technically and economically, M.494 has proved its worth in many specialised and varied applications which include: protection of insulations from corona discharge; sealing and potting grease in electronic equipment; lubricant for electric cable prior to its being drawn through conduits, harness, etc.; packing grease for glands and for impregnating asbestos packings to prevent sticking of joints; lubricant for preventing sticking of screw threads, e.g. with electric fittings located outdoors; vacuum sealing grease.

Further particulars about M.494 and other members of the I.C.I. range of silicone greases, M.490, DP.49 and DP.203 will be supplied from the nearest I.C.I. Sales Office or from **I.C.I. Ltd.**, Nobel Division, Silicones Department, Stevenston, Ayrshire.

LEAD IN PLASTIC FORM

From the makers of Plastic Steel and other Devcon products comes a new plastic material, Devcon L.

Devcon L is a combination of approximately 94% lead and 6% of a special thermo-setting plastic. Similar in many respects to Plastic Steel, it has the consistency of putty, and can be moulded to shape as easily as modelling clay and no heat, pressure or flame is required in applying it. Three hours after the addition of a special hardening agent, the mixture becomes a strong mass very similar in all essential qualities to lead itself.

Once hardened, the Devcon L can be sawn, drilled or machined with regular tools. It can be pounded or shaped with a hammer, and malleability is identical, for all practical purposes, with that of lead.

NEW COLOURS AND PATTERNS IN FORMICA

Formica Ltd. announce with pleasure the addition of eleven new colour/patterns to their standard range of Formica Decorative Laminates. This brings the total number of available patterns up to nearly sixty. Five of the patterns are new woodgrains, five are colour variations on the "Linette" theme and one is an extension to the "Capri" range.

Although there is undoubtedly a shortage of them in their natural state, the more exotic real woods are now becoming increasingly popular. All the new Formica woodgrains help to provide a varied and attractive answer to the current and increasing demand for less usual, though "natural," effects. They will be welcome where the installation of wall-panelling is contemplated.

The five colour-variations on the "Linette" theme are tangerine, canary yellow, autumn tan, holly green and persian blue. Characteristic of them are the firmness and clarity of their positive colours.

Another colour-way has been added to the "Pantomime" Artwork range. The design is made up of diamond shapes in three tones and is already available in red, grey, green-grey, lime green and dark blue. To meet popular demand, a black/white effect was added to the range from April 1st.

TELCLEATS

Telcleats are the new cable cleats, introduced by **The Telegraph Construction & Maintenance Company Ltd.** (Telcon) a short time ago, and provided a means whereby most types of circular-section cables up to 2 in. in diameter can be easily and securely affixed to a variety of surfaces. They are precision moulded in one piece, so that there are no loose parts to mislay. Fixing is effected by means of a single hole through which a suitable screw or bolt is passed. The material is black Telcothene which is completely non-corrodible and non-corrosive, having no deleterious mechanical or chemical effect on cable sheaths, whether of metal or plastic.

The design incorporates features which ensure a good grip on the cable to minimise slipping on vertical runs.

Telcleats are suitable for mounting in cable trays, trunking or racks, and to surfaces of brick, concrete, plaster, wood, hardboard, etc. They are flexible and easily opened out to allow them to be slipped on to the cable. The fixing operation is extremely simple, the exact method being dependent upon the conditions of installation.

Normal spacing practice is followed and Telcleats are designed so that combinations of various sizes can be assembled in tier formation, and the spacing of cables is neat and occupies the minimum of space.

They are also ideal for supporting Telcothene Tubing for cold water installations.

There are eleven sizes to accommodate cables or piping of various diameters, from 0·5 in. to 1 in., rising in steps of 0·1 in., and 1·2 in. to 2 in. rising in steps of 0·2 in.

PREPARING LINOLEUM FOR A PLASTIC SEAL

Petalon Limited, who market the Glitsa range of floor seals, announce an improved wax remover.

Wax Remover F will remove both wax and the transit seal without damaging the linoleum. A special additive also increases the emulsifying effect and retards drying time.

Successful application of a seal always depends on thorough preparation of the floor. Not only must all traces of wax be removed, but also the transit seal with which most linoleum is treated before it leaves the factory.

Wax Remover F is available from: Petalon Ltd. of Fitzhardinge Street, W.1, at 23s. per gallon. One gallon will treat 45 square yards of linoleum.

Notes for Members

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

OBITUARY

Mr. F. J. White

We regret to announce the death of Mr. Frederick James White, a Life Member.

Mr. White served a seven year apprenticeship with Messrs. Platts Ltd. of Wednesbury, Staffordshire, and during this time attended West Bromwich Technical School. He subsequently served for four years on the engineering staff of Imperial Chemical Industries at Northwich, followed by eleven years with Rolls-Royce Ltd. at Derby before joining the Hospital Service. In January 1929, he was appointed Chief Engineer of the City Hospital and Boundary House Institution, then under control of the Derby Health Department. He held this post until his retirement.

Mr. White was an early member of the Institution and of the East Midlands Branch.

OXFORD "FOUR-BRANCH" MEETING

The annual meeting of the Midland, London, Southern and West of England Branches was held at Oxford on May 28th in the glorious weather that this meeting usually seems to strike.

The first part of the discussions was taken up with a number of suggestions regarding action that could be taken to emphasise dissatisfaction at hospital engineers' conditions of service, and these included the assistance of the Press, selected M.Ps, and other devices. Existing methods and arrangements for negotiation were brought into the debate. Other matters included the position of certain deputy Superintendent Engineers and of certain Senior Engineers who were carrying out Group duties.

Another matter brought up was residence on site as a condition of service.

In regard to attendance upon fully automatic oil-fired boilers, the Secretary reported that he had been in communication with five major Insurance Companies and they had advised him that they were opposed to the discontinuance of suitable supervision on such plant. This view was fully supported by members present.

The Meeting discussed the conversion of autoclaves which appeared, on the whole, to be satisfactory but it was felt that, though certain improvements had come about during the year, still more were to be expected.

Various other matters, such as the extra duty allowance and leave with pay for attending examinations, were also discussed.

A very much fuller report of this meeting has been circulated to the Branches concerned.

Members were very much indebted to the Radcliffe Infirmary authorities for the hospitality extended to them on the occasion of this meeting.

COMBINED YORKS, LANCASHIRE AND EAST MIDLANDS MEETING

This meeting was held at Middlewood Hospital, Sheffield, on May 14th, for the principal purpose of discussing the recent salary award.

Mr. M. J. Sewell, Vice-Chairman of Sheffield No. 2 H.M.C., addressed the Meeting and said much about the important part that he considered was played by the engineering staff of the service, particularly in making best use of the plant, so much of which suffered from years of neglect.

NORTH EASTERN BRANCH

The following news has been received from the North Eastern Branch.

A joint meeting of the North Eastern Branch and the Association of Hospital Superintendent Engineers (No. 1 Region) was held at the Liberal Club, Newcastle-upon-Tyne, on May 6th, 1960, to mark the retirement of Mr. Oswin Ritchie from the Hospital Service.

Members had a pleasant evening, and Mr. T. Blagburn presented, on behalf of members of both associations, an hors-d'oeuvres set.

At the I.H.E. branch meeting which followed, great indignation was expressed about the paucity of the recent salary awards, particularly when compared to the salary increases recently granted to other grades within the Hospital Service. It was strongly felt that the time had come to consider the use of stronger measures.

Mr. H. Wilson has relinquished the position of Senior Engineer, Prudhoe and Monkton Hospital, and taken up the appointment of Superintendent Engineer to the Royal Buckinghamshire and Associated Hospitals Management Committee.

The position vacated has been taken up by Mr. R. R. Christie, a member of the London Branch.

Mr. R. Heddle, Superintendent Engineer of St. George's Hospital, Morpeth, has been appointed Superintendent Engineer to South Shields H.M.C.

The position vacated has been filled by Mr. R. Lloyd, Senior Engineer, Walkergate Hospital, Newcastle-upon-Tyne.

The new Superintendent Engineer at St. Crispin Hospital, Duston, Northampton, is Mr. T. Boag. He was admitted to membership of the Institute of Marine Engineers in 1959.

Mr. R. H. Lloyd, who was recently elected a member of this Institution, has taken up the post of Senior Engineer at Hackney Hospital in the place of Mr. Blenkinsop who has retired.

Mr. J. G. Taylor has been appointed Senior Engineer to City Hospital and Manor Hospital, Derby.

The present Superintendent Engineer to the Mid-Glamorgan H.M.C., Mr. A. J. Marsh, has been appointed Superintendent Engineer to the Canterbury Group.

Mr. N. Divers, formerly Assistant Engineer at Haine Hospital, Ramsgate, has taken up the post of Senior Engineer at Buckland Hospital, Kent.

(Continued from page 143)

SUNDERLAND AREA
HOSPITAL MANAGEMENT COMMITTEE
THE GENERAL AND MATERNITY HOSPITALS SUNDERLAND

Applications are invited for the post of Assistant Engineer (non-resident).

Applicants should have completed their apprenticeship or training in Mechanical Engineering and have a thorough knowledge of the principles and practice of boiler operation and engineering and electrical services. They are also required to possess a First Class M.O.T.C.A. certificate or National Certificate in Mechanical Engineering.

Salary scale £605 × £25 (4) × £30 (1) to £735.

Detailed applications, together with the names of three referees, should be sent to the Group Secretary, S.A.H.M.C., General Hospital, Chester Road, Sunderland, within two weeks of the appearance of this advertisement.

SHEFFIELD REGIONAL HOSPITAL BOARD
AREA ENGINEER

Applications are invited from Engineers, holding A.M.I.Mech.E., and experienced in designing Heating and Ventilating installations, for superannuable post of AREA ENGINEER on the Regional Engineer's staff. Salary scale £1,665-£2,035. Mileage allowance for use of officer's own car on official business. Duties include responsibility for an engineering design team and liaison with consulting engineers engaged on all engineering services in over 80 hospitals in one of three areas controlled by the Board.

The Area Engineer will have ample opportunity for exercising individual responsibility, creative thought and work, and the expression of personality. The Board's headquarters have a congenial atmosphere and are situated in pleasant surroundings and first class residential suburb of the City. Applications, stating age, full details of education, training, qualifications, career, etc., to be forwarded to the Secretary, Sheffield Regional Hospital Board, Fulwood House, Sheffield, 10, not later than 12th August, 1960.

GLOUCESTER, STROUD AND THE FOREST
HOSPITAL MANAGEMENT COMMITTEE
DEPUTY SUPERINTENDENT ENGINEER

Applications are invited for the post of DEPUTY SUPERINTENDENT ENGINEER to assist the Superintendent Engineer in the operation and maintenance of engineering services and maintenance of plant and buildings in this GROUP of 13 hospitals. Applicants should be qualified in accordance with Ministry of Health requirements. Salary scale £700 per annum, rising to a maximum of £800 per annum. Commencing salary may be determined by experience. All enquiries must, in the first instance, be made to the Superintendent Engineer, Gloucestershire Royal Hospital, Great Western Road, Gloucester.

MISCELLANEOUS

NEW MICROCELL COMPANY

Microcell Ltd. announces that its Rubberised Hair Division has been formed into a subsidiary company known as Rubberised Hair Ltd. The works are at 9–11, Curtain Road, London, E.C.2.

The members of the board are Mr. Henry Kremer, Mr. W. A. Bartlett and Mr. M. R. C. Saunders (Executive Director).

The company has the full backing of the parent company, Microcell Ltd.

It was decided to form the company to enable the expansion programme planned for the Rubberised Hair Division to be carried out more effectively.

SPEEDYHEAT EXPAND

Speedyheat Ltd. (44, Tower Hill, London, E.C.3), manufacturers of the "Speedyheater" space heating and air circulating units, have widened their interests. They are now the London Office of Burgess & Company (Engineers) Limited, makers of the "Burgess Boiler" for hot water and steam. In addition, they are authorised agents for the "Bekon" range of pressed steel radiators for high and low pressures.

CLASSIFIED ADVERTISEMENTS

SITUATIONS VACANT

ST. NICHOLAS HOSPITAL MANAGEMENT COMMITTEE

SENIOR ENGINEER

Applications are invited for the appointment of Senior Engineer at St. Nicholas Hospital, Gosforth, Newcastle-upon-Tyne, 3.

Candidates, who should possess a sound knowledge of steam boiler plants and have wide experience of mechanical and electrical engineering, should possess one of the following qualifications:

M.T.C.A. First Class Certificate of Competency in Marine Engineering;

M.T.C.A. Certificate of Service as First Class Engineer;

City & Guilds Full Technological Certificate in Plant Engineering (First Class).

The person appointed will be responsible to the Superintendent Engineer for all engineering services at St. Nicholas Hospital.

A house is available at a reasonable rental.

Salary scale £765 × £25 (2) × £30 (2) × £35 (1)—£910 per annum.

Applications, stating age, qualifications, experience and the names and addresses of three referees, to be sent to the Group Secretary, at the above addess, not later than 30th July, 1960.

WORTHING GROUP HOSPITAL MANAGEMENT COMMITTEE

WORTHING HOSPITAL, LYNDHURST ROAD, WORTHING, SUSSEX

SUPERINTENDENT ENGINEER required 1st September for acute general hospital (210 beds) and post-operative unit (52 beds), to be responsible to the Hospital Secretary for (1) the satisfactory operation, maintenance and co-ordination of the engineering services, both mechanical and electrical, (2) supervision of the carrying out of engineering maintenance, and (3) the keeping of records necessary for effective control. Substantial hospital development planned.

Applicants must have completed an apprenticeship in general mechanical engineering, or equivalent, and be fully experienced in the maintenance and operation of steam boiler plants, and must also hold one of the following qualifications, or equivalent approved by the Minister:

(a) First-class Certificate of Competency in Marine Engineering or equivalent Naval Certificate.

(b) City and Guilds Full Technology Certificate in Plant Engineering (First-class) (from 1957).

Salary (10½-20 points) on scale £865-£1,005 p.a.

Resident accommodation not available, but successful candidate will be expected to live within reasonable distance of hospital.

Applications, stating age, qualifications, experience and names of three referees, to Hospital Secretary immediately.

A. V. OAKTON,
Group Secretary.

(*Continued on page 142*)

Laundry Managers visit Broadbents

THE Society of Hospital Laundry Managers held a Summer School at the Cairn Hydro Hotel, Harrogate, from the 12th to 15th May, 1960, and during this conference it was arranged that they visit Thomas Broadbent & Sons Ltd., Central Ironworks, Huddersfield to tour the works.

Approximately 95 delegates attended and were met by the Mayor of Huddersfield and the Directors and Guides of Thomas Broadbent & Sons. After separating into parties of 12, they were conducted on a short tour which included demonstrations of a complete range of 16 in., 21 in., 30 in. and 36 in. hydro extractors and the new labour saving Broadbent Sling Operation, the Hydraxtor (a pressure type of extractor), Drycleaning and Automatic Folding of sheets and small flatwork. During the tour a number of machine and production operations were also witnessed, but unfortunately the time was insufficient to describe these items in full detail; to augment the tour a film depicting Broadbent Laundry Machines in operation was shown immediately after lunch.

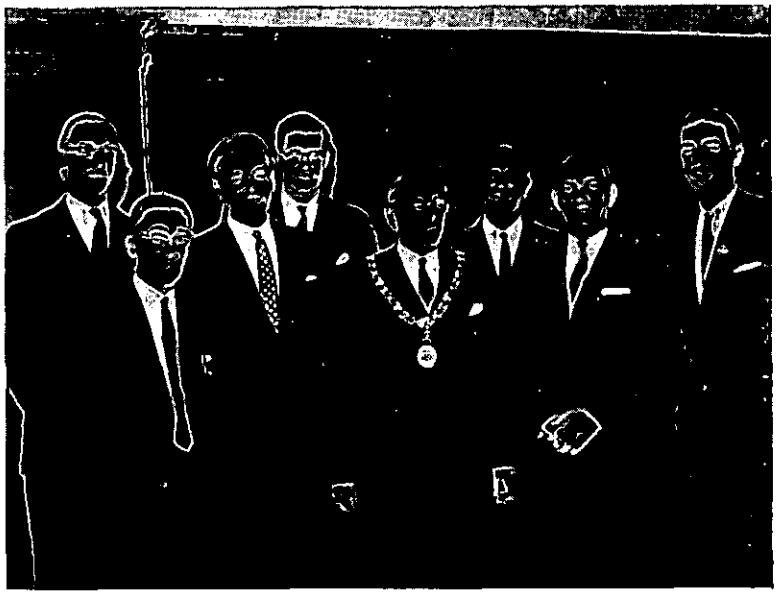
The lunch was attended by the President Mr. N. S. Mundye, Vice Presidents Mr. R. I. Aston and Mr. R. H. Law, Chairman Mr. C. H. Adams, and General Secretary Major E. G. M. Wingfield, and the Mayor of Huddersfield (Alderman R. H. Browne, J.P.) also graced the proceedings. Immediately after lunch films taken in various laundries were projected, the main one relating to Automatic Folding of sheets, smallwork and table linen at Una Star Laundry, Southampton. This was followed by a short film in colour of Automatic Quarter Folding at the Hanover Fair, a film of the new Stacker/Receiver on test in the works, and finally a film depicting Broadbent Sling Operation with the new 36 in. JB(60) 100 lb. load automatic extractor.

After lunch the President proposed a vote of thanks to Messrs. Thomas Broadbent & Sons Ltd., and His Worship The Mayor, Alderman R. H. Browne, J.P.—this was seconded by Mr. T. Wade of Manchester and Alderman T. E. Parker, J.P., of the South West Metropolitan Hospital Board. Mr. W. B. G. Cran, Director, Thomas Broadbent & Sons Ltd., replied on behalf of the firm, and His Worship the Mayor replied on behalf of the Town of Huddersfield.

The delegates expressed keen interest in all the proceedings and eventually departed for a short tour of the Dales *en route* to Harrogate.

HOSPITAL DESIGN UNIT

In reply to a question, the Minister of Health said in the House that the design unit set up in 1954 in his department had published a bulletin in 1958 on operating-theatre suites. Bulletins on residential accommodation for nurses, consultative outpatient departments, and kitchens were in course of preparation, together with some engineering studies and interim building notes on various other hospital departments. As the first of a number of development projects, an outpatient department and a kitchen would be built.



From left to right: Mr. R. H. Law, Mr. R. I. Aston, Mr. N. S. Mundye, Mr. P. Broadbent, The Mayor of Huddersfield (Alderman R. H. Browne, J.P.), Major E. G. M. Wingfield, Mr. C. H. Adams, and Mr. W. B. G. Cran, on the occasion of the visit of the Society of Hospital Laundry Managers to Thomas Broadbent's Huddersfield Works.

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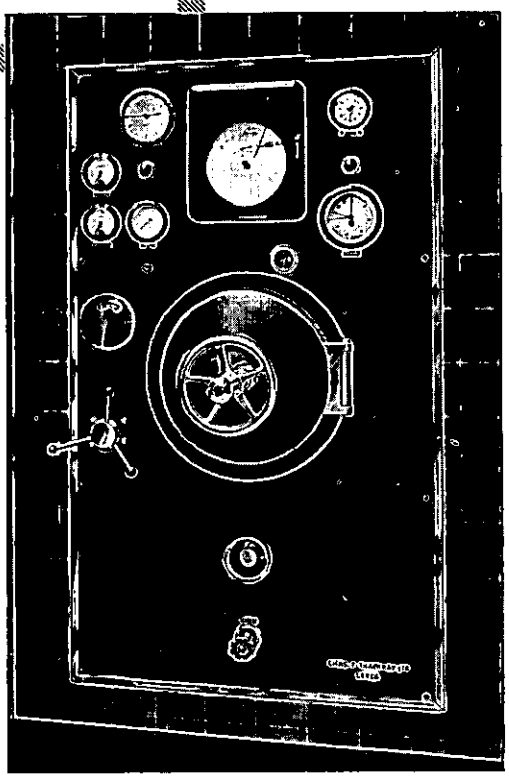

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*See LANCET Feb. 28/59. Pages 425-435

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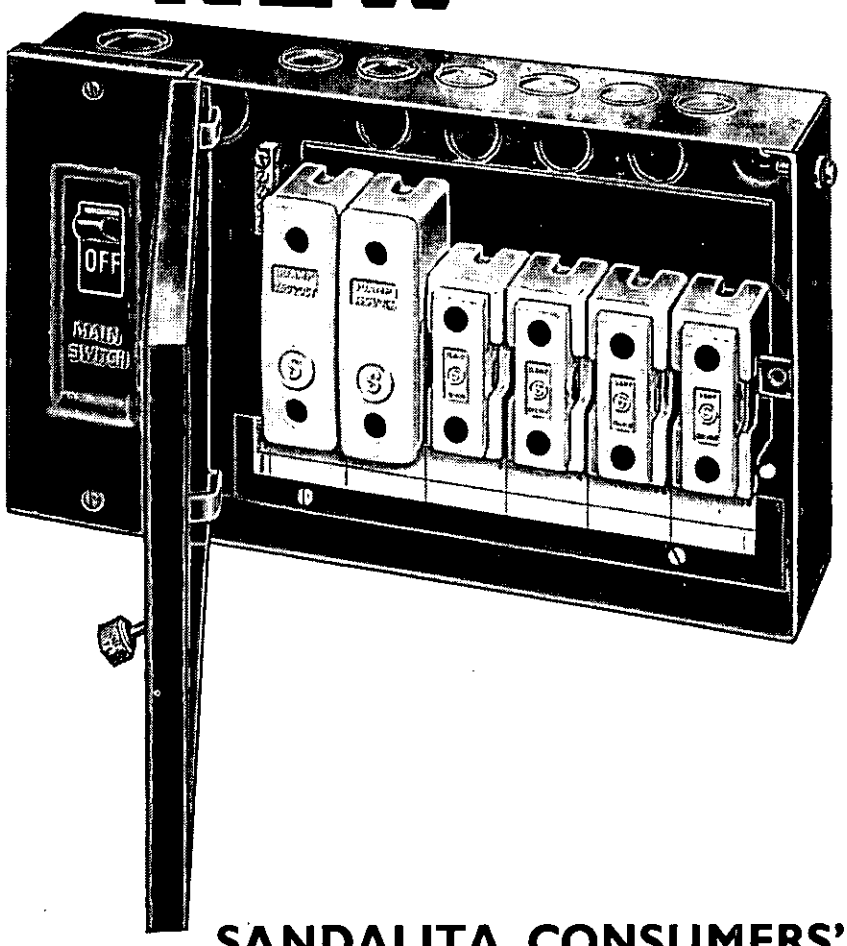

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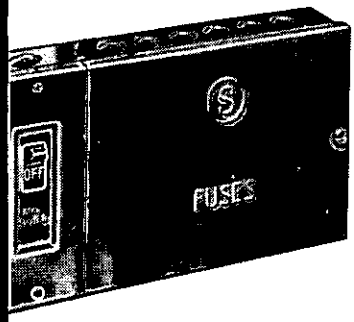

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