Hospital Engineering

The Journal of the Institute of Hospital Engineering

Vol. 24 May 1970

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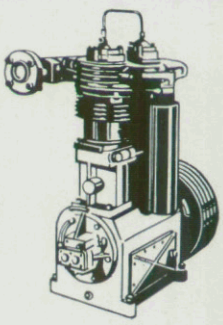

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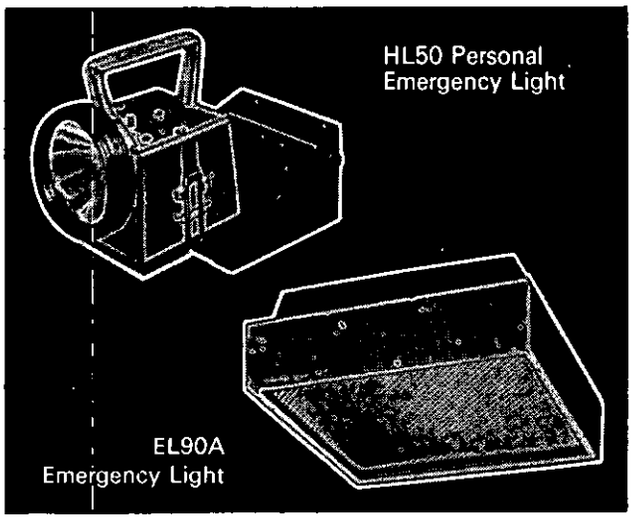

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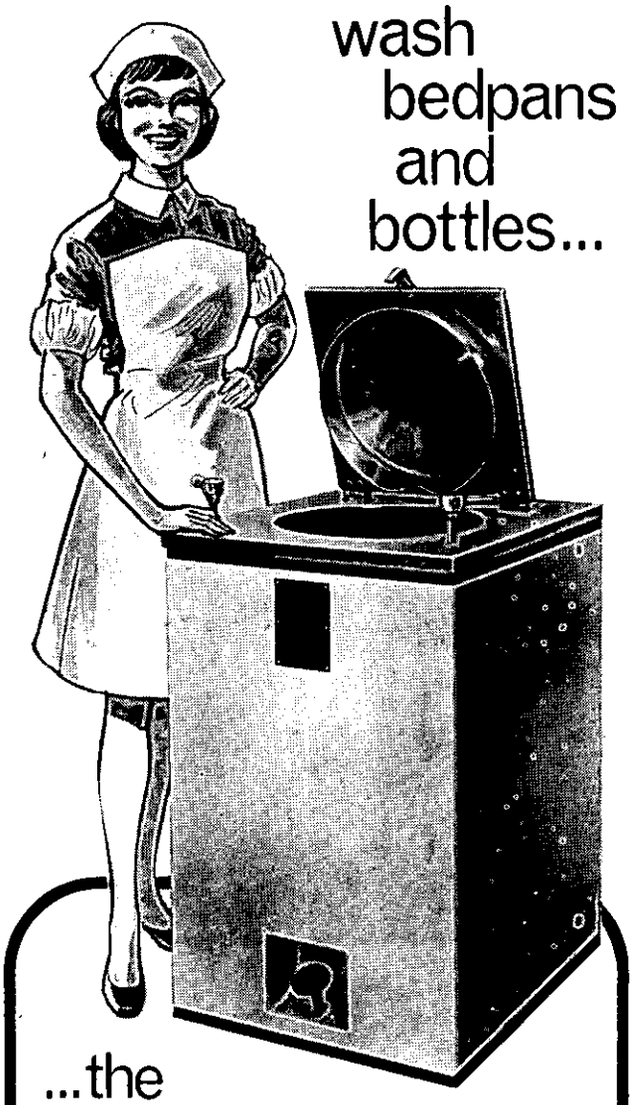

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Contents

Special Features

News Features

Departments

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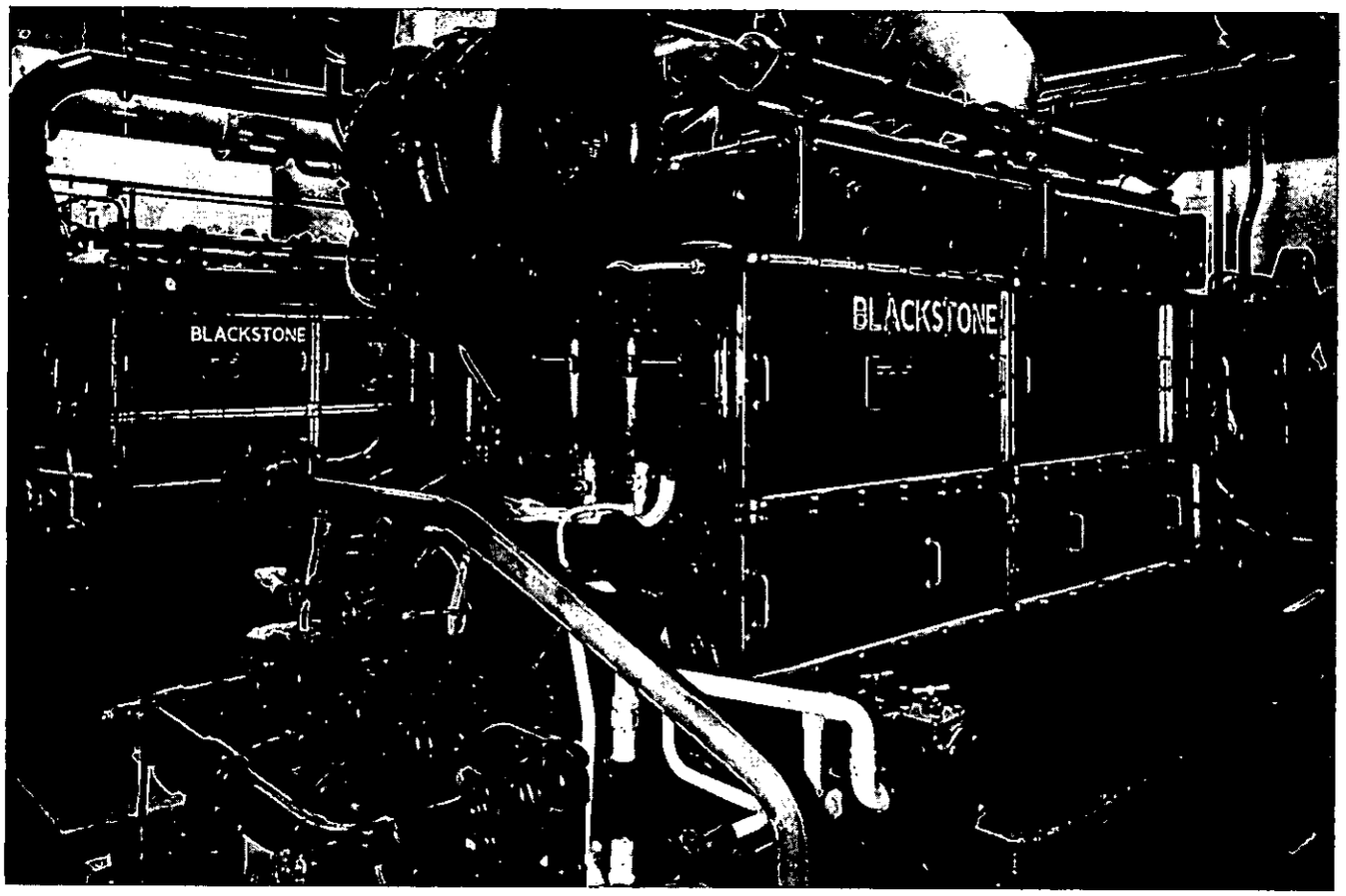
Power Generation



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Hospital Engineering

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Pages 91-113

Green Paper 2

In this issue of *Hospital Engineering* we publish in full the memorandum submitted to the Secretary of State for Social Services by the Regional Engineers' Association (REA), in which the regional engineers give their comments on the second Green Paper. Their views are of interest and importance because they not only state how they would like to see the NHS reorganised (and give their reasons), but also give their diagnosis of what is wrong with the health service at present. They also offer to advise, later in the year, on how the maintenance departments of area health authorities should be organised. The Association's views follow their submission on the first Green Paper; the report should be read in conjunction with this.

The main aims of the second Green Paper are strongly endorsed by the regional engineers. They accept the concept of area health authorities almost without comment. The basic unit for administration is seen to be the group of 100–150 000 people in a district, cared for by *their* health, welfare and social services, *their* general practitioners, dentists, opticians and pharmacists, and by *their* district general hospital. Not more than four or five such districts should be grouped under an area health authority to keep its responsibilities within the normal span of management control. Thus, on entirely different reasoning, they arrive at the same number of AHAs as does the second Green Paper. This, however, leads them to the conclusion that there should be 400–500 district committees with lay members, and that they must have clearly defined responsibilities delegated to them by the AHAs. When the REA comes to formulate its advice on the organisation of the building and engineering departments of area health authorities and district committees, it must work closely with the Institute of Hospital Engineering, the majority of whose members are now closely concerned with engineering at the district level. It would be helpful if the Woodbine-Parrish Committee could soon issue its report. We note with pleasure that some regional and group engineers are already working jointly on a King's Fund Panel on the future organisation of district general hospitals; this panel should extend its range to cover area health authorities.

Like many others (not least *The Times*) the regional engineers are critical of the second Green Paper's proposals for increasing the direct control by the Secretary of State and the central department of the health service as a whole. This is contrary to the recommendations of the Guillebaud Report of 1956, and no reasons are given in the Green Paper for this very major change of government policy. Regional engineers deplore the proposed creation of regional health councils which will be in the sterile position of advisers without responsibilities, powers or funds, and isolated from the administrative realities of running the service. Their advice is almost certain to be ignored. In fact, the regional engineers consider that the proposals for the control of the area health authorities are muddled and impracticable, and that a properly constituted administrative tier is necessary between them and the Secretary of State. This could be undertaken by expanding the regional offices of the Department and jettisoning the RHBs entirely, but such a course is entirely contrary to one of the stated aims of the Green Paper—local participation—and entirely neglects the very great contribution to the NHS of the members of the RHBs. These bring to the service a freshness

of view, a common sense formed in the professions, industry and commerce, a sensitivity to local opinion little tempered by considerations of day-to-day political advantage, and a willingness to make quick decisions which is apparently quite novel to civil servants; in total, a bundle of qualities that prevent the health service from degenerating into a monopoly run by a bureaucracy. The REA favours an increase in the powers of the AHAs as compared to the present hospital management committees, but sees that RHBs should be retained with the important duties of determining broad policy and priorities, providing specialist services in all disciplines, linking with regional development councils, planning capital programmes and designing and building major projects. They also add the novel thought that the RHBs should hold the responsibility for the management audit of the AHAs.

The regional engineers diagnose the defects and difficulties of the present health service as arising less from matters of organisation than from training, management, accountability and audit, from the inherent dangers of a monopoly, and from the major policy decisions involved in balancing, to the public's satisfaction, almost unlimited medical and nursing responsibilities against necessarily limited resources. The second Green Paper, in its vagueness on control of the service above and below the AHA level, offers no firm suggestions on how to rectify these defects. The REA considers that the retention of RHBs with revised powers, the amalgamation of HMCs into larger administrative units, the unification (as far as possible) of the tripartite service, and the formation of area health authorities and district committees would together form a better framework within which to carry out the aims of the Green Paper—to put the service right.

On the whole, we would agree, (although, all things considered, the NHS as it is is not doing too badly). In particular, we do not see the need for a radical reorganisation to achieve unification, especially when this would involve the demolition of a successful piece of regional organisation.

ENGINEERING IN A LARGE ZULULAND MISSION HOSPITAL

by A. J. Reynoldson, Grad. I. Hosp. E.

The Charles Johnson Memorial Hospital, Nqutu, Zululand, serves a population of some 45 000 people scattered over an area of 700 mile^2. The countryside is rugged, and in some areas quite mountainous, and roads are mostly dirt or mud tracks. We attend to 65 000 outpatients a year, and administer 11 district clinics through our mobile clinic vehicle. The hospital itself handles over 500 surgical operations a year, delivers 1700 babies, rears 100 premature babies, and treats 600 cases of pellagra and kwashiorkor in children. We have male and female general and tuberculosis wards, four children's wards and a large maternity section comprising an antenatal ward, labour wards and delivery rooms, premature-baby unit, postnatal ward, isolation ward and postnatal clinic. The hospital also trains midwives and general nurses in its two schools.

From an engineering point of view it is a fascinating place, embracing every aspect of self sufficiency, from its power station to the sewerage farm and water supply. The works department has a staff of thirty, comprising electricians, carpenters, tinsmiths, builders and general labourers, and has to have an answer for everything. I hope to give just an outline of the various facets of my work here, much of which would be far from the province of the hospital engineer in England.

Electricity

The power station is the hub of the hospital, driving as it does the steriliser and medical equipment. We have to maintain a continuous supply 24 h a day as breakdowns could cause chaos and loss of life to some of our patients. The plant comprises two Lister Blackstone

Fig. 1 Two views of the power-station interior

ER2 vertical diesels driving 90 kVA alternators by Lancashire Dynamo and Crypton, with an 18 kVA Caterpillar set for emergency standby (see Fig. 1).

The original assembly of the plant is worth describing. Originally we had only one Blackstone set, which proved to be too small to carry the winter load, and a second set had been ordered when I arrived. Foundation excavations were begun in the engine room, but very poor soil conditions demanded a $15 \times 8 \times 10$ ft^3 engine block. The casting of the block was duly commenced, and took 15 h —in those days we had no concrete mixer and everything had to be done by hand. The engine, $3\frac{1}{2}$ tons of it, arrived, and we were confronted with the problem of getting it into the engine room, around the back of the Caterpillar plant, and up on to the plinths. Eventually, *with thirty labourers, a 1 ton chain block and some* stout poles, we manhandled the machine in and rested it on the plinths with only a few scratches to the paintwork. (It did leave a team of rather exhausted men!) After the engine the alternator and exciter were child's play, and the plant was coupled up to the switchboard and run onload for a week's test.

Having two plants operational made life much easier, since previously decarbonising and overhauls had to be completed at top speed, the Caterpillar plant only being able to run essential services. All servicing of the plant is carried out by my department, from decoking the diesels to cleaning the alternators and adjusting switchgear. Blockages in the heat exchangers and oil cooler are a headache, as our water is not all that could be desired. I found that a unit would only run for 1000 h before overheating; so we invested in a spare set of heat exchangers which has given us more time to service them. The cooling towers supplied to us were of very inferior quality, and we have recently replaced one with a unit of our own design and manufacture, which is proving very successful.

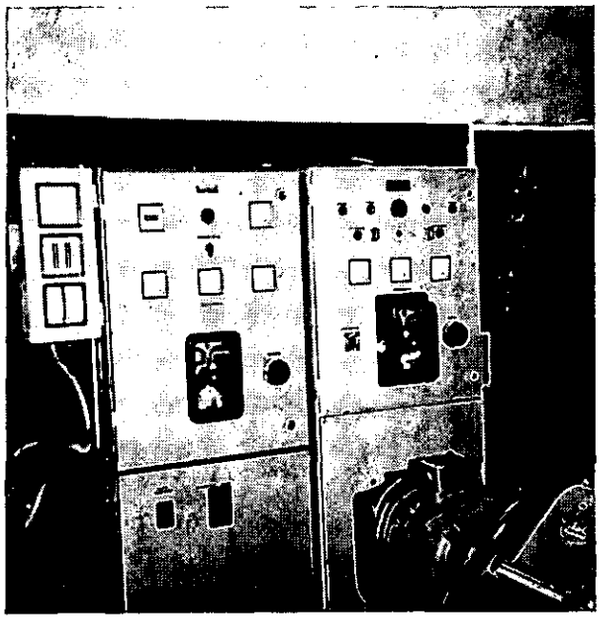


Fig. 2 Paralleling switchgear

The alternators are coupled to a paralleling switch panel, designed by us and incorporating the Brown Boveri regulators and synchroscope (Fig. 2). From the engine-room panel twin underground cables carry the current to the works office in the centre of the hospital, where the main distribution panel is situated. This divides the 3-phase 4-wire input from the engine room into ten smaller 3-phase cables serving the various sections of the hospital. Incorporated in this panel are engine-water-temperature alarm bells and warning lights, as well as ammeters, frequency meters and voltmeters, enabling a complete portrayal of conditions existing in the engine room. The outgoing 3-phase cables from the

works office run to ten smaller distribution boxes, where they are again broken down into several cables feeding the separate departments. We use only armoured p.v.c. cable for outside work, and all buildings are wired in 0·75 in or 1 in screwed conduit. Our switchgear and distribution boxes contain overload-trip switches; we have discarded all the original wire fuses. The maintaining of all electrical services, as well as rewiring and cable laying, is undertaken solely by the works department.

Water

Two earth-walled dams, with a capacity of 10^7 gal, hold our main supply of this precious commodity, and we rely entirely on rain catchment to replenish them. Apart from these two reservoirs, three boreholes are in use, one supplying drinking water and cooling-tower makeup for the power station, the other two supplementing the reservoir supply. The reservoirs are a mile from the hospital and are surrounded by a fir-tree plantation. The purpose of the trees is to shade the water to minimise evaporation and to draw rain clouds. I must admit that they seem to achieve neither! The water is gravity fed from the upper reservoir through a 2-stage settling-tank system, and the cleaned water is pumped up to the hospital. The settling tanks are run with a drip feed of aluminium sulphate which causes an electrolytic action, flocculating the mud which settles on the bottom. This mud is drawn off when it reaches a certain level, and the tanks are then cleaned, filled and restarted.

Two pump houses stand adjacent to the tanks, one housing a water-cooled Lister diesel, the other an air-cooled Lister diesel, both driving 8-stage Baemar centrifugal pumps. The air-cooled set is kept as a standby, and is rigged to pump from the dam to the tanks to facilitate speedy filling after desludging and cleaning operations. From the pump houses a 3 in galvanized-iron pipe runs up to the hospital head tanks on the maternity section roof. These tanks have proved inadequate, as they give a pressure of only 10 lbf/in² in the system; so I have bypassed them and now run the main straight into the system, utilising a Birket pressure-reducing valve to bring the main-line pressure from 60 lbf/in² down to 20–25 lbf/in². Excess water delivered by the pumps passes through a relief valve in the pump house and is returned to the settling tanks.

It was when drought struck us two years ago that we sank the two bore holes in the region of the reservoirs to supplement our dwindling reserves. Bores 1 and 2 are 200 ft and 500 ft deep, respectively. Bore 1 utilises a reciprocating-rod pump, and bore 2 a rotary-turbine pump, both driven by air-cooled Lister diesels. The water is fed from these pumps into the secondary settling tank, reducing the amount drawn from the reservoir. A third bore hole is in close proximity to the hospital, and supplies drinking water and power-station cooling requirements. A 3-phase electric motor drives a conventional reciprocating-rod pump, and is controlled from the main panel in the power station. Water is pumped into 1000 gal tanks, from which it is pumped to the various departments by an electric centrifugal pump. The tanks allow a reserve to cover overhauls to the bore pumping equipment.

In addition to these sources we have an emergency supply from two miles away on the other side of the hospital. This is a spring delivering some 15 000 gal/week (much more after a storm), which is stored behind a small concrete dam. Water from this is pumped to a 20 000 gal storage tank on the hill above the hospital by a Climax twin-cylinder reciprocating pump driven by another air-cooled Lister diesel. From the hill tank water is gravity-fed to the hospital and used when the settling tanks have been emptied for cleaning.

We are, at present, in the throes of constructing a 700 ft dam wall in the vicinity of this pumping station, to hold an estimated 15 Mgal, as well as a new purification plant and pumping station. This is being built in

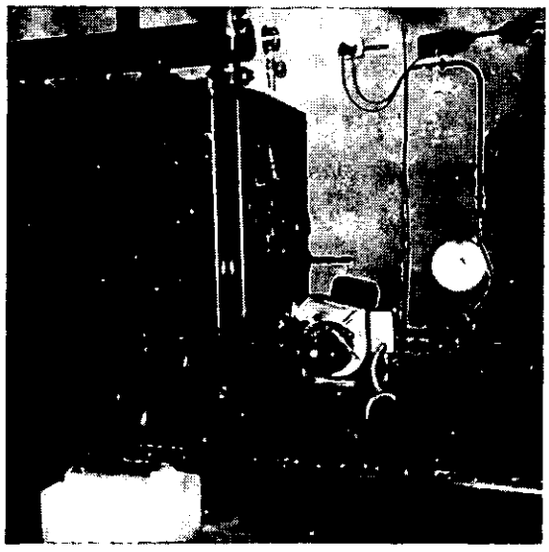
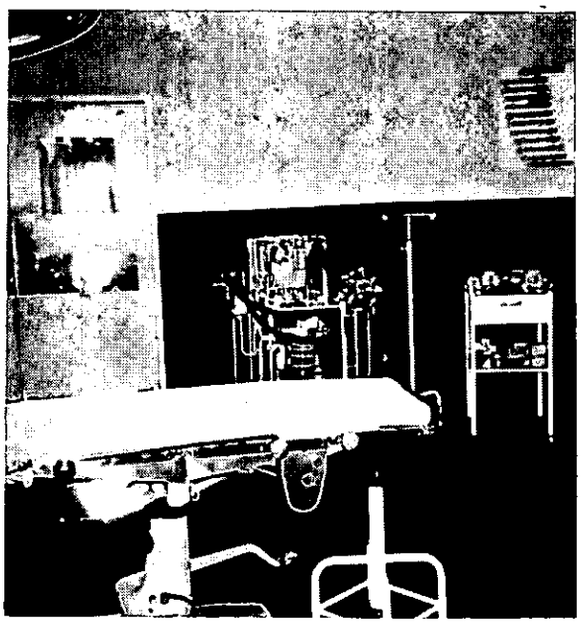


Fig. 3 Lucifer hot-water boiler and Nu-Way burner

Fig. 4 Screen dividing antenatal ward

Fig. 5 Exterior of new maternity section, showing the labour ward and bridge leading to postnatal wards
Fig. 6 Interior of new theatre
Fig. 7 Kitchen and stores complex, showing gas bank
Fig. 8 Vulcan ranges installed in kitchen
Fig. 9 Converted cooking vat

5



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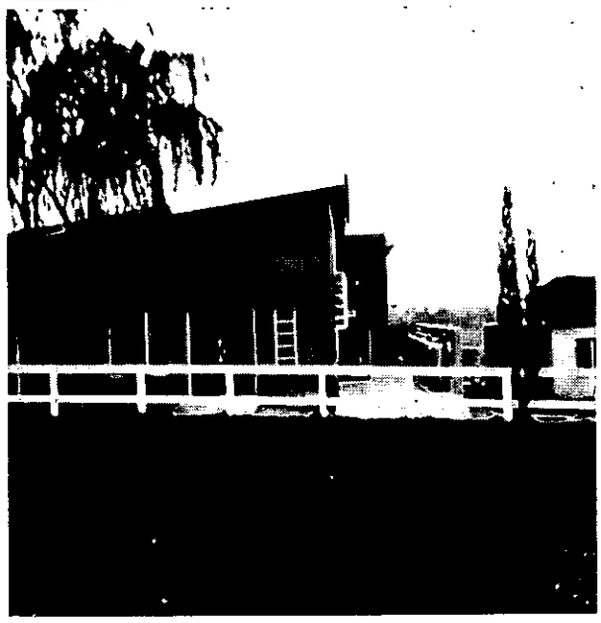

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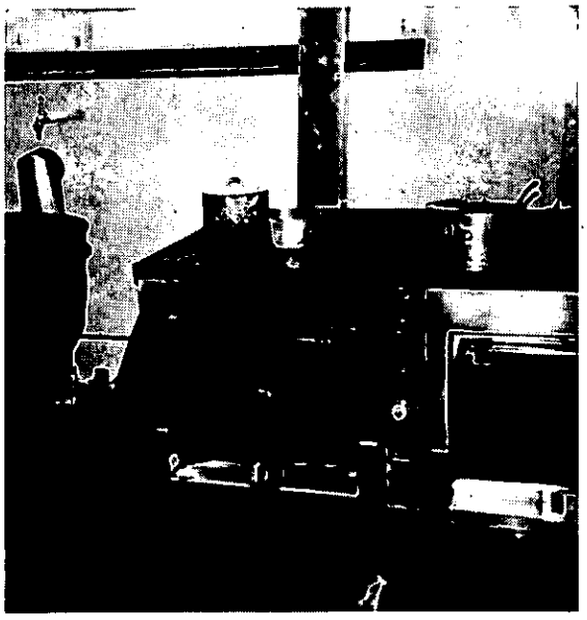

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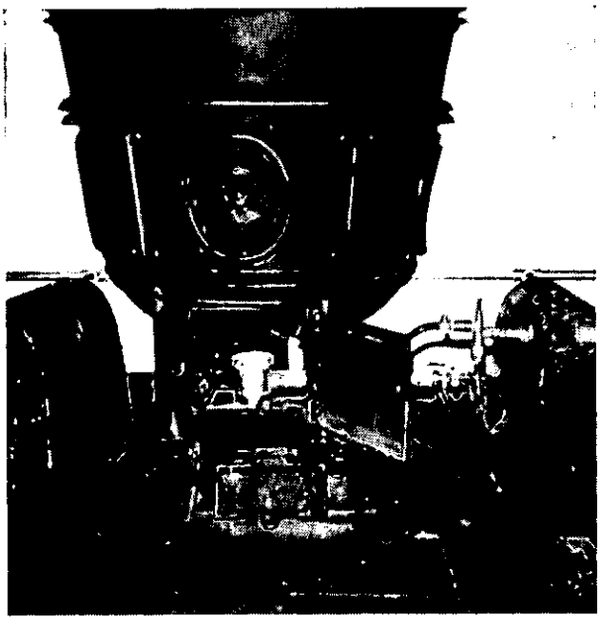

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view of our ever-increasing consumption and expansion.

Hot water is supplied by a selection of hand-stoked coal boilers placed strategically around the hospital, and by a new central oil-fed plant (Fig. 3) serving the new maternity unit. This central plant is a Lucifer boiler fitted with a Nu-Way light-oil burner, and it is fully automatic. Recently we piped hot water round three of our children's wards using a ring main and an electric circulation pump. We hope to install a second similar plant, so doing away with the old coal-fired units. We have no piped steam as yet; all our sterilising equipment is electrical, and most of the heating is by gas. The works department is responsible for all water-supply machinery as well as pipeline laying and plumbing throughout the site.

Sewerage

All our sewerage systems are fed into two 6 in mains running out of the hospital into the upper sewerage works. The upper works comprises a series of rag screens, a Dortmont tank, a digester and sludge-drying beds. The raw sewage passes through the screens and flows into the Dortmont tank. This allows the solids to settle to the bottom, while the effluent passes over a weir with a scum baffle and into the dosing siphon. Solids settling to the bottom are pumped out daily into the adjacent digester by the screen-cleaning attendant. The digester has a capacity of four to six weeks, and when full a certain amount is drawn from the bottom. The sludge drawn, having had time to digest, is a black tarlike substance and is completely odourless (or so the authorities maintain). This is poured onto drying beds, where any fluids are piped back to the Dortmont tank dosing siphon. After drying, the sludge is either used as manure or buried in pits. We usually bury ours. The effluent passing from the Dortmont tank enters the dosing siphon, which is rather like a giant-sized automatic lavatory cistern. This sends the effluent down the main to the lower plant in separate batches. On reaching the lower farm it passes through two parallel septic tanks, to deal with any solids bypassing the upper system, and into two oxidation ponds in series, which cover an area of half an acre each. The processed effluent is then run off into the ground. Once again the running and maintaining of this, along with laying of new sewers, is the responsibility of the works department.

General

The main workshops, truck and ambulance garages and works stores are situated in a fenced-off enclosure, which includes the power-station building. The night engine staff act as gatekeepers and watchmen. The workshop itself is opposite the power station, with a gravel roadway running in between, and houses the electricians, tinsmith and carpentry shops, with a section for pipe fittings, the arc welder and machine tools. The lathe is in a room adjoining the power station, along with engine spares and special tool kits, while the spray-painting booth is located at the far end of the works yard. Cement and builders' tools are in a room adjoining the garages, while heavy builders' equipment, the concrete mixer and building materials are stored on a concrete pad between the workshop and garages. Fuel tanks for 6000 gal diesel fuel, 1000 gal petrol and 2000 gal power paraffin are sunk around the perimeter fence, allowing fuel tankers easy access.

The demands on the carpentry section are always in excess of output, as reasonably semiskilled carpenters are at a premium and cabinet makers almost unheard of. The two men we have at the moment are reasonable, but I usually find myself involved in anything even slightly complex. We make most of our own ward and nurses-home furnishings, the standard being very high considering the skill of the staff. Our best result so far has been a screen dividing the antenatal ward. The lower 4 ft are in oak panelling with twin swing doors in the centre, and there is a 15 ft run of clear-glass panelling above (Fig. 4).

The tinsmith's shop is always a hive of activity, coping with all minor welding and soldering jobs as well as replacing bottoms on endless pots and pans. Here the ward beds are repaired and resprung, and trolley castors are replaced. Beds are an endless task for the spray painter, as nursing staff seem to be able to knock paint off at an incredible rate.

Our building team have the task of executing all ward alterations, and all minor buildings such as small extensions to buildings or erecting new buildings of one or two rooms. Larger projects are usually farmed out to a contractor as I do not have enough time to supervise everything. We do all electrical and plumbing installations ourselves.

Running repairs and general servicing of ambulances, mobile clinics and hospital pickups are also the worry of the works department. Being, among other things, a qualified motor-vehicle engineer has proved invaluable, as these vehicles are used mostly on dirt roads or across country, and need constant attention. In the dry season the veld is hard and shakes everything to pieces, while the rains turn roads and countryside into an impassable bog. On occasion ambulances only reach patients or the hospital with the timely assistance of several span of oxen.

New buildings

Two and a half years ago we opened our new maternity unit, comprising antenatal ward, labour-ward block, premature-baby unit and postnatal wards. Above the postnatal ward are the midwifery school, demonstration rooms and staff nurses' quarters (Fig 5). This whole complex was built at a cost of 84 000 Rand. The labour-ward section contains five delivery rooms, and eclamptic room, a labour ward, bathrooms and the necessary sterilising rooms and offices. Below is the antenatal clinic and premature-baby unit (Fig. 8), which has two incubators and radiator-heated cubical rooms, run off the main boiler system. A lift connects the labour wards with the ground floor, giving easy access to the operating theatres in the main block. The labour-ward unit has piped oxygen from a bank in the basement; we hope to incorporate more wards into the piped-oxygen system in the near future.

Adjoining the labour-ward building is the postnatal

and isolation unit with the midwifery school etc. above. These buildings form two sides of a quadrangle, the other sides being formed by the L shaped antenatal wards. We have managed to save many of the beautiful trees and gardens by carefully building round them, sometimes at the cost of some efficiency. A concrete jungle may be very efficient in some respects, but here in the outback everyone has to live in the hospital, and surroundings can become very important.

After the completion of the maternity department, work began on a second operating theatre (Fig. 6), the original being too small to cope with increasing demands. This is a 2-storey building in the main quadrangle formed by the male and female general wards and the TB wards. The lower floor contains an X ray filing office, the TB record office and the main linen store, while the first floor houses the theatre proper, with the ancillary changing rooms, central sterilising department and sluice rooms as well as the theatre sisters' office and the patient-recovery room. This building cost R10 000 and has been beautifully equipped by donations from overseas; permission has just been received to install air conditioning. Lighting in this theatre has a mains-failure battery bank in the basement boiler house.

We are, at present, putting the finishing touches to a new patients' kitchens and provisions-store complex (Fig. 7) at a cost of just over R10 000. The kitchen itself is now fully operational, and is run on liquid petroleum gas. A twin bank of 24 100 lb cylinders with an automatic changeover regulator serves nine vats and two Vulcan ranges (Fig. 8). The vats are coal-fired field-kitchen units from our original kitchen, converted by the removal of the coal grates and the fitting of high-pressure gas burners (Fig. 9). This conversion saved us over R800 compared with the cost of new gas boilers. The provisions store adjoining the kitchen has an interconnecting serving door. All bulk provisions are housed on pallets, a hydraulic-lift trolley facilitating easy handling, while small items are housed on Dexion shelving. I am, at the time of writing, building a deep-freeze room and cool room within the new store. These are lined with 4 in thick polystyrene, and have blower coils mounted in the ceilings. The compressors have only just arrived from Durban; so the compressor house has yet to be constructed.

We have a fairly full building programme for the months ahead, including a new administrative block, and a larger outpatients' block incorporating X ray room, laboratory and dispensary.

To conclude

I hope this will give engineers at home some idea of the trials and tribulations experienced by those of us working in the less publicised parts of the world. We have to contend with many frustrations and setbacks as well as very poorly educated staff, but are expected to produce results comparable with any in the main centres. There is certainly a great challenge to the young engineer out here, with opportunities unattainable at home. It is a great pity that so few are willing to take the plunge and spend two or three years overseas—I can assure any that do that they will never regret the experience.

---

* Postbox *

Dear Sir,

May I congratulate you on publishing the practical electrical-installation course by Mr. Egley. It is clear, concise and quite easily understood. If this is just the beginning of this class of paper I look forward to many hours of enjoyable reading and learning.

Please publish as many as possible, on electrical and mechanical engineering, air conditioning etc.

Yours sincerely,

J. L. Thompson

18 Princes Road,
Redhill, Surrey

Dear Sir,

There is always a natural reluctance on the part of engineers to try anything new—we all have unhappy recollections of the teething troubles of new equipment. If this reluctance extends to attendance at the Hospital Engineering Centre, Falfield, which has just got under way, I want to try to dispel any fears that may exist. I was a student on the first introductory course, and I have nothing but praise for it.

No newcomer to National Health Service engineering should miss the opportunity he may get to attend this course. He will broaden his outlook and learn a lot, as well as meeting acknowledged experts with a wide cross-section of experience. (Many longer-serving members of engineering staffs would also benefit!)

Add to this a delightful rural environment with recreational and leisure facilities, and you have an interesting, enjoyable and thoroughly worthwhile fortnight.

Yours truly,

A. F. Lamberti
(Oxford Regional Hospital Board)

39 Churchill Road,
Didcot, Berks.

Economical modernisation

The women's geriatric ward at Ladywell, with, through the doorway, the day–dining room

Noteworthy examples of how even low-budget modernisations can achieve first-class results are provided by uprating schemes that have been completed at two hospitals in Salford, Lancashire.

The hospitals concerned are Salford Royal and Ladywell Hospital, both of which are controlled by the Salford Hospital Management Committee.

At Salford Royal, a women's general surgical ward in the 150-year-old section of the hospital has been converted into a 17-bed special neurosurgery unit. Provided with the very latest in hospital equipment and attractive and modern in design and decor, the new unit ranks with the best and most up-to-date neurosurgery centres in the country.

The conversion—which included extensive structural alterations, installation of a suspended ceiling and internal partitioning, replacement of all windows with double-glazed units, and provision of contemporary-style fixtures and fittings and a matching colour scheme throughout all sections of the unit—has been achieved at a total cost of £17 000.

The colour scheme for the new unit was planned by the Blundell–Permoglaze colour advisory studio at Tysley, Birmingham, in consultation with Mr. K. Wright, Group Engineer. The scheme included comprehensive proposals for all wall and ceiling decor plus specifications for matching window curtains, bed curtains, light fittings, floor tiles and carpeting, and consists, basically, of blends of white, candy pink and magnolia. Traditional hospital greens and creams have been avoided.

The new neurosurgical unit has been divided into two main parts. There is a male section, containing seven beds in a general ward plus one single bed for very-intensive-care treatment, and a female section, comprising eight beds in a general ward and a single bed for intensive care.

There is a modurail running behind each bed, on which medical equipment is hung. This saves floor space, avoids clutter and promotes nursing efficiency. At each bedside, there are piped oxygen and suction, and there are four socket outlets per bed for monitoring equipment and bedside treatment. Each bed also has a nurse-call extension, plug-in radio with stethoscope, a shaver socket, and a bedside light with dimming facilities.

The unit has also been provided with a consulting room, X ray room, staff room, patients' day–dining room, bath and toilet facilities, a modern kitchen, and a lady's powder room, which has been made as attractive as possible to encourage women patients to take an interest in their appearance as soon as practicable after undergoing operations.

The creation of more pleasant surroundings has also made a significant contribution at Ladywell Hospital, where the upgrading of a 60-year-old geriatric ward has just been completed at a cost of £7800.

The ward concerned was a 45-bed unit with beds arranged in a traditional manner, which has been found to be unsuitable for geriatric patients.

The necessary effect has been achieved by dividing the ward by partitions into bays to provide a warmer atmosphere. The divisions have reduced total bed space from 45 to 38, but the improved amenities more than make up for the loss of seven beds. The decorative scheme is made up of a combination of white, ash green, magnolia and Wedgwood blue, which, together with contemporary light fittings and furnishings, have helped make it one of the most attractive units in the Ladywell Hospital.

It is understood that further low-budget schemes are being planned for the modernisation of other outdated wards at both Ladywell and Salford Royal.

* Market News *

For further details, simply encircle the relevant numbers on the reply-paid postcard

Bedhead panels

Static Switching Ltd. has carried out a survey on the many thousands of bedhead panels that they manufacture.

While the two DHSS standard bedhead panels are doing much to help standardisation in bedhead design, the company felt the need for a system which would allow more flexibility regarding individual nursing requirements at economical costs. For instance, a hospital may not be able to afford all the features included in the standard panels.

In sympathy with these findings, it has developed the 'Identikit' bedhead panel system. This lays out the 64 possible permutations of features to formulate a custom-made design for a specific function.

Static Switching Ltd., Heath Mill Road, Wombourne, Wolverhampton, Staffs. **HE78**

Emergency light

A new emergency light, the Saftilight Monitor 200, has an inbuilt charger and a Voltabloc nickel–cadmium sintered-plate battery needing no maintenance. In the normal condition, the unit is supplied by mains and the battery is on trickle charge. If mains failure occurs, two emergency lamps are automatically lit by battery current. There is a choice of units to give either 60 lm or 30 lm minimum output for 1–2 h under emergency conditions.

When mains supply is restored, the emergency lamps extinguish and the battery is recharged. Full battery capacity after complete exhaustion is regained in 24 hours.

The Monitor 200 can be supplied as a nonmaintained unit with emergency lamps only, or with two mains-powered lamps in addition to the emergency lamps.

Nonmaintained units have a small charge indicator. A special feature of maintained units is that the mains lamps indicate the condition of the emergency lamps by failing to illuminate if the corresponding emergency lamp has failed. This feature gives early warning of a failure which would otherwise not be noticed until an actual emergency. **HE79**

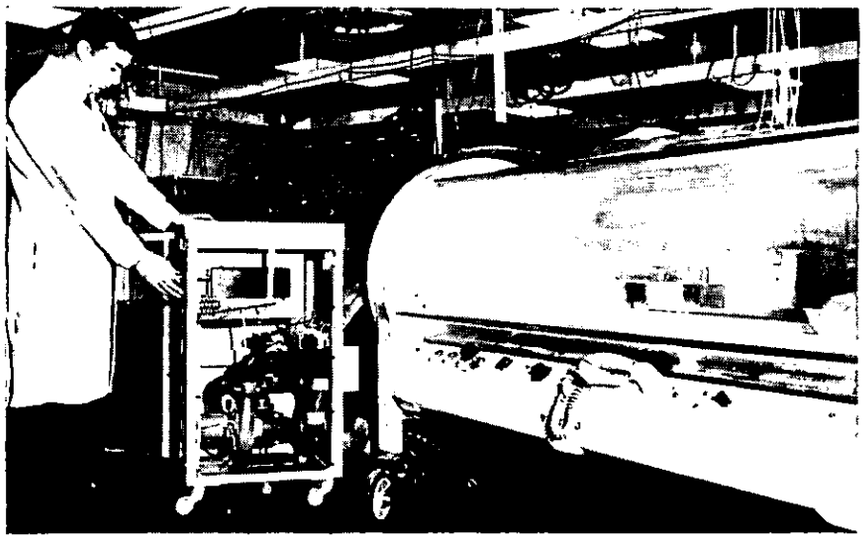
Cadmium Nickel Batteries Ltd., Station Road, Hampton, Middx.

Disinfecting unit

A new machine which automatically disinfects medical equipment with formaldehyde vapour in approximately half the time taken by traditional methods has been introduced by Vickers. Although the unit was developed originally for the disinfection of hyperbaric oxygen chambers of about 20 ft^3 capacity (for one adult patient), it has been adapted for disinfecting infant incubators, lung ventilators, anaesthetic equipment and similar apparatus. The lightweight unit is mounted on castors and can easily be wheeled into position, connected up and put into operation by one man.

The formaldehyde vapour is produced by evaporating a 20% solution of formalin having a low methanol content. After the formalin has been circulated for about an hour, it is extracted into the open air and fresh air is introduced. Any remaining residue of formalin is neutralised by circulating ammonia vapour for about half an hour, and the system is then again vented with fresh air. The operating cycle is automatically controlled, and the machine switches itself off. **HE80**

Vickers Ltd. Medical Engineering, Basingstoke, Hants.

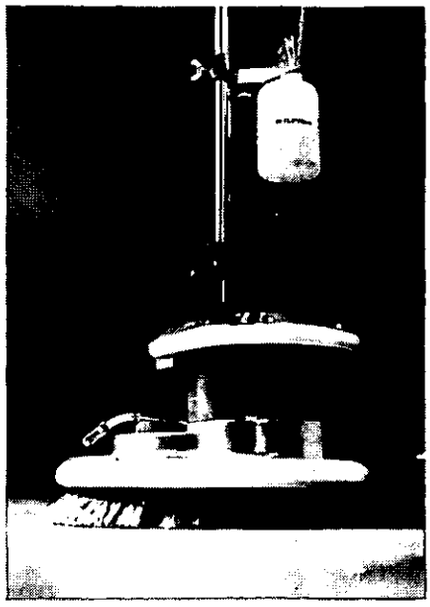


Polish spray attachment

Nilfisk Ltd., maker of a wide range of suction-cleaning equipment, has introduced a new polish-spraying attachment for use with models 400 and 500 floor-maintenance machines.

The spray, made of heavy-duty plastics and stainless steel, has a capacity of 1·5 pint. The bottle is quickly attached to the machine handle, and the spray is operated by a fingertip control. A transparent plastics tube carries the polish to the fully adjustable nozzle secured to the base of the machine, which gives accurate dispensing of polish in operation. When used with a nylon pad, the attachment allows large areas to be spray-cleaned and polished in one operation.

Nilfisk Ltd., 31 Bower Way, Slough, Bucks. **HE81**



Drainage system

OsmaDrain is a versatile drainage system comprising a complete range of u.p.v.c. underground pipes and fittings, all of which have been tested and approved by the Agrement Board as being suitable for domestic drainage. The potential lifespan of an installation was estimated by the Board to be greater than 50 years. Performance under pipe-deformation and deflection tests was found to exceed the requirements expected to occur in practice.

Osma Plastics Ltd., Hayes, Middx. **HE82**

2-wire emergency lighting

MLP Lighting Ltd., has announced a new 2-wire emergency-lighting system which is claimed to be the only such system available, offering great savings in the time and costs of installation. Existing light fittings working on normal 2-wire operation can be replaced by a standard emergency fitting without using a third wire. The only modification to the circuit is the addition of a low-value capacitor across the terminals on the live side of the switch. This allows a flow of sufficient by-pass current to prevent the fitting operating except when the mains fails at source. The system is available as an integral part of MLP fittings, but it can also be installed in conjunction with other manufacturers' fittings.

Although made for the 2-wire system, fittings can also be used in existing 3-wire installations.

MLP Lighting Ltd., 42a Bath Street, Leamington Spa, Warks. **HE83**

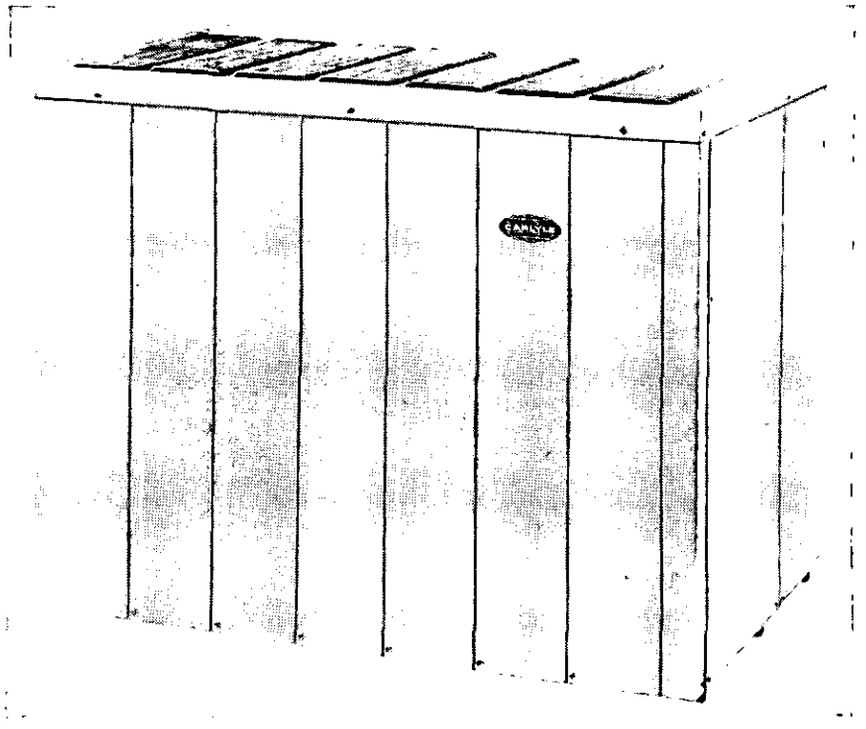
Gas-fired chillers

The new Carlyle range of air-cooled gas-fired water chillers comprises five sizes. Each model is an absorption refrigeration unit which supplies chilled water to remote coils for air-conditioning systems for commercial installations. The units are very flexible; they can be installed singly or in multiples for larger loads, and they can be sited on top, or adjacent to, a building, or at any remote spot desired.

The unit automatically cycles the gas on and off to match the load, and if this exceeds the unit's capacity the chiller will produce cooling at its maximum capacity without damage.

Being air-cooled does away with the need for water towers and attendant pumping equipment. The chilled-water circuit operates at atmospheric pressure, and is so designed that it and the pump will not be damaged by freezing.

Carlyle Air Conditioning Co. Ltd., Bilton House, Uxbridge Road, London, W5 **HE84**



Literature available

District heating
Second edition of the District Heating Association handbook; a well illustrated hardback volume giving details of twenty district-heating schemes in operation in the UK. Also includes a classified index to suppliers, a list of consulting engineer members, various advertisements and an item on the first annual district-heating convention, which was held last month in London. Sent for 1s. 6d. if a self-addressed label is included with the order. *District Heating Association, St. Chad's Street, London, WC1* **HE87**

Adhesives and floor care
Ten data sheets, five on adhesives for use with vinyls, ceramics and polystyrene, and five on floor cleaners and polishes. *Marley Floor Tile Co. Ltd., Burnham, Bucks.* **HE88**

Valves
Leaflet covering the MIL Ltd range of valves and accessories for heating systems. *Mil Limited, Heath Town Works, Wolverhampton, Staffs.* **HE89**

Gas burners
Data sheet (D90 CG) describing a range of fully automatic gas burners specifically engineered to fire the Crane Whitehall XC series of boilers. *Nu-Way Heating Plants Ltd., Droitwich* **HE90**

Wiring cables
32-page catalogue giving tables of the details of plastics and rubber-insulated wiring cables available to metric standards. *Crompton Parkinson Ltd., Crompton House, Aldwych, London, WC2.* **HE91**

Hot-air generators
Data sheet describing the IF range of indirect-fired hot-air generators, which cover the range 330 kBtu to 3 MBtu per hour. *Nu-Way Eclipse Limited, Droitwich* **HE92**

Cooling towers
8-page booklet giving full technical details of the recently introduced S-type cooling tower, for air-conditioning and refrigeration. *Carter Thermal Engineering Limited, Redhill Road, Hay Mills, Birmingham 25* **HE93**

Tractors for industry
Profusely illustrated 40-page descriptive booklet showing the uses of tractors in various industrial-type situations. *County Commercial Cars Ltd., Albert Street, Fleet, Hants.* **HE94**

Automatic voltage stabilisers
Brochure covering the Powerstay 2·4—95 kVA single and 3-phase range of stabilisers. *Zenith Electric Co. Ltd., Cranfield Road, Wavendon, Bucks.* **HE95**

'Boiler Vac'

Available to those concerned in the maintenance of commercial or domestic boilers is a new vacuum-cleaning unit, claimed to provide a quicker, more efficient, method of clearing boiler waste than has previously been available.

Known as the 'Boiler-Vac', this new unit is part of a range of industrial and commercial vacuum-cleaning machines recently launched by Numatic Engineering Ltd. The 'Boiler-Vac' features a stove-enamel cannister and a powerful, long-life, quiet-running motor protected by a double filtration system. A range of accessories is also available.

Light in weight and highly portable the unit can be moved around the plant or transported with ease, and may be used in the cleaning of virtually all kinds of small–medium commercial or domestic boilers.

Numatic Engineering Ltd., Sherbourne Road, Yeovil, Som. **HE85**

Standby power supplies

A foolproof standby-power control system is being manufactured and marketed by Berwyn Power Equipment Ltd., the company jointly formed by General Electric of America and Aberdare Holdings Ltd. The system, an early result of collaboration between the two companies, is a combination of standby invertors and battery-charging rectifiers, and ensures an uninterrupted supply of electricity in the event of failure of the public supply.

The first hospital to be equipped with this new system is the University Hospital of Wales, Cardiff, where the delivery of 15 units is now being completed.

Berwyn Power Equipment Ltd., Aberdare Holdings Ltd., Blackwood, Mons. **HE86**

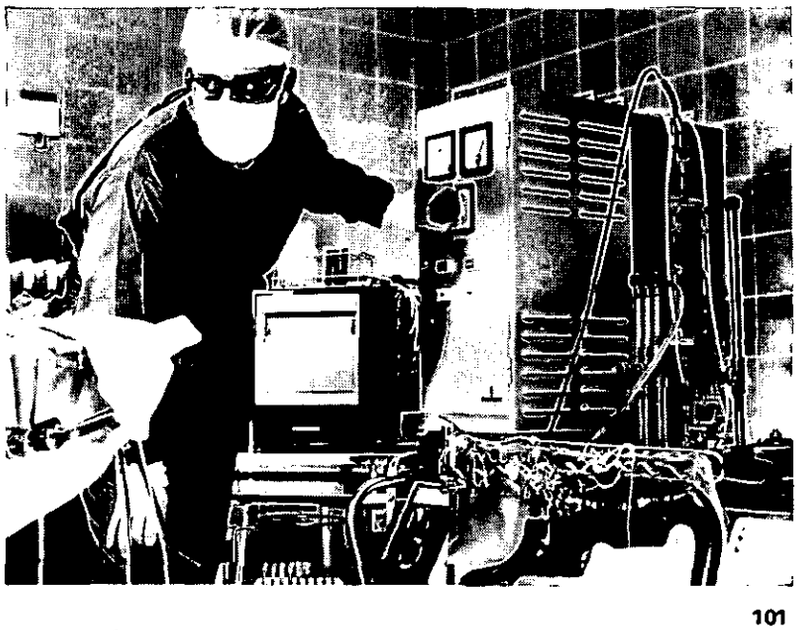
Clippings

Trials of nuclear-powered heart pacemakers have now started in the UK and two successful animal implants have taken place. The first was carried out in a London hospital on Friday, 13th February 1970, and the second in a Glasgow hospital on 20th March 1970. The animals concerned, both dogs, have so far responded well. These implant experiments are an essential component of an exhaustive joint technical development and trials programme by the Department of Health & Social Security, the Atomic Energy Authority (at Harwell and Aldermaston) and the hospitals concerned. If successful, the programme will permit patients suffering from heart block to be fitted with pacemakers powered by nuclear batteries having a design life exceeding 10 years, in place of the short-life (approximately 1-2 years) chemical batteries that are used at present. A nuclear-powered pacemaker would thus permit a patient to live a normal life without repeated surgery.

The nuclear battery, developed at Harwell, utilises the heat from the radioactive decay of a small quantity of plutonium to generate electricity from a miniature semiconductor thermoelectric convertor. The complete battery is 2 in long and weighs about an ounce.

Scientists from the Stanford University School of Medicine and the NASA Ames Research Centre have successfully tested a new application of ultrasonics that can pry out secrets about the functioning of the human heart. It can provide fundamental details of the heartbeat and blood circulation which up to now have been unobtainable without passing a catheter (a long thin tube) into one of the heart chambers.

That procedure, cardiac catheterisation, requires many hours, and the patient is usually admitted into hospital. Additional laborious procedures involve the taking of X rays and blood samplings. By contrast, ultrasonic studies of the heart can be performed by a well trained person in the doctor's office or at the patient's bedside in a matter of minutes. The technique could be applied as a screening procedure for patients with known or suspected heart disease, and can be used to monitor precisely the heart's healing process in patients recovering from open-heart surgery or from a heart attack.



Income tax, cigarettes and petrol aren't changed, but he hasn't said anything about beer yet

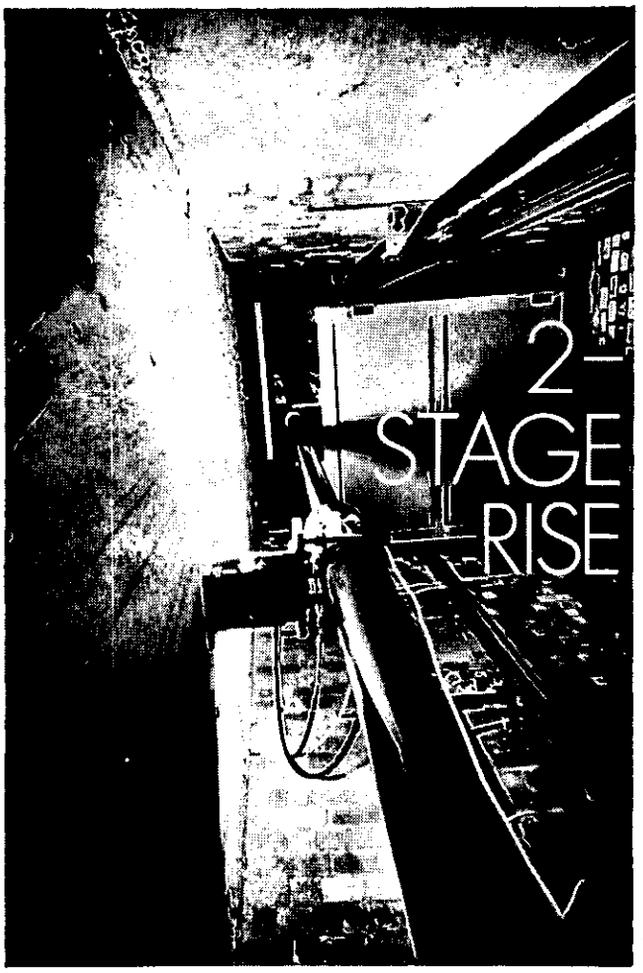


Fig. 1 View up the shaft of the new hydraulic lift

In recent years, architects have become increasingly aware of the inherent advantages of electrohydraulic lifts. These include smoothness of operation, levelling accuracy, quietness, minimal requirements for headroom, motor room and pit, and the need for only a light non-load-carrying shaft. Until now the principal limitation of the electrohydraulic lift has been that it was economical for only relatively short travels. Recently introduced by Becker is a long-travel, high-speed lift almost doubling the maximum economic travel, while retaining all the inherent advantages of previous designs. It also incorporates a unique combination of built-in safety and topping-up facilities.

Well designed and properly installed electrohydraulic lifts can be extremely smooth in operation. This springs from the use of oil as the operating medium, which allows slowing motion on approaching or leaving floors to be a standard feature, instead of a costly addition. These lifts also level very accurately; Becker guarantee a standard accuracy of $\pm$ 0·25 in. This feature generally eliminates the need for costly relevelling motors.

Power is supplied to the lift ram cylinders by an electrohydraulic pump unit, which, together with the control equipment, is housed at ground level, eliminating a costly and perhaps unsightly penthouse motor room. Only a minimum of headroom is required, and only a shallow pit. The lift shaft need only be a light structure, as all the loading is transmitted by the hydraulic ram(s) direct to the foundations (Fig. 1).

The power unit is extremely quiet and, to ensure complete silence in the car, can be muffled, and even sited well away from the shaft in a low-cost area of the building.

The new lift achieves its long travel through a 2-stage ram. This system, in which both stages are extended or retracted simultaneously, is to be distinguished from a conventional telescopic ram in which each stage has its own specific speed of extension. The 2-stage ram gives uniform uninterrupted movement over the full stroke of the ram system.

When the ram system is in its retracted position, as shown in Fig. 2, the cushioning peg is a short distance inside the annular restriction and the topping-up valve is open, allowing oil to pass to the upper face of the piston ram. When the system is to be extended, oil from the hydraulic power unit passes to the lower face of the piston ram via the annular restriction. As the piston ram is raised, the cushioning peg is lifted clear of the restriction and the topping-up valve is closed. As the piston ram continues to rise, oil is displaced from its upper face, via oil passages, to raise the displacement ram. The areas of the ram faces under pressure are designed so that the displacement ram is extended at the same speed relative to the piston ram as is the piston ram relative to its fixed cylinder.

To retract the ram system the oil pressure is relieved and the two rams are lowered at the same relative speeds to the position shown in the Figure, where they are stopped by limit switches.

In the event of the limit switches failing, overtravel carries the cushioning peg right into the annular restriction. This feature provides the inherent safety of the long-travel system.

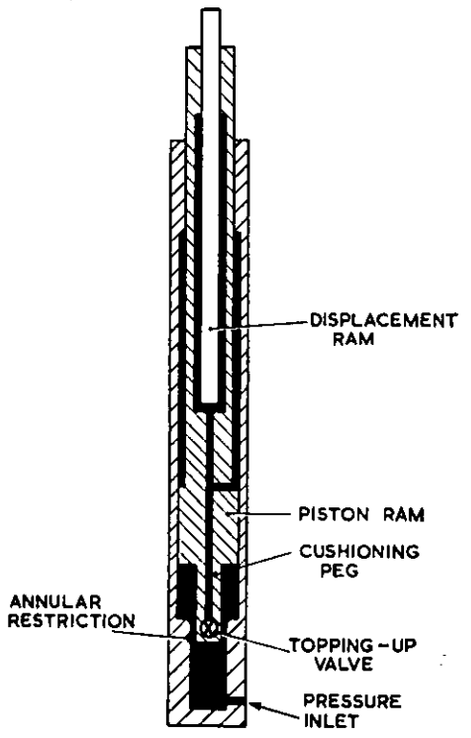


Fig. 2 Schematic of the hydraulic system in its retracted position

FUTURE STRUCTURE OF THE NATIONAL HEALTH SERVICE

Memorandum submitted to the Secretary of State for Social Services by the Regional Engineers Association

—March 1970

1 Summary

The second Green Paper is welcomed as a further development towards the replanning of the health and social services. The Association supports the integration of the services and the proposed size and number of area health authorities. The number of district committees is considered to be far too low, and a target of 400–500 in lieu of 200 is recommended.

The Association does not consider that the single-tier system which is now proposed, with the Department directly supervising 90 subordinate authorities, affords the opportunity of instituting modern management and maximising the resources of the service. Such a wide span of operational control will inevitably require very major expansion of the regional offices of the Department, and their assuming the role of the present Regional Hospital Boards. This degree of centralisation is contrary to the spirit in which the services were conceived, and is in direct contradiction to the very detailed non-party investigations and recommendations which have followed.

The proposal to place regional health councils off the direct line of operational control will deprive them of the vital daily experience on which the validity and acceptability of their planning duties would depend. Planning, without direct responsibility and involvement, will become a sterile exercise, and one which will increasingly become unacceptable to the operational authorities.

The proposed separation of medical planning from constructional planning cannot be recommended. It runs contrary to all experience of the expanded capital programme, and to all recent advice of the Department on the necessity for multidisciplinary teams.

The Association, with the exception of these major observations, supports the aims and proposals of the second Green Paper.

2 Memorandum

The Regional Engineers Association represents the regional engineers, and their deputies, of the Regional Hospital Boards of England and Scotland, the Welsh Hospital Board and the Northern Ireland Hospitals Authority. This memorandum, like the Green Paper, is, however, limited to England. Separate papers are being prepared for Wales and Scotland and will be submitted to the Secretaries of State.

The aim of the Association is 'to promote the advancement of hospital design and function in all branches of hospital engineering'.

The Association submitted observations on the first Green Paper, and welcomes the opportunity to submit further comments and suggestions.

The Association is primarily concerned with two aspects of the National Health Service:

(*a*) the upgrading and extension of existing hospitals, and the construction of new ones, at a cost of £110m per annum.

(*b*) the reliable, efficient and economical operation and maintenance of engineering services in hospitals at a cost of £50m per annum. This figure relates only to direct expenditure, and includes no allowance for services such as laundries, c.s.s.d.s etc. which include a high engineering commitment.

Comments have not, however, been limited solely to these fields, as it is considered that while members have wide experience of the NHS, they are yet able to take a dispassionate view of its operation, and also of the proposed changes.

The Association notes your intention to discuss the proposals fully with representatives of the staff who will be affected by them. It is assumed that this refers not only to discussions with staff associations and trade unions, but also such representative bodies as this Association.

The Association notes the three firm decisions reached by the Government, and submits the following comments on other questions for which revised proposals are given. The comments of the Association have been divided between the two following sections. In Section 3 comment is made directly on the second Green Paper, referring in bold type to paragraph numbers in that report. In Section 4 the Association submits more general views on the organisation it recommends to achieve what it understands to be the political aims for the Service.

3 Comments on second Green Paper

3.1 'The principles of the new Health Service—Chapter 1'

The Association accepts and endorses the four fundamental principles on which the National Health Service was built, and the four main objectives for strengthening those original principles:

unification
co-ordination
local participation
effective central control.

It also strongly supports the intention of giving more emphasis to the prevention of ill health and to health promotion.

1(ii) The Association draws attention to the fact that it was not only 'medically' that certain areas were impoverished; this unfavourable distribution extended to buildings, equipment, staffing and every other aspect.

The Association does not agree that 'hospitals outside the main centres of population have been upgraded within the limits set by antiquated buildings', even though this statement is qualified in part by the succeeding sentence. It is incontrovertible that there still exist hospitals, and areas within hospitals, where even the most basic requirements of heating, hot water, lighting, electric power etc. are not being met.

3.2 'The case for unification—Chapter 2'

8-17 The Association supported, in its observations on the first Green Paper, the abolition of the tripartite nature of the National Health Service then proposed. It continues to support unification.

3.3 'Area health authorities—Chapter 3'

3.3.1 'Administration by local government'; 'The establishment of area health authorities'

18-21 The Association accepts the arguments which have led to the conclusion that the service cannot be controlled by local authorities, and that special area health authorities must be established.

22 The need to relate boundaries of health authorities to those of local authorities is recognised; it is not, however, seen as a need which must override health consideration, if, in exceptional and difficult circumstances, conflict arises between the two considerations.

23 The proposed flexibility will have to be used if the difficulties of defined areas are to be overcome, as the existing hospitals are in many cases not located in the areas they will serve.

3.3.2 'Membership'

24 The Association in its original observations stressed the very great contribution made to the service by the unpaid Chairmen and Members. It strongly endorses the present tribute.

Although there must be inevitable upward pressures for appointed committees to become 'self-perpetuating', they can be overcome. It is the function of the Secretary of State to ensure that they are successfully resisted.

25 The proposed method of constituting the area health authorities introduces new but workable principles. The success of the new organisations will, however, depend very much less on the system than on the collective and individual capabilities of those elected or appointed.

27 The proposed number of area health board members (20–25) is considered too large if the principles of the Farquharson–Lang report are to be implemented. For this reason, and also because it is difficult to obtain members, it is considered that a membership of 13 to 19 is preferable; 15 or 16 were suggested in the first Green Paper.

28 The payment of part-time salaries to chairmen and expenses to members is supported.

3.3.3 'The boundary of the National Health Service'

29-41 The difficulty of whether the service should be organised to suit the label of the user or the skill of the supplier is recognised. It is fundamental to the organisation of this service, and a problem experienced widely in other fields. The decision in favour of alignment by skills is endorsed. The recommended division of services is supported, but it is expected that considerable difficulties will arise in the public-health sector. The facilities of honorary appointments, attachments etc. referred to in subsequent sections of the Green Paper (Chapter 4) will have to be widely and wisely exercised to overcome the inherent staffing problems of local authorities. Further comment is made on this point in Section 3.4.1.

3.4 'Collaboration with local government—Chapter 4'

3.4.1 'Exchange of services'

42-45 The increased flexibility between local and health authorities for the interchange of staff, advice and services offers many advantages. Although these will primarily occur in the medical and nursing fields, there will

be gains, for example, from the increased specialist advice available on such items as housing services, road design for new hospitals, road maintenance, snow clearance, road lighting, sewerage design and maintenance, sewage-purification plant operation etc.

46-48 It is, however, difficult to see how local authorities can be provided with satisfactory health advice under the arrangements suggested. The problem is, of course, difficult, for even if it were not the intention to provide medical and dental advice from health-service-employed staff, the scope and volume of local-authority medical work might neither justify nor attract full-time staff.

3.4.2 'The work of the community physician'

49-52 Again great difficulty is expected in the proposed division of staff and responsibilities between local and health authorities.

3.5 'Local participation—Chapter 5'

3.5.1 'District Committees'

53-54 The aims behind the formation of District Committees are appreciated and agreed; the magnitude of the work of the great majority of area health authorities will require devolution if the third of the four main aims, 'local participation', is to be achieved. The Green Paper states: 'No powers will be delegated to them by statute. Their functions require study . . .'; but unless the District Committees are given powers, preferably by delegation, they will in no way be able to implement the role which is envisaged for them. In Section 4 of this paper the argument is developed that 400 to 500 district committees are required rather than the 200 mentioned.

3.5.2 'Voluntary organisations and voluntary work'

55-59 The Association endorses the need for encouraging voluntary work, and for tapping the potential which exists. In particular, the mobility of modern society makes this most desirable in relation to long-stay patients who are increasingly isolated from family and other contacts.

3.6 'The administration of area health authorities—Chapter 6'

3.6.1 'The role of the central Department'

60-61 Neither of the two Green Papers has considered the very different task of the day-by-day management service. The view has been advanced in the past that the Civil Service, ideal in its traditional role, is less suited to the very different task of the day-by-day management of undertakings. If there is substance in this widely held view, then how much more would it be applicable to the structure now proposed, where the Department, at central and regional level, will be directly responsible for the operation of the area boards, and involved 'more closely than in the past with the expenditure and efficiency of the administration at local level'.

When the NHS Bill was debated in 1946 the necessity of providing a high degree of decentralisation was accepted, and this principle was written into the Act in respect of both the Regional Boards and hospital management committees. During the first ten years of the service there developed an oscillation between the 'agency' and 'independent' status aspects of both these tiers of authority. The position of Boards in particular became equivocal as a result of direct supervision of management committees by the Ministry. This was the subject of adverse comment by the Select Committee on Estimates in 1951 which stated:

> The Ministry of Health must . . . either decide to give greater scope to the Regional Hospital Boards than they at present enjoy, or alternatively they must move towards reorganising the service on the basis that the functions of the Regional Hospital Boards are primarily of a planning and advisory nature. The choice between these alternative courses is a major question of policy.

After this report the trend developed to strengthen the responsibilities of Boards, and this was strongly endorsed by the extensive, authoritative and accepted Guillebaud Report of 1956 (Command Paper 9663) which stated:

> We should make it clear at the outset that we consider two levels of management—i.e. the regional and group levels—to be essential for the efficient administration of a service which deals with more than 3000 hospitals in England and Wales and some 400 in Scotland.
>
> We conclude that Regional Hospital Boards should be told, and hospital management committees should accept, that the Regional Boards are responsible for exercising a general oversight and supervision over the administration of the hospital services in their regions. It is a corollary of this recommendation that the Ministry should leave the task of supervising the hospital management committees to the Regional Boards, and should not itself undertake this task over the heads of the Boards.

The reasons which led the Guillebaud Committee to those recommendations, and the Government to accept and implement them, still apply, and are not affected either by the reorganisation of local government or by integration of the tripartite service. To these arguments the Association would add that it considers it is not possible for the Department to supervise directly the work of 90 subordinate authorities. Such a span of control is totally outside all established criteria for modern management. The difficulties inherent in such a proposal could only be overcome by extensive delegation to very considerably strengthened regional offices of the Department. This would amount to the retention of existing Regional Boards but without their major advantages of public participation, local identification, decentralisation etc. This argument is further enlarged in Section 3.7.2.

The suggestion that direct supervision by the Department would be possible is often made, based on a comparison with the role of Departments in relation to local authorities. Such an analogy fails to take account of the totally different roles involved; the Health Service is an operational undertaking requiring continuing supervision and management, whereas the relations with local authorities are periodical, involving major policy and finance but totally excluding responsibility for daily operation.

3.6.2 'Integrated services under area health authorities'; 'Statutory committee for the family-practitioner services'

62-68 The Association has no observations on these sections of the report.

3.6.3 'Internal organisation'

69-77 The major problems during the period immediately following the proposed reorganisation will undoubtedly arise from the need to ensure that the old boundaries of responsibility are not perpetuated, and that the advantages of integration are achieved by approaching health needs wherever possible from entirely new directions. In attempting this, the proposed structure offers advantages.

Two difficulties arise from the present medical structure. The first is the independence of the medical consultant, and the inevitable consequent difficulties of creating a viable operational medical structure. In the increasingly complex and interrelated needs of the service it is not seen how efficiency can be achieved without some modifications of the present degree of independence, despite the recommendations of the Godber report. The second factor is the lack of attention which has been paid in the past to the training of medical administrators, and the generally low priority accorded to management by the profession. The proposal to establish, at area health authorities, the post of chief administrative medical officer is therefore welcomed as a step towards greater medical co-ordination at a level close to the hospital.

The patterns of administration are stated to be tentative, and the Association is preparing a separate paper on the structure for maintenance departments. These recommendations do not affect the major considerations of the Green Paper, and will be submitted during the coming summer.

3.6.4 'Finance'

78-79 The Association sees no practicable alternative to the proposals announced for financing the service, and strongly endorses the basis announced for determining the budget of area health authorities by using a basis of the population served, suitably modified by the type of factor mentioned at the end of paragraph 79 of the report. It would, however, be essential for the programmes of area health authorities for capital and revenue expenditure to be passed to regional health councils for approval if the councils are to gain knowledge, and if their planning is to bear any relation to the needs of area health authorities and the communities they serve.

The report refers to the preparation of programmes of capital expenditure by area health authorities. Little detail is given, but, although it is possible to conceive such a system, under which the design and construction of capital works is the responsibility of another authority and yet the budget is prepared by the area health authority itself, there are many serious drawbacks and it is difficult to see any advantages which could possibly compensate. The control of capital expenditure in rigid financial years is difficult even with the advantage of diversity gained by the large programmes of existing Boards; the programmes of area health authorities would be so small that control could not reasonably be achieved.

One major disadvantage arises from the separation of budget preparation from responsibility for capital-works design. Experience of the present organisation, under which Boards are responsible for both aspects, indicates that the inherent difficulties in implementing the building programme can only be overcome by a clear and undivided total responsibility.

3.6.5 'Trust funds'

80-82 The Association has no observations.

3.7 'Regional health councils and central government—Chapter 7'

3.7.1 'Regional health councils'

83-89 The proposed method for appointing members of regional health councils, as in the case of area health authorities, introduces new but workable principles. Again the same comment applies—that the success of the new organisations will depend very much less on the system than on the collective and individual capabilities of those elected or appointed. However, the Association considers, for the reasons advanced in Section 3.6.1, that a tier is essential between the Department and the area health authorities.

Although it is stated that the functions of the councils have yet to be defined, it is nevertheless envisaged that they should have an advisory role in the planning of hospital and specialist services and in the assessment of priorities between competing developments. The planning of hospital and specialist services and the assessment of priorities between competent developments cannot, in the view of the Association, be an 'advisory' function. For an authority to perform this assessment with success a number of factors are necessary; there must be:

(*a*) accurate and up-to-date knowledge of the situation in the region

(*b*) integration, within that authority, of all disciplines associated with planning. Constructional implications, for example, cannot subsequently be tacked onto medical-priority recommendations which have been determined in isolation

(*c*) involvement. It is not possible for planning in the context of this service to be 'advisory'; to be valid it must be the function of an authority in the main stream of executive action and responsibility. Planning in any other context must inevitably become divorced from the realities of the situation, and there will be a strong tendency for it to lose the support of those authorities carrying the burden of normal operational responsibilities.

In addition to their advisory planning role, the regional health councils are to be given six executive functions:

(*a*) deployment of senior professional staff

(*b*) postgraduate medical and dental education

(*c*) staff training

(*d*) promoting research into clinical and operational problems

(*e*) blood-transfusion services

(*f*) ambulance services.

The comments made on planning in the previous paragraph apply equally to the first of these functions, which is so intimately involved with the operation and the development of the service. It is totally illogical to separate this from the main stream. The other functions could be so separated if this were essential, but there will be inevitable losses in efficiency. If, for any reason, the ambulance and blood-transfusion departments are unable to meet the normal reasonable demands of the service, then their separation from the line of operational control would make apportioning more difficult, and their inability to meet demands less acceptable.

The Association does not consider that regional health councils will be able to implement efficiently the limited range of duties mentioned in the Green Paper, because they will be isolated from the flow of information and instructions between the operational area health authorities and the Department. In this sterile position the councils, deprived of experience and the exercise of judgement, will depend on past knowledge of diminishing validity for their decision making. Their officers, mainly recruited from the present Boards, will have no opportunity of gaining experience of the integrated aspects of the new service; their advice on the hospital and specialist services will inevitably be limited by their lack of, and inability to gain, experience of the wider possible approach to health problems. Only by giving one regional body the duties envisaged in the Green Paper for both the regional councils and the regional offices of the Department can all the necessary skills be brought together, and an appropriate management structure formed.

The establishment of consortia and the making of joint arrangements with local authorities by area authorities should be encouraged, subject to conformation with regional policy.

3.7.2 'The central Department'

90-91 The Association does not believe it would be possible for the department adequately to maintain a direct relationship with 90 area health authorities unless its regional offices were made responsible for broadly the present functions of Regional Boards, and strengthened with staff to the extent that they approximated to the existing Boards. This might achieve the fourth stated aim of 'effective central control', but only by seriously reducing the extent to which the third aim, 'local participation', could be achieved.

The Association does not believe that it would be right, or practicable, to isolate the engineering and architectural staffs required for the programming, planning and execution of major schemes from the staff of the regional council responsible for recommending the priorities. Emphasis has been rightly placed in all recent Departmental literature on the interdisciplinary nature of work on capital planning. Factors at all stages interact and interlace to such an extent that it is not now possible to envisage any reasonable solution other than that of multidisciplinary teams with continuity at all stages.

To achieve the expansion of the capital programme, Boards have found it essential to form their own design offices in addition to the establishment of engineers for overall planning, and the briefing and monitoring of consulting engineers. These design units, through their specialisation, provide a reservoir of hospital-engineering expertise not available elsewhere. Additionally, because of their specialisation and physical location, they are able to design more economically than outside consultants both as regards contract costs and design charges, after making the appropriate allowances for overheads. Another function of these design units is to provide a source of experienced staff who can undertake the investigation of specialist hospital problems, which it would be impossible to tackle in any other way.

The implication that some of the capital-works staffs of Boards will be invited to work in the regional offices of the Department raises a point of difficulty. In the main these staffs have been recruited with considerable difficulty over a period of years; they have local associations, and for many reasons are not attracted by their concept of civil-service conditions of employment. They have specialist skills which are in short supply; the first Green Paper stated: 'Staff for highly specialised work must not be wastefully dispersed'—the Association believes that there is a very real risk of losing staff to industry and private practice in the reorganisation now proposed.

The Association welcomes the recommendation for more interchange of staff with the Department, but would advise that this can be difficult to implement, particularly where movement of families is involved.

No definition is given of 'major' schemes. The division of responsibility for capital works between two different authorities can raise considerable problems, and is not recommended. The Association would, however, support the delegation of minor capital schemes to area authorities, particularly as these will have to have a higher level of technical staffing than even the largest of present hospital management committees; as stated in Section 3.6.3 the Association will be submitting a separate paper on the structure of maintenance departments during the coming summer. The delegation of minor capital works must, however, in all cases be subject to the oversight and approval of the capital-works authority. There are many reasons for this requirement, which has been shown to be justified by the experience of Boards, including:

(*a*) minor developments which have seriously prejudiced or even prevented the short- or long-term developments proposed for a hospital. This is one reason why the Department has in recent years rightly stressed the need for a development plan to be prepared and approved for a complete hospital before minor developments are agreed

(*b*) expediences, to reduce the costs and keep schemes within delegated limits, have been adopted, resulting in high maintenance or running cost; e.g. the use of electric heating

(*c*) many schemes have failed to achieve overall economies by not including facilities for future

extensions or adjoining schemes due to be built as a result of oversight or lack of knowledge.

The Association would support the need for a more active role for the Department in manpower planning and training, although it records its appreciation of the action already taken by the Department in forming, at the request of the Association, the Advisory Committee on Hospital Engineering Training, and of the results which are starting to be achieved in this field.

3.7.3 'Central Advisory Council'

92 While supporting the formation of the proposed Central Advisory Council, the Association would draw attention to the diminution of public procedural processes which may tend to follow.

3.7.4 'The National Health Service Hospital Advisory Service'; 'Complaints and a health commissioner'

93-98 The Association has no observations on these sections of the report.

3.8 'Staffing the service—Chapter 8'

The Association strongly endorses the main theme of this chapter, exemplified by the statement: 'The quality of the service it provides depends, above all else, on the calibre of the men and women working in it'.

The Association supports the formation of a national staff commission to effect the redeployment of staff. It also stresses the need to ensure that skilled staff are not lost to the service in the period of discussion and unease which will inevitably follow the suggestion to reorganise on the scale now suggested.

Part 2

4 The future structure of the National Health Service—general recommendations

The Association, in its first submission, stated that it considered there were two great problems facing the service. The first was the need to balance, to public satisfaction, almost unlimited medical and nursing possibilities against necessarily limited resources. This problem has not been mentioned in either Green Paper. It is seen to be a vital problem because it affects the whole attitude of the public to the work of the service. Television, journals and papers give wide publicity to the periodic dramatic breakthroughs that are made in medicine, and concentrate on the high-skill-dependency areas of work. Following such a subconscious background it is inevitable that there should be resentment at finding a waiting list of a year for a relatively simple operation, that there are difficulties in communicating in English with some nursing or junior medical staff, or that not all staff in long-stay hospitals are gifted and dedicated.

The second major difficulty is the need to devise a structure and operational procedures which will minimise the almost inevitable frictions which arise as a result of the near monopolistic nature of the service. The second Green Paper introduces the major aim of 'local participation,' and the proposal for district committees will assist in overcoming this particular problem. The expansion of the Department, and the transfer to its regional offices of the majority of functions of the Regional Boards, will achieve the opposite result.

Boards generally have tended in the last few years to receive unfavourable newspaper publicity; this does not necessarily mean that their original creation as a local democratic force was wrongly conceived. Against the background of recent happenings, it was inevitable that there should be adverse publicity; that this has focused on Boards instead of on hospital staff or at a political level is a major advantage.

In concentrating in three of its four aims (unification, co-ordination and local participation) on structure, the second Green Paper, like the first, implies that this will solve the main difficulties of the service. This is not the view of the Association, which sees the major problems, in addition to the two previously mentioned, as the needs for training, modern management, accountability and audit. The fourth aim, 'effective central control', is not seen as a substitute for the solution, at all levels, of the major problems isolated by the Association.

The Association in its earlier submission 'built up', on grounds of span of control, from four or five districts of 100 000 to 150 000 people per area board to a national total of 100 to 120 area boards. Although the present Green Paper adopts a totally different approach, the answer is broadly the same, and provides a unit large enough to contain the necessary physical resources and personal skills. Although the Green Paper states that the precise number of district committees has yet to be determined, it envisages the figure of 200. This is considered to be too low for many reasons, not least because it reduces the element of public participation. We would recommend that the number of district committees be determined by local considerations, but that a national total of 400 to 500 be envisaged for preliminary planning purposes.

Sections 3.6.1, 3.7.1 and 3.7.2 develop the argument for a 2-tier system; this continues the recommendations made in the original submission, which are still considered totally appropriate following the White Paper on local government. Those recommendations are repeated below for convenience.

> The difficulties of the Department in dealing directly with a high proportion of the 690 existing subordinate authorities are appreciated; they have not been reduced by the direct contact maintained in certain spheres by the Department with hospital management committees and consultants. The difficulties will be substantially reduced by the formation of area boards, but an additional tier is necessary if the span of control of the Department is to be kept within the bounds of modern management practice—whether the number of area boards be 40 as proposed in the Green Paper, or 100 to 120 as suggested by this Association. The intermediate tier would:
>
> (*a*) determine broad policies and priorities of need between area boards
>
> (*b*) provide an efficiency audit to raise and equalise standards within and between area boards.

(*c*) provide such specialist medical, management, engineering and building services as cannot economically be decentralised to area boards

(*d*) act as the authorised link with regional development councils, regional government (should this develop) and with the Greater London Council

(*e*) carry out capital-works planning and the design and construction of major projects.

The Green Paper, in many paragraphs, envisages the need for informal or formal structures at levels between those of the Department and the proposed area boards. The Association considers that a formal level should be retained and that it is best provided by the existing Regional Hospital Boards. Hospital management committees should be absorbed into the proposed smaller area boards; their powers and responsibilities and those of Regional Boards would need restatement. Changes of boundaries may be desirable as a result of recommendations on local government.

The intermediate tier could be formed by expansion of the Department's existing regional offices; the Association considered this choice and rejected it. Four main factors led to this view.

(*a*) The Association values highly the contribution to the Health Service of the unpaid chairmen and members. Coming as they do from many fields of public and social service, and the professions, industry and commerce, they apply the acid test of common sense to the policies of the Boards and to the proposals of their officers. They provide a sensitivity to public need and opinion in the region which is all the more beneficial because it is little tempered by considerations of day-to-day political advantage. They spur their officers in the execution of policy and are a valuable and necessary corrective to the bureaucratic attitude which tends to develop within any group of paid officials. There should be stronger representation of general practitioners, dentists etc., on regional and area boards, but lay members should be in a substantial majority.

(*b*) The Association is conscious that the social services are a near monopoly, with all the disadvantages that this can entail. The intermediate tier proposed by the Association will have important responsibilities for formulating regional policy. This tier should be alert to local feelings, and directly controlled by representatives of the public resident in the area, and not by a Civil Service chain to the Department, the Secretary of State and Parliament.

(*c*) A Regional Board is able and willing to give quick decisions on all points of policy within its powers. It is doubtful whether a Department regional office would be given the same delegated powers as those laid down by statute for a Regional Hospital Board, or whether it would be able to use them so freely.

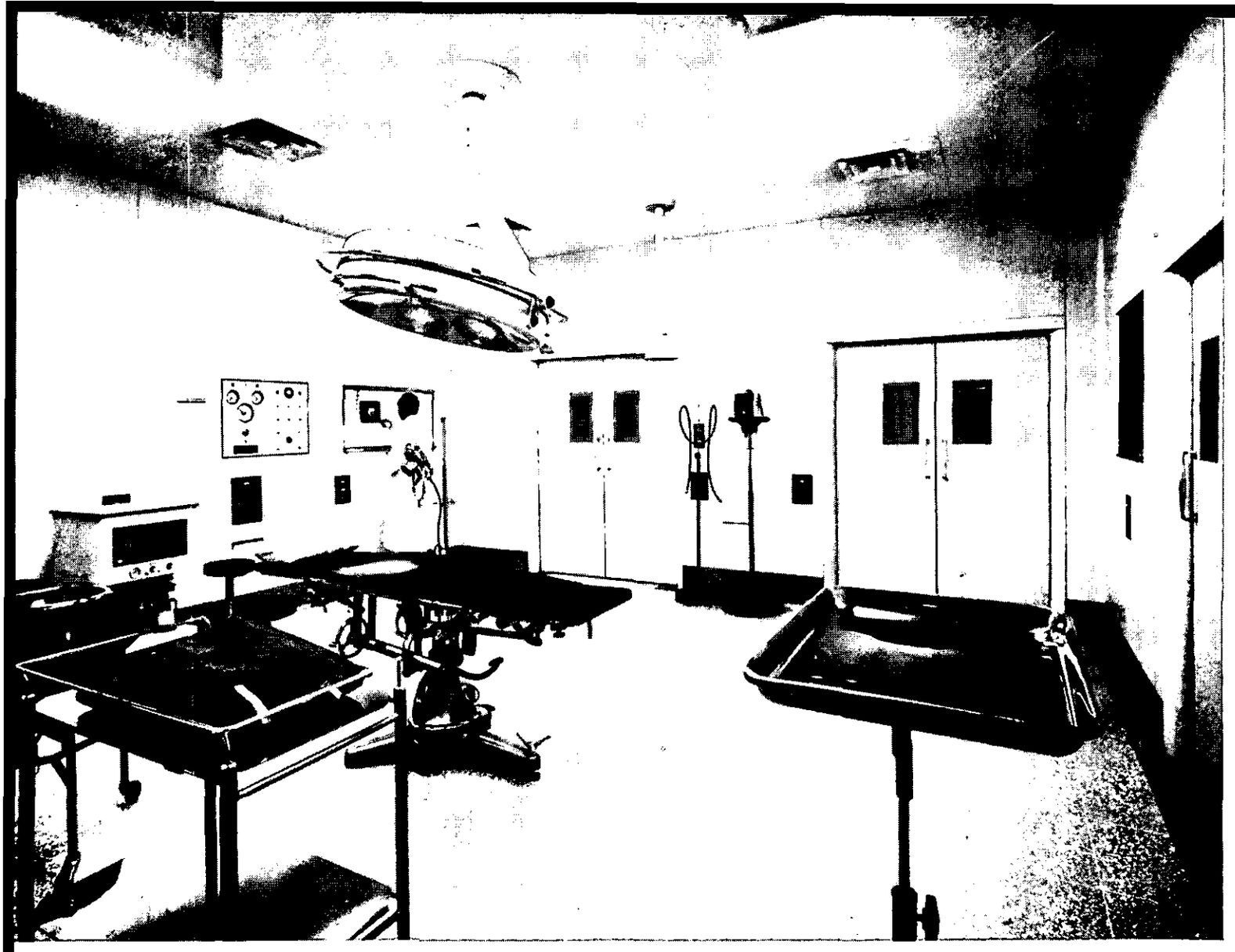
(*d*) The members of Regional Hospital Boards and their chief officers are local, and change infrequently. They live within the community they serve. A Regional Board therefore has a valuable continuity and identity of interest with the people it serves.

It is not entirely clear from the Green Paper where the boundary of capital works is envisaged; paragraphs 60 and 79 refer to area health authorities' responsibilities for capital expenditure, paragraph 91 makes the Department (centrally and in its regional offices) the designer for 'major' schemes, and also makes its services available to area health authorities for smaller schemes such as health centres. In paragraphs 85 and 91 the regional councils plan developments and assess priorities, but only on the basis of advice to the Department. The Association cannot recommend this division of work. In Sections 3.2.1 and 3.2.2 of this Memorandum the necessity for uniting medical with engineering and architectural planning is demonstrated, together with the need for capital works to be centrally controlled at regional level.

The proposal to curtail the responsibilities of Regional Boards and to centralise capital works within the Department has not been the subject of independent investigation. The contribution of new ideas and developments by Boards in this field has been immense. This fertility of ideas arises to a high degree from the initiative which the decentralisation of Boards not only permits, but also positively encourages. The major advances in hospital construction, including such aspects as industrialised building, standardisation of design, simplified hospitals etc., have all originated from Regional boards, and have been tested there in practical applications before being taken up by the Department. The flow of new thinking, in minor as well as major developments, has conspicuously been in an upward direction.

The standards of maintenance of hospitals have been a matter of concern to the Association for many years, although of course the direct responsibility clearly rest with hospital management committees. These views have been made known to the Department; the phrase, 'the present standards of maintenance, with a limited number of exceptions, are deplorably low', was used in the earlier comments in 1968 on the first Green Paper. These views have now been endorsed by investigations following the report of the Comptroller and Auditor General. The Association believes that the formation of the area health authorities, principally because of their larger size, offers the opportunity to establish a structure and staffing which can competently and economically maintain the £2000m capital investment of the country in its health-service buildings. The Association will submit its detailed recommendations to the Department during the coming summer.

The Association again draws attention to the wider range of maintenance responsibilities which should be undertaken by the area health authorities; the recommendations of the earlier observations still fully apply.



Laminate-lined theatre

The Newcastle Regional Hospital Board has specified Formica decorative laminate for a new operating theatre in the ear, nose and throat unit of the Walkergate Hospital, Newcastle. This prototype decorative-laminate installation is the first to be installed by the NRHB, and will soon be followed by two similar installations in the Sunderland Royal and Tynemouth Victoria Jubilee Infirmaries, where twin operating theatres are being built.

In the Walkergate Hospital approximately 2100 ft² $\frac{1}{16}$ in laminate, together with 1000 ft² of backing board, is used to line the walls, ceilings and doors of the operating theatre. For the walls, Narvik blue (*BS 7-081*) laminate has been pressure-bonded to $\frac{3}{4}$ in w.b.p. plywood, reverse compensated with backing board. The panels, which are secret-fixed to 3 × $1\frac{1}{2}$ in battens fixed to brickwork, are machined on the long edges to take $\frac{1}{8}$ in loose tongues, and the surface butt joints are filled with an 'Expandite' nonhardening sealant. Sheets of Formica 5 ft wide reduced the number of joints used.

Postforming grade laminate is employed for all corner sections to eliminate sharp crevices where bacteria might lodge. The ceiling panels, surfaced with Magnolia (BS 3-033) laminate, are fixed by a similar method to the wall panels, suspended by stirrups.

The choice of colour in operating theatres is of prime importance since there must be little or no glare or light reflections. Normally, pastel shades of blue and green are favoured which will not influence the colour of a patient's skin. 'Narvik blue' decorative laminate was chosen for the walls, and 'platinum tweed' laminate for the doors to provide clear contrast and instant identification by theatre staff as no door frames are visible.

Formica is, of course, capable of meeting the most stringent demands of hygiene, and will withstand constant washing down with antiseptic solutions. Large sheet sizes considerably reduce the number of joints, and postformed corners facilitate cleaning. Perhaps even more important, when operating theatres need to be in constant use, the question of redecoration can cause serious disruptions to theatre routine and availability. This problem very rarely arises with decorative-laminate surfacing.

Part 3

Electrical-installation testing

by A. Egley

2.4 Phase-sequence test

2.4.1 Object

To determine the phase sequence of a 3-phase supply.

2.4.2 Instrument

Phase-sequence meter (or special apparatus) with three coloured leads.

2.4.3 Method

At all 3-phase busbars, switch boards, distribution boards and outlets, connect the coloured leads to the conductor connections of the identical colour. Observe the rotation of the meter disc. If this is the same direction as the arrow on the disc, then the sequence is correct. If not, colouring errors have been made, and they must be rectified.

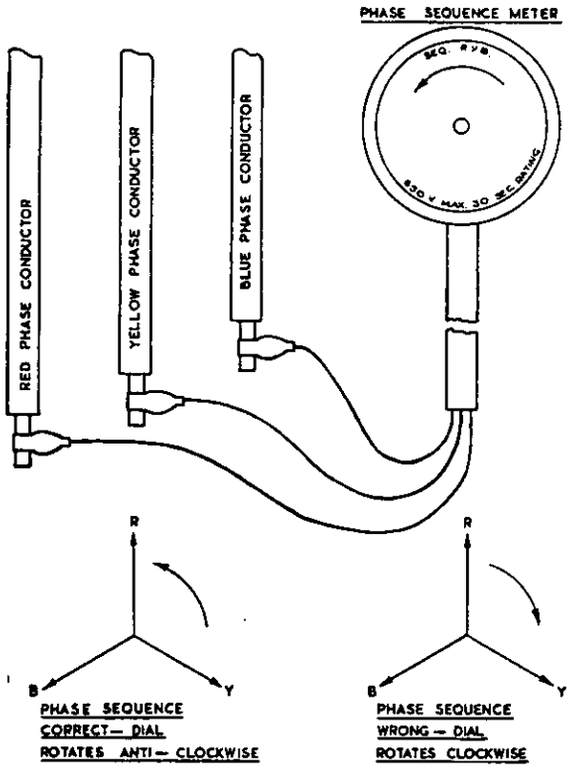


Fig. 5 Principle of phase–sequence test

2.4.4 Theory

The phase sequence begins at the generator. There are three windings in a common frame, and a field system revolves in the frame. We call the three windings R, Y and B. If the field system revolves in one direction, the peaks of the voltage waves will come up in the order R, Y, B. If we reverse the direction of rotation the voltage waves come up in the order R, B, Y—which is the reverse sequence.

We have all met the problem of a 3-phase motor running in the wrong direction. It is only necessary to swap two terminals in the switch or breaker for the motor to run in the right direction, because this, in fact, reverses the phase sequence of the supply to the motor. In bygone years no importance was attached to marking cables, but the use of coloured insulation on conductors has changed that. It is a waste of money to have coloured cables and then connect them in a haphazard manner. The use of any form of identification implies some logical system.

How many times have you been called to a motor, found, say, the red fuse blown and traced it back to the busbars to find it coloured yellow or blue there? Your first reaction is to call the fellow who did the original work a careless fool, and you would be right.

The use of phase-sequence-sensitive devices in motor circuits and emergency change-over contactors makes it vital to colour correctly and check phase sequence. This is akin to polarity testing. Correct colouring makes life easier for all concerned.

2.5 Earth-loop impedance test

2.5.1 Object

To measure the impedance to alternating current of either

the line–earth loop

or the neutral–earth loop

from some point in an installation back through the STAR point of a transformer to the original point. This is where the term 'loop' comes from, as opposed to measuring the resistance of the earth path alone by the earth-continuity test. The impedance measured can be used to calculate the maximum current that can flow under fault conditions. The test is carried out with the supply live.

2.5.2 Instruments

Two principal instruments are used:

line–earth loop tester

or neutral–earth loop tester

Both instruments are fitted with a length of 3-core

flexible cable terminating in a 3-pin plug at the free end. There may be one lead for each particular type of socket; i.e. 5A, 13A and 15A. For portable-apparatus testing, probes and crocodile clips are used.

Both instruments are scaled in ohms, and fractions of an ohm.

2.5.3 Method (Figs. 6 and 7)

Insert the appropriate lead into the test set and into the socket, or other device, from which the test is to be conducted. Set the instrument to the maker's setting, which varies between instruments. Note polarity signals on instruments if fitted. These indicate whether the socket or other device is connected in the correct polarity. If this is correct, depress test switch or button and observe the reading on the scale. This is the 'loop' impedance, either line–earth or neutral–earth.

Most test instruments have tables attached showing the maximum size of rewirable fuse, cartridge fuse or circuit breaker which will operate on earth fault at that point. This rating *must never be exceeded*, or the circuit is not safe in use.

The Figures indicate the basis of the test.

Care must be taken when using the line–earth test set, since faulty conduits can give rise to voltages up to mains voltage on the conduit system. The test should therefore be carried out with the building unoccupied, or at least not until due warning has been given to the occupants.

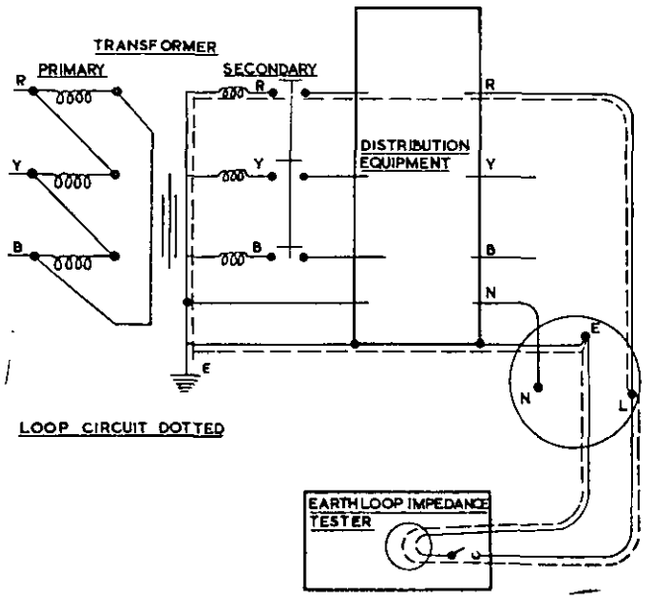


Fig. 6 Line–earth loop test

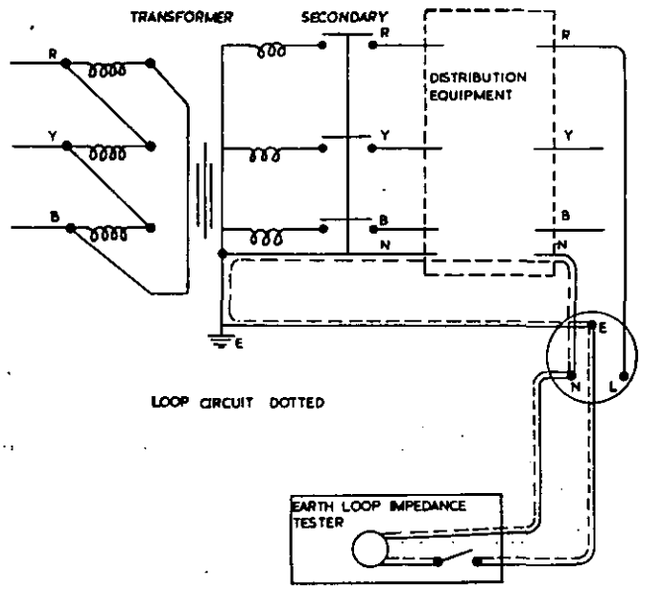


Fig. 7 Neutral–earth loop test

2.5.4 Theory

Both instruments work on the principle of injecting a simulated fault current round the loop.

The line–earth type creates a short circuit with a current-limiting device in circuit. The neutral–earth instrument injects a current into the neutral–earth path from the instrument itself. The current is derived from the socket, or other device to which the set is connected, by a transformer.

If an earth fault occurs in the installation, the fault current flows from the transformer, through the various mains and submains to the fault, and then back down the earth path (conduit, cables etc.) to the transformer. The current that flows is the circuit voltage divided by the sum of the impedances of the conductors, switchgear and earth path.

If the circuit under test is fitted with protective fuses or breakers which are not in the path of the fault current, they do not blow and a dangerous situation occurs. If this potential situation is not located and a fault actually occurs, a fire may result, or anyone touching metal switch or socket plates, machinery, water pipes or other services connected with earth may possibly be electrocuted.

This is a test which should be repeated at regular intervals throughout the life of the installation. It can indicate rusted conduit, corroded armouring or terminations and broken or corroded earth bonds, straps and jumpers.

The earth-continuity test (Section 2.2) cannot be carried out properly on a concealed installation after completion. Therefore, the earth-loop test is the test which is used in maintenance.

If protective multiple earthing becomes standard, the neutral–earth loop test will not be possible, and line–earth loop testing will become standard practice. However, this is some time ahead, and for a long time existing practice will be maintained.

Example

Assume a 240 V single-phase circuit of p.v.c. s.w.a. cables on a drive-lighting installation. There will be many junctions of both active conductors and armouring. If on test the earth-loop impedance were 10 Ω (a likely value on this type of cable and installation), then if an earth fault occurs at the last lantern, the maximum current that can flow is

$$I_{max} = \frac{V}{Z} = \frac{240}{10} = 24 \text{ A}$$

If this installation were protected by a 15 A rewirable fuse, it would take a considerable time for the fuse to blow. (It takes 45 A to blow it within 0·1s.) A safe device would be a 15 A h.r.c. fuse (which blows immediately with 22·5 A) or a circuit breaker of similar rating.

* Among the Branches *

MIDLAND BRANCH

The Midlands Branch now refers to the first week in March 1970 as its 'Winter Sports Event'. Its committee and members dodged the snow on the Monday when attending a committee meeting at the Birmingham General Hospital about the 1970 Conference, and followed that by a highly successful cheese and wine party on the Tuesday in the comfort of the Sports & Social Club at the Highcroft Hospital. On the following Saturday, after another snow-shovelling spree, members were at last able to relax in the new Walgrave Maternity Hospital's lecture theatre to listen to Mr. F. A. Phillips of the British Leyland Corporation talking on 'The Rover gas-turbine car'. Mr. Phillips traced the history of the gas turbine over the last twenty years and drew attention to the plans for quantity production that are now being laid down. With the aid of slides he also described the fundamentals, design and characteristics of gas turbines, and outlined the industry's research programmes.

Mr. Phillips's informative paper was followed by the branch's AGM and the election of officers and committee for the following year. The retiring Chairman, Mr. F. J. Williams, is succeeded by Mr. S. C. Stapley, and Mr. A. V. Baker has now joined the committee and taken over the onerous duties of secretary/treasurer from Mr. H. R. Martin. Mr. B. A. Hermon, of course, resigned from the Midlands Branch committee last August when he left the Birmingham area to take up his duties as regional engineer, Oxford Regional Hospital Board. The Committee is now therefore made up as follows: Chairman, Mr. S. C. Stapley; Vice-Chairman, Mr. K. W. Ashton; Secretary/Treasurer, Mr. A. V. Baker; Committee, Mr. E. Austin, Mr. A. Chater, Mr. H. R. Martin, Mr. R. G. Smith, Mr. F. J. Williams; PRO/editor of *Intercom*, Mr. D. L. Hall.

WELSH BRANCH

The Welsh Branch will be holding a weekend school at the University Hospital of Wales, Cardiff, commencing on Friday afternoon, 2nd October 1970, and continuing on the Saturday and Sunday.

There will be a full programme of lectures and discussions, and a conducted tour of the £20m new University Hospital of Wales which is to be completed early in 1971.

Entertainments will be provided for members' ladies, and it is also hoped to make a block booking at one of Cardiff's leading night clubs for the Saturday evening.

NORTH-EAST BRANCH

A well attended AGM of the North-East Branch was held at the Royal Victoria Infirmary, Newcastle upon Tyne, on Wednesday, 25th March, when Mr. J. S. Mason was in the chair.

The Branch Honorary Secretary, Mr. C. R. A. Meyer, gave his report on the past year, and a number of suggestions for future activities were forthcoming indicating the enthusiasm and keenness in the branch.

In the election of officers for the forthcoming year, Mr. E. Parker was elected Chairman, Mr. N. Atkinson Vice-Chairman and Mr. C. R. A. Meyer was re-elected Branch Honorary Treasurer.

The meeting was attended by Mr. D. H. Mellows, Area Council Member, and Mr. J. E. Furness, Secretary of the Institute, who reported on recent events and on the programme and activities to come. This was followed by a most lively period of general discussion.

SCOTTISH BRANCH

The AGM was held at the Carlton Hotel, Montrose, on the 21st March. The new Branch Chairman is Mr. W. Runcie, Group Engineer, Aberdeen Royal Infirmary, and Mr. A. R. Hunter continues as Honorary Secretary.

The forthcoming programme has been planned and will include two visits. One will be to see the new boiler installation at the Aberdeen City Hospital, and the second is to be to the new Ninewells Teaching Hospital, Dundee.

LANCASHIRE BRANCH

A meeting was held at Prestwich Hospital, near Manchester, on Saturday, 21st March. A film was shown of the construction of a 27 mile stretch of the Birmingham–Preston M6 motorway. The film had additional interest for those who had been involved in Keele courses as it included shots of, and references to, the building of the bridge and service station on that part of the motorway that skirts the west side of Keele Park.

The film was shown in the nurses' home, and the company then retired to the hospital's most pleasant boardroom to hold the branch's AGM.

The Chairman gave his report of the past year's meetings. In the election of officers, Mr. A. Millington succeeded Mr. D. H. Mellows as Branch Chairman, and Mr. T. Hardacre will continue as Branch Honorary Secretary.

Mr. J. E. Furness, Secretary of the Institute, attended the meeting and spoke of coming events and activities.

The branch is indebted to the Prestwich Hospital Management Committee, and to Mr. D. Clement, for the facilities placed at our disposal, and for the excellent refreshments.

NEW FACES

News of members' promotions are always of interest. Should you change your post, send the details to the Editor and a brief mention will be included in *Hospital Engineering*.

Encircle HE 9 on reply-paid card for further information

WHAT DOES RELIABILITY COST? IS IT WORTH IT?

The economics of the reliability of supply

(A COMPARISON OF STANDARDS ADOPTED IN VARIOUS COUNTRIES)

It is well known that the *standard of reliability of electricity supply* (generation, transmission and distribution) varies between countries as well as within countries. Is reliability of supply necessary? Is it an economic proposition?
These points were raised at a conference, held in London on the 9th–13th October 1967, sponsored by the IEE Power Division. The 43 conference papers, presented by eminent engineers from many countries of the world, have been collected and bound as IEE Conference Publication 34.

Part 1: Papers

303 pp (A4 size) photolitho, soft covers, 1967
Price £4 5s.

Part 2: Discussions

166 pp (A4 size) photolitho, soft covers, 1968
Price £3 10s.

Orders, with remittances, should be sent to:

Publications Department,
IEE, Savoy Place, London WC2

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Value engineering

The technique of value engineering is to ensure that better value is obtained in all areas, from initial design to administration, in both manufacturing and service industries. The technique is described in the proceedings of the 1st annual conference of the Value Engineering Association.

73 pp., A4 size, 16 papers, photolitho, soft covers, 1968, price £5

Orders, with remittances, should be sent to:

Publications Sales Manager,
Peter Peregrinus Limited, PO Box 8,
Southgate House,
Stevenage, Herts., England

The opening section of the book discusses four important aspects. The first two cover the need to convince management of the necessity for a value programme and the training requirements of value engineers. The second two explain a method for 'make or buy' decisions and cost analysis with relation to function.

The second and third sections describe the way in which successful programmes have been operated, for low-cost design of domestic appliances, aircraft engines and airframes, and for value engineering in shipbuilding and for low-volume products.

The final section covers the future of value engineering in administration and some views on the role which Government can play in the leadership of projects to provide better value.

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OFFICIAL APPOINTMENTS
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MISCELLANEOUS

APPOINTMENTS AND SITUATIONS VACANT

SOUTH-WESTERN REGIONAL HOSPITAL BOARD
ENGINEERING TRAINING CENTRE FOR THE
NATIONAL HEALTH SERVICE,
EASTWOOD PARK, FALFIELD, GLOUCESTERSHIRE

INSTRUCTION STAFF

Further interviews are being arranged for instruction staff at this newly acquired residential centre accommodating 60 trainees, situated between Bristol and Gloucester. The centre will provide short-term instruction in a wide range of hospital installation subjects for hospital staff, including design engineers, maintenance engineers and craftsmen, in England, Wales and Scotland. Installation of hospital plant will assist practical demonstrations.

For one post applicants should be chartered mechanical or electrical engineers, or their equivalent, on a salary scale £1812–£2542.

For other posts candidates should preferably be qualified to HNC standard, with salary scale £1680–£2066.

All applicants should have practical hospital or similar experience. Whitley Council conditions of service for National Health Service will apply. Some housing accommodation is available.

TECHNICIAN DEMONSTRATORS

Technician Demonstrators are required at the above centre to install and maintain plant and equipment and prepare it for demonstration. They will also be required to construct demonstration equipment under the direction of the instruction staff and to assist them with practical instruction.

Practical hospital or similar experience is necessary, and for one post experience of electronics is required. An Ordinary National Certificate or City & Guilds Certificate of similar standard is desirable.

Salary scale £785–£1370 per annum. Commencing salary may be above £1000 for a candidate whose age, qualifications and experience are appropriate. Whitley Council conditions of service as above.

Some unfurnished accommodation is available.

Application forms, indicating post required, are obtainable from the Secretary to the Board, 27 Tyndalls Park Road, Bristol BS8 1PJ to whom they should be returned as soon as possible.

YORK 'A' HOSPITAL
MANAGEMENT COMMITTEE
HOSPITAL ENGINEER

Applications invited for the above appointment for duties at City, St. Mary's and associated hospitals in York. Applications must have completed an apprenticeship in mechanical engineering, have a sound knowledge of steam boiler plants (oil-fired at the City Hospital) with a wide experience in the management of mechanical and electrical-engineering plant similar to that of modern hospitals. Candidates must hold City & Guilds Mechanical Engineering Technician Certificate (Part II) which must include plant maintenance and works service, or City & Guilds Certificate in Plant Engineering or Ministry of Transport First-Class Certificate of Competency which includes an OND or ONC. Applications will, however, be considered from candidates without the stipulated qualifications, the salary being suitably abated.

Salary £1403 per annum rising by five annual increments to £1658, plus £50 per annum special responsibilities allowance.

Applications, stating age and giving full details of education, experience and qualifications, together with the names and addresses of two referees, to Group Engineer, Bootham Park, York.

LONDON BOROUGH OF
ISLINGTON
BATHS DEPARTMENT

Applications are invited for the post of

ENGINEERING
ASSISTANT

Salary £1665-£1890 per annum
(inclusive of London weighting)

The person appointed will be responsible for the overall maintenance of the mechanical and electrical engineering plant, equipment and services in the Council's five baths and laundries establishments.

Preference will be given to applicants possessing an appropriate engineering qualification.

Forms of application and full details may be obtained from the undersigned, to whom completed applications should be returned within two weeks of publication of this advertisement.

ALAN V. WRIGHT
Borough Baths Manager
260 Hornsey Road
London N7
01-272 2606

SOUTH WORCESTERSHIRE
HOSPITAL MANAGEMENT
COMMITTEE
GROUP ENGINEER

required for this mixed group of 13 hospitals to be responsible for all engineering services. For the time being he will also be responsible for building maintenance but this is under review and it may be decided to appoint a building supervisor.

Extensive capital development scheduled.

Salary (72 points) £2265–£2685 per annum plus £175 responsibility allowance.

Further details of the post and application forms from: Group Secretary, Croft Road, Worcester WR1 3NY. Closing date: 22nd May 1970

ROCHDALE AND DISTRICT
HOSPITAL MANAGEMENT
COMMITTEE
GROUP ENGINEER

Applications are invited, from people holding the appropriate qualifications, for the post of group engineer to the Rochdale group of hospitals. The group consists of six hospitals and two clinics and has 1086 beds.

The salary is £1934–£2271 per annum (36½–48 points) and in addition there is a special responsibility allowance of £100 per annum.

Applications giving details of qualifications, experience and names of two referees should be sent to: The Group Secretary, Rochdale and District Hospital Management Committee, Group Offices, Birch Hill Hospital, Rochdale, Lancs., within two weeks of this advertisement

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ASSISTANT ENGINEER required at ST. STEPHEN'S HOSPITAL, CHELSEA, London SW10. Post offers valuable experience in the operation and maintenance of all engineering services in an expanding acute hospital. Practical experience and approved qualification required but consideration will be given to applicants without the stipulated qualifications (on an abated salary scale). Day release for higher qualification considered. Salary £1077–£1403 plus £90 LW. Abatement if unqualified £100. Applications to the Secretary, Chelsea and Kensington HMC, 5 Collingham Gardens, London SW5

ASSISTANT ENGINEER

Applications are invited for above post for duties at Naburn, Fulford and Maternity Hospitals (all one site) in York. Previous applicants for this post are being considered, and new candidates should have completed an apprenticeship in mechanical engineering, have a sound knowledge of steam-boiler plants with a wide experience in the management of mechanical and electrical-engineering plant similar to that in modern hospitals. Applicants must hold an ONC in mechanical or electrical engineering.

Salary: £1077 rising to £1403 per annum.

Apply giving full details of age, education, qualifications and experience, together with the names of two referees, to the Group Engineer, Bootham Park, York

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BEDFORD GROUP HOSPITAL
MANAGEMENT COMMITTEE
HOSPITAL ENGINEER

required for Bromham Hospital, near Bedford—424 beds for the mentally subnormal. Candidates should possess the HNC in mechanical or electrical engineering or an equivalent qualification approved by the Department of Health. However, consideration will be given to the appointment on an abated scale for applicants without such qualifications.

Salary scale £1405–£1658 plus a responsibility allowance of £25.

Family accommodation is available.

Applications, giving details of age, experience, qualifications and the names of two referees, to the Establishment Officer, Bedford Group Hospital Management Committee, 3 Kimbolton Road, Bedford.

EDGWARE
GENERAL HOSPITAL
EDGWARE, MIDDLESEX
ASSISTANT ENGINEER

This is an excellent opportunity for a young man, preferably with ONC in engineering. He will be responsible to the hospital engineer for the operation and maintenance of engineering services which include a new oil-fired central steam-raising boiler house. Opportunities for day release for further study will be given.

Salary scale £1077 per annum rising by eight increments to £1403 per annum, plus £90 London weighting.

Applications to Group Personnel Officer, Edgware General Hospital, Edgware, Middlesex. Telephone 01-952 2381

CLASSIFIED ADVERTISEMENTS

continued from previous page

APPOINTMENTS and SITUATIONS VACANT

HEREFORDSHIRE HOSPITAL MANAGEMENT COMMITTEE

Hospital Engineer required for St. Mary's Hospital (Psychiatric) and a sub-group of hospitals; to be directly responsible to Group Engineer. Major work has been carried out on the services at St. Mary's Hospital including new oil-fired boiler plant.

Applicants must have served an apprenticeship and be fully qualified in accordance with the latest Whitley circulars.

A Hospital House will be available on a service tenancy at a reasonable rent.

Salary scale £1403–£1658 plus £25 special responsibility allowance.

Applications stating age, training, qualifications and full experience, together with names of three referees, to:
Group Engineer, Herefordshire Hospital Management Committee, Victoria House, Eign Street, Hereford.

TECHNICIAN
EAST BIRMINGHAM HOSPITAL

A technician is required to assist in the maintenance and development of electromedical and laboratory equipment. Experience in the servicing and calibration of similar equipment is desired and knowledge of control and application of radioisotopes an advantage. Minimum qualification ONC/OND electronics, electrical engineering or physics. Basic salary £1020–£1500 per annum according to qualifications and experience. Write for application form to the Group Engineer, East Birmingham Hospital Management Committee, Group Administrative Offices, 45 Bordesley Green East, Birmingham 9.

MISCELLANEOUS

CIRCULATING PUMPS and Steam Turbines, Complete units, electric and steam, spares and service. TURNEY TURBINES Ltd., 67 Station Road, Harrow. Tel: 01-427 1355 and 01-427 3449.

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Anthony Wedgwood Benn, UK Minister of Technology

The purpose of this new book **'Automation for productivity'** is to inform senior management of the benefits that can be derived from the application of computers and automation techniques in industry.

Contents

Ten papers, presented at a conference held in May 1968 and sponsored by the IEE, MinTech, CBI, Industrial Automation Liaison Committee and UKAC, on systems already installed in a wide range of industries; the financial implications of automation; and the role of Government in the promotion of control systems.

122 pp., A4 size, photolitho, soft covers, 1968. Price £2 14s.

Orders, with remittances, to: Publications Department, IEE, Savoy Place, London WC2

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LA MONT are specialist designers and manufacturers of controlled circulation boilers and associated equipment for hot water systems.

The first LA MONT hot water boiler was installed in 1937. Today these boilers are widely used throughout the U.K. in unit sizes ranging from about 2,000,000 to 80,000,000 B.T.U./hr., for a variety of hot water applications covering both high and low pressure conditions.

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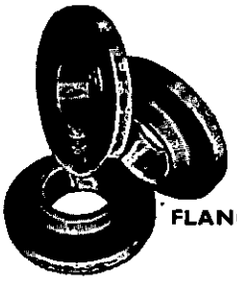

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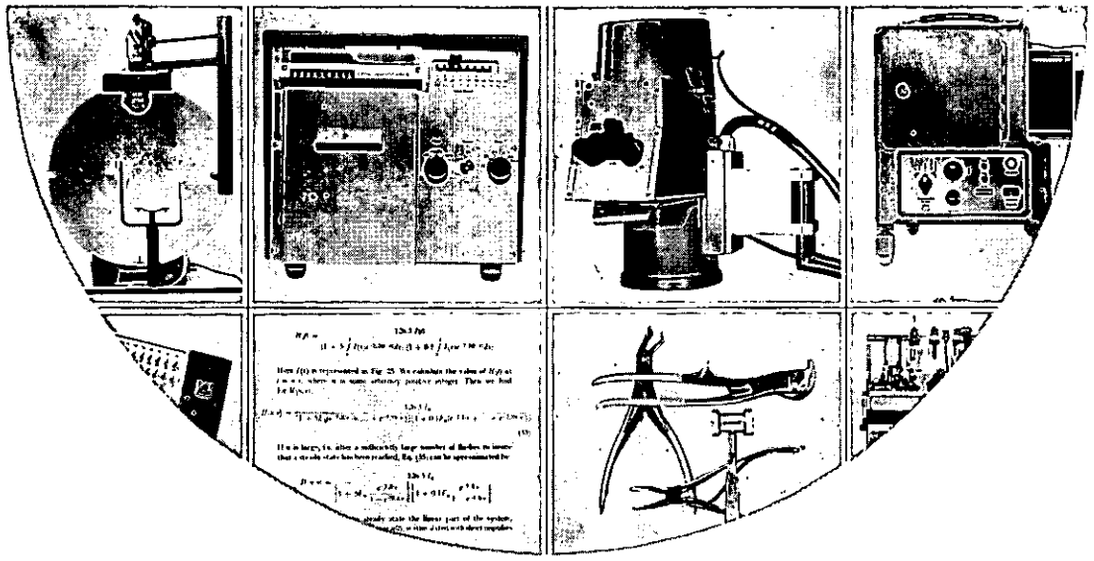

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