HOSPITAL ENGINEERING

December 1978

International Federation Issue

The Journal of the Institute of Hospital Engineering

I.F.H.E.

International Conference -Lisbon

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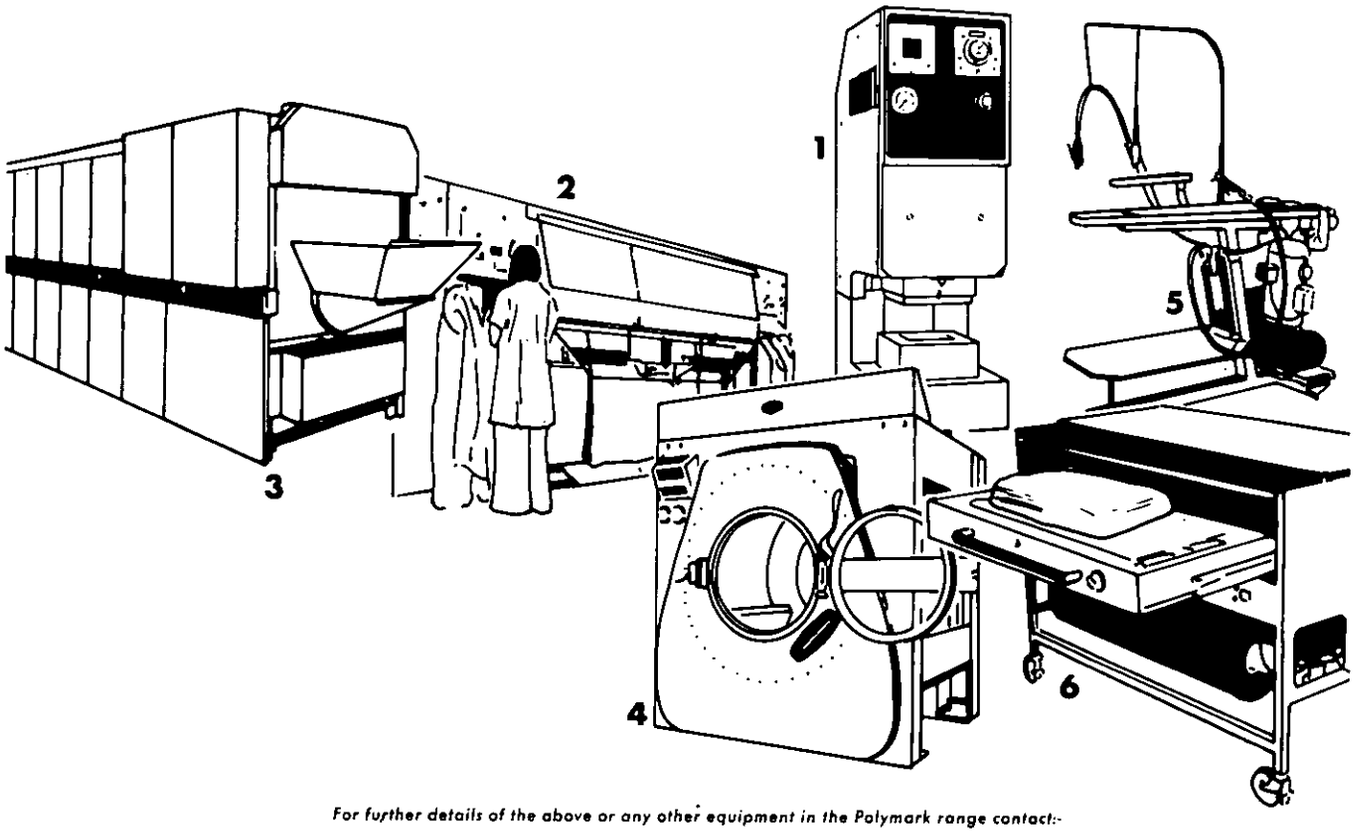

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Institute News

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The business of the meeting will be the presentation and consideration of the Annual Report and Accounts for the year ended September 30, 1978, the appointment of the Auditors and the fixing of their remuneration, and the announcement of the result of the ballot for the election of elected members of the Board.

BY ORDER OF THE BOARD
M. W. LEONARD,
Secretary

Copies of the Annual Report will be available at the meeting and will be despatched to any member wishing to receive a copy as soon as the Report and Accounts are available, which is unlikely to be earlier than March 8, 1979.

The Falfield/Keele Courses

Interesting Developments — Regalia

The Keele-type management courses in Developing Management Effectiveness, successfully completed their third year at the Hospital Engineering Centre in September. These courses which now incorporate the building side of the Works Organisation, were initiated and organised by the Institute in collaboration with the Department of Health, at the University of Keele in 1962.

Since the transfer of the courses to Falfield in 1976, the responsibility for their organisation has been taken over by the Department. However, the Institute has retained an interest by taking part and supporting them whenever possible. The spirit and atmosphere developed by and on the Keele Courses are well known, particularly by those who have attended them. These two factors are no less, now that the courses are transferred to their new home at the Hospital Engineering Centre, where they are still referred to, unofficially but with affection, as the Keele Courses.

Course Members at the Intermediate Course in July felt they would like to mark the connection of Keele and Falfield in some way, and at the same time to pay some form of tribute to the Principal and staff of the Centre for their co-operation and understanding in helping to establish the Keele Courses at Falfield.

To this end it was decided that the 1978 Intermediate Course should inaugurate a set of Regalia, by presenting the first pieces comprising three fine silver 'three candle candelabra'. These were presented to the Chief Engineer, Mr T. A. Nicholls, at the course dinner for safe keeping at the Centre. It was suggested that future courses might wish to contribute to the Regalia, which should be known as the 'Keele/Falfield Regalia'.

This wish was soon followed by the Advanced Course in September making a similar contribution, but this time comprising two silver 'five candle candelabra'. It will be of particular interest to members to hear that Mr J. R. Harrison, President of the Institute, who attended both courses, also very generously presented a silver 'five candle candelabrum' in the name of the Institute of Hospital Engineering. The Tutorial Panel, together with staff from the Department who were connected with the courses added their contribution of a handsome walnut wood gavel.

All three presentations were made at the course dinner in September, to Mr John Bolton, Director General of Works, for safe keeping with the other items. The Regalia now comprises nine separate pieces made up as follows:—

3 Silver Candelabra (three candle pieces): Intermediate Course, 1978.
2 Silver Candelabra (five candle pieces): Advanced Course, 1978.
1 Silver Candelabra (five candle piece): J. R. Harrison, 1978.
1 Walnut Gavel: Tutorial Staff, 1978.
1 1974 Keele Challenge Cup: Intermediate Course, 1974.
1 Shield for the Most Improved Speaker of the Week: M. J. Burke, 1977.

When a suitable position has been found at Falfield, the various pieces will be labelled and put on display.

It is to be hoped that the inauguration of the 'Keele/Falfield Regalia' will not only enhance the course dinners and other functions, but will also strengthen the bonds between the Department and the Institute, which has always been one of the underlying factors in the Keele Courses.

The 1979 courses have now been fixed for:—

Intermediate Course: July 8 to 13.
Advanced Course: September 16 to 21.

Since both these courses were oversubscribed in 1978, early application is advised. Further information may be obtained from the Principal, Hospital Engineering Centre, Eastwood Park, Falfield, Wotton-under-Edge, Gloucestershire GL12 8DA.

Mr W. A. J. Whiffin

It is with deep regret that we have to report the sudden death of Mr W. A. J. Whiffin (Wally), who passed away on October 16, 1978, at the age of 58 years. He leaves a wife and two married daughters. Mr Whiffin's most recent post was that of District Works Officer to Southampton and South West Hampshire Health District (Teaching).

Wally Whiffin.

Wally Whiffin's career had spanned over 30 years within the Health Service.

He had a wide experience of all types of health care having held appointments in Acute, Psychiatric and Mentally Handicapped hospitals. He gained a vast amount of engineering knowledge whilst serving with the Royal Engineers as Warrant Officer and first joined the NHS as an engineering fitter.

His first step into management was as an Assistant Engineer at the Central

Hospital, Warwick. He later became Hospital Engineer at the Warnefield Hospital, Leamington Spa and was involved in vast improvements to its services during his appointment, spanning ten years. In the early 'sixties he was appointed as Group Engineer to *Coleshill Hospital Management Committee* at Marston Green, a large Hospital Group for the mentally subnormal. Here again he was actively involved in substantial replacements and improvements both with engineering and building services.

In 1965 he was appointed to Southampton Hospital Management Committee as Group Enginer. Southampton HMC was an Acute group of hospitals which was just about to undergo a major development programme.

He soon established himself in the Wessex Region and became involved in many working parties. He was a member of the Wessex Regional Working Party which investigated and eventually established a Medical Electronic Maintenance Section within engineering departments throughout the Region, the first being established at Southampton.

Wally was deeply interested in training and as a member of the Wessex Region's Group Engineers' Association was involved with other colleagues in producing a Regional Training Programme for Assistant Engineers.

In 1975, following the re-organisation of the Health Service, he was appointed District Works Officer to Southampton and South West Hampshire Health District, a district which had become a Teaching District by the setting-up of the newly formed Medical School linked with Southampton University.

During his service in the NHS, he had been a very active member of the Institute. For many years he was not only a committee member but was also secretary of the Midland Branch, and had organised on more than one occasion the five branch meeting at *Oxford. Following his transfer* to the Southern Branch he had been a branch committee member for 13 years and had been elected to both Vice-Chairman and Branch Chairman during that time. He actively supported Institute conferences, seminars and symposiums and within the Southern Branch had given service on the Technical Sub Committee, organising programmes and presenting papers himself at Branch meetings.

In 1974 he received due recognition and was awarded Corporate Membership of the Institute of Mechanical Engineers.

Wally Whiffin will be remembered by his colleagues, both young and old, as an individual who had worked continuously to achieve the best works services possible from limited resources, in order to provide patients in hospitals with safety and comfort during their period of treatment. He had also striven to give to others the benefits of his own personal knowledge and experience throughout his distinguished career. He will be remembered as a man whose first priorities, at work and play no matter where he was or what he did, were care and concern for all others.

He will be sadly missed both by the Health Service and by the Institute.

Mr A. Round

Mr Round, who became Chairman of the Southern Branch earlier this year has been appointed District Works Officer to the East Birmingham Health District. This is a return to a previous 'stamping ground' and Mr Round was then active in the Institute's affairs, so that the Southern Branch's loss will be the Midland Branch's gain.

Airport Visit

In the evening of Friday, October 20, 1978 a few members from the North Western branch visited the Control Tower complex and Manchester Airport. This was a most interesting and fascinating visit which was thoroughly enjoyed by all who attended.

The members had the radio transmission, airfield lighting, radio, recording and computer equipment shown and explained, and some equipment was demonstrated to them. They were able to track aircraft within a fifty-mile radius, finally going into the control tower to see for themselves the same aircraft being talked down and landing.

It is hoped that a further visit can be arranged for members who wished to go, but had to be refused due to restricted numbers.

J. SUNDERLAND

East Anglian Branch

The September meeting was held at Fulbourn Hospital, Cambridge. The subject of the meeting was a talk on 'Corrosion Problems in Steam Condensate Lines' presented by Mr D. J. Evans BSc MSc DHSS Engineer, ably assisted by Mr R. G. Freestone and Mr K. Allison, followed by a lively discussion.

At the November meeting, held at Norfolk and Norwich Hospital, Mr L. G. Banks and Mr C. P. le Breton gave a talk on 'Energy Conservation in Hospital Kitchens'.

The practical approach to energy conservation was emphasised and supported by a great deal of valuable data. Following the talk a tour of the hospital kitchen allowed members to observe the problem, see the main areas of wastage and discuss some of the difficulties with catering staff.

Building Construction Forum Calendar of Events

Tuesday, January 16, 1979 at 6 pm — Joint BCF/BNES Meeting. 'Civil Construction on Nuclear Power Stations' to be introduced by Messrs R. H. England and N. O. E. Lakin (Taylor Woodrow Construction Ltd).

Thursday, March 1, 1979 at 6 pm. 'Telecommunications for the Future.'

Thursday, May 15, 1979 at 6 pm. Annual General Meeting followed by 'Airships for Heavy Lifts.'

Wednesday, October 10, 1979 at 10 am. (One-Day Seminar). 'Building Regulations and Development — are they relevant to present day problems?'

Monday, November 19, 1979 at 6 pm. 'Post-war Innovation of Building Materials — success or disaster?'

Wednesday, January 16, 1980 at 6 pm. — Joint BCF/IQS Meeting. 'Terotechnology and Cost in Use.'

Thursday, March 6, 1980 at 10 am. (One-Day Seminar). 'Lifts, escalators and paternosters.'

Monday, May 19, 1980 at 6 pm. Annual General Meeting followed by Joint BCF/CBI Meeting on 'Materials and Fittings — manufacturers liability.'

Further details are obtainable from J. G. Watson at the Institution of Civil Engineers, 1–7 Great George Street, Westminster, London SW1P 3AA. Tel. 01-839 3611.

John McCullough Retires

John McCullough has retired from his post as Engineer at the Mater Infirmorum Hospital, Belfast, after a proud record of 48 years' service and our good wishes go with him in his retirement.

William Nicholas of Glasgow is to retire early in 1979. He was one of

the very early members of the Institute and it is hoped that he will continue to join erstwhile colleagues at Branch meetings.

D. P. Smith of Kilmacolm, Renfrewshire, retired in June. Mr Smith is another member of long standing to whom best wishes go for a happy retirement'.

Wanted – Help for the Disabled

Help and advice is wanted on the production of a prototype portable light tubular alloy wheelchair, with a view to possible production on a commercial basis. Ideas/comments, technical or otherwise, to: Dr J. P. Furness, 21 The Green, Brompton, Northallerton, North Yorkshire.

UK Mechanical Health Monitoring Group Seminars

The MHMG have arranged the following seminars to be held in the New Year.

Tuesday, January 23, 1979. 'Vibration Monitoring' — percepts and case studies.

Wednesday, January 24, 1979. 'Bearings and Gears' — defect identification and monitoring.

Thursday, January 25, 1979. 'Surface Defect and Wear Monitoring'.

Further details from UKMGH Ltd, 92 London Road, Leicester LE2 0QR. Tel Leicester (0533) 544210.

Letter to the Editor

NHS poaching staff?

Sir,

The President of the Heating and Ventilating Contractors Association, Alfred Manly, has recently criticised Government departments (including the NHS) for 'poaching' labour from the industry without bearing their full share of training.

Mr Manly claims that a recent survey carried out by the HVCA confirms the fact that the present Government policies are contradictory, in the sense that craft wage rates are being held down within the industry, which is dutifully training young people at considerable expense, whilst the public sector is allowed to pay higher rates and so attract away the newly trained.

Mr Manly is perfectly correct in his claim that not enough training is done within certain parts of the public sector and one has only to look at craftsmen working in NHS hospitals as witness to this.

Would not a survey carried out nationally reveal that only a very small proportion of NHS craftsmen are trained through apprenticeship schemes within the service.

Mr Manly has said that employers of H & V labour (including Government departments) should have one craft apprentice for every three craftsmen, and one student apprentice for every four to five technicians and technician engineers.

These are bold statements, but it must be perfectly clear to anyone looking at the problems of recruitment and the questionable quality of craftsmen trained outside our industry, that these ratios probably represent the minimum-levels situation.

A great deal has been done over the past ten years or so within the NHS and we owe much to those who had the foresight and the grit to carry through the Falfield project.

Is this not, however, just the foundation from which we must consolidate and properly establish Regional training schemes which truly reflect the enormous demand for highly skilled craftsmen and technicians.

Ultimately, it must be recognised that changes in our strategy can only come about with the necessary revenue investment, but we must try to persuade those who hold the purse strings that it is as important to invest in Works training schemes as it is in medical, nursing and administrative schemes.

Mr Manly is reported to have asked the President of the CIBS to appeal to 'non-contractors' to bear their share of the burden of training, and this appeal will, without doubt, be taken 'on board'.

Should we not, in return, seek to persuade Mr. Manly, and the contractors his Association represents, that it is simply not sufficient to bandy around numbers when deciding training policies, but to examine carefully the need to improve the quality of training at all levels, in order to meet the increasing technical and managerial demands placed on all of us both in the public and private sectors.

Yours faithfully,

JAMES F. SANCROFT,
District Works Officer,
North East District (Teaching)
Kensington & Chelsea &
Westminster AHA (T)

ICUs – safety and comfort

Dear Sir,

In the International Federation Issue of your journal *Hospital Engineering* No 26, June 1978, page 3 found the letter of Mr A. A. Al-Abdulla, President of the Iraq State Organisation of Buildings, regarding my paper 'Common Mistakes in Planning Intensive Care Units'. May I reply to this as follows:

a. Magnetic Fields:

To block the demand circuit of a demand pacemaker, or to introduce interference in ECG recordings, only 20 Milligauss of magnetic field are necessary, as our own experimental work has demonstrated. Such weak fields can easily be found outside even metal-encased chokes (we found, at least in the USA, that the encasing of chokes in fluorescent lamps is mostly made of plastic) if such encasings are not well grounded. One way of eliminating such stray fields would be to install the choke outside the room.

b. Colour Distortion:

While it is correct that in such locations colour-corrected daylight lamps are generally installed, it is equally true — at least in our experience — that these special lamps are usually replaced with anything at hand once they burn out, since the purpose for such special lamps is generally not known or understood by the maintenance electrician nor by the staff of the ICU. The colour distortion caused by incandescent lamps is, we have found, far less misleading than the distortion caused by the wrong type of fluorescent replacement.

c. Light Flicker:

As we had mentioned in the original paper, we have taken time-lapse movie pictures of the human eye exposed to flourescent light and found that the eye responded accordingly.

While the flicker is less disturbing with twin tube fittings, provided these are connected to opposing phases, the

flicker is still clearly recognisable in these films, ie it is definitely not completely eliminated, even if tubes with special coatings or fillings are used.

May I take this opportunity to thank Mr. Al-Abdulla for his remarks which I regard as a positive contribution to fact-finding discussions without which scientific achievements would be not possible.

Yours sincerely,

Prof HANS A. von der MOSEL,
Director of MEC

International Federation News

I.F.H.E.

21st International Hospital Congress, Oslo June 24-29, 1979

The 21st International Hospital Congress is to be held at the University of Oslo, Norway, between 24–29 June, 1979, in collaboration with the Norwegian Hospital Association. Further details will be circulated to all IHF members in due course. Meanwhile, the Programme Committee for the Congress has decided that the following main discussion group themes should be included in the Congress programme:

Accident and emergency services;
Cost containment and quality control;
Care of the child;
Health care staffing in developing countries;
Hospital design — integration of engineering services.

For each of these main discussion groups there will be two half-day sessions with simultaneous translation in the three official languages of the Congress — English, French and Spanish. At each of these sessions it is proposed that there should be two main speakers giving introductory papers lasting 20–25 minutes each; this will leave about 90 minutes at each half-day session for further short contributions and discussion.

The President of the International Federation, Eduardo Caetano, will be chairman of the technical session.

The Programme Committee will select the two main speakers for each session. But in order to encourage as much participation as possible from those attending the Congress, the Committee will be glad to hear from other individuals interested in presenting short papers (about 10 minutes, 1,000 words, or less), particularly in relation to the planning and management aspects of the five main themes. The Committee will then decide which of these short papers can be accepted for presentation at the Congress, either in one of the main plenary multi-language sessions, or in a smaller single-language follow-up session. For these short presentations, the Committee will be particularly interested to hear of innovations, developments, research studies or demonstration projects that the speaker thinks other countries could usefully study, adopt, adapt, or argue about.

Further information may be obtained from Mr Miles Hardie at the IHF, 126 Albert Street, London NW1 7NX, England.

6th Congress of the International Federation Washington 1980

The Council of IFHE have decided to hold the 6th Congress of the Federation in Washington, USA.

A Congress Committee has been established and it is now confirmed that the Congress will be held at the Sheraton Washington Hotel from July 7 to 11, 1980.

The Committee have also decided that the following subjects will be addressed:

Hospital Planning and Construction;
Hospital Engineering Services and Systems;
Safety, Environment and Infection Control;
Plant Equipment and Maintenance;
Telecommunications in Health Care;
Hospital — Medical Instrumentation Management (Clinical Engineering);
Energy Systems and Conservation;
Managing the Engineering Functions (Hospital Engineering Administration).

During the next few weeks the Committee will be sending out announcements requesting abstracts for papers on the above topics which will probably take the form of a detailed summary of approximately 300 words or a full paper to be submitted in duplicate prior to June 1, 1979.

The summary (abstracts) should be sent to Judy Fowlkes, Social Director, American Society of Hospital Engineering, 840 North Lake Shore Drive, Chicago, Illinois 60611, Tel. (312) 645 9440.

Future Meeting of IFHE Council

Arrangements are now being made for the next meeting of Council to be held in Holland, probably on April 8, 1979.

Letter from the President

This letter was sent by the President of the IFHE, Eduardo Cætano, to all the members of the IFHE Council concerning the international issues of the journal.

Dear Colleague,

As you know, the present situation of the International Issues of the Journal is a matter of concern for the IFHE.

This subject has been examined in the course of the Council Meeting in Lisbon, and a Committee set up to further study the theme within a broader scope of the problems of 'Communication' among us.

Meanwhile, the Council has already taken some decisions on the matter and I have been asked to relate them to all members.

1. I am fully confident that (as decided at the meeting) your National Association feels resolved, and is willing and ready, to send for publication in the Journal:

a. **news-letters** (however short) on your Association's activities and the corresponding programmes;
b. **papers** presented at your Conferences and Seminars, that may be of interest to hospital engineers in other countries;
c. a very brief **information** on technical articles and books published in your country (even a simple bibliographical mention).

2. A practical way towards the compliance with these resolutions is the proposed nomination of a **correspondent for the Journal** by each National Association. This is, of course, a very important step and I am sure that the General Secretary is going to hear from you soon about such nomination on the part of your Association.

3. At the Council's request, the rep-

resentatives of National Associations in the Council are invited to take immediate practical steps within their organisations to promote the production by individual members, or teams, of technical articles for the Journal. It might be emphasised that the publication ensures an almost world-wide distribution of their contributions.

4. The representatives, in their own Association's Councils and Assemblies, are also kindly invited to devise particular ways and means, and **to take appropriate action,** to support an effort to subscribe a number of copies of the Journal proportionate to the number of your national associates.

The decision to publish the International Issues in bilingual form (English and French) should, in many cases, powerfully contribute to the success of such efforts.

I must also recall an interesting suggestion of the Institute of Hospital Engineering, of the UK, towards improving the financial situation of the Journal. It seems important to me, that we should want to break the vicious circle of 'limited means of the Journal → limited number of subscriptions → limited number of copies → limited means of the Journal → limited number . . .'

In fact, our Journal travels to well over thirty countries. This wide distribution among professional men of Hospital Engineering throughout the world should encourage advertisements from member countries (and elsewhere).

This being so, National Associations are invited to establish and send to the General Secretary — or directly to Mr Ashton — a list of names and addresses of major companies in the 'Hospital field' in their countries, so that the publisher may contact them with a view to advertising in the Journal.

If there are such companies in your country, I earnestly hope that, pretty soon, YOU will do something about it, and about the other items in this letter. Then we'll all have helped to change the situation of the Journal for the better.

However, if any of the suggested steps does not seem practical in your case, for whatever reason, PLEASE write your suggestions to us.

That, too, shall be a sign of lively collaboration.

Best wishes,

E. A. CAETANO,
The President

Fifth International Congress of Hospital Engineering

Lisbon, May 28 - June 2, 1978

The last International Federation issue of Hospital Engineering *in September, contained a brief first report of the Lisbon Congress, since there was not enough time to prepare full coverage. We are therefore delighted to devote substantially the whole of this issue to the Congress, and to print several of the papers given there. More will appear in our next International Federation issue, in March 1979. Every effort is being made to publish French translations of the synopses of the papers, and in one case the paper (by Jean Swetchine on pages 19 to 21) has been reprinted in its original language.*

See pages 24-25 for a full report on the 12th Meeting of the International Federation Council, which was held during the Congress.

Hospital Engineering *is pleased to be the means of communication between health care engineers in more than thirty countries, and fully supports the President of the Federation, Eduardo Caetano, in his efforts to improve the content, and therefore the communication value, of the Journal.*

CHRISTOPHER TANOUS, *Editor.*

The 5th International Congress of Hospital Engineering was held in Lisbon, Portugal, from May 28 to June 2, 1978.

The Gulbenkian Foundation building in Lisbon, with its support facilities, created an excellent atmosphere as the venue for the Congress. The Portugese Government, its Ministers and Officers together with the Organising Committee of the IFHE are to be congratulated on their efforts to ensure success of the Congress.

It is understood that during the Lisbon Congress the Council of the International Federation made a significant decision to enter the field of formal training and education in those specialist subject areas of hospital engineering which are of common interest and demand throughout the world. This is an important development which will be reported in detail in future issues of *Hospital Engineering.*

The Congress was attended by more than 1,000 delegates from thirty countries and this in itself is a measure of its success and increasing recognition given to the work of the International Federation.

The 6th International Congress of Hospital Engineering will be held during 1980 in the USA, probably in the Washington or Baltimore area.

Our thanks and appreciation were expressed to the immediate past president, Monsieur Jacques Ponthieux of France for his valuable work in the development of the IFHE during his years of office.

Mots d'Ouverture

Mesdames et Messieurs,

Nous saluons, en vous souhaitant la bienvenue, tous les participants et accompagnants qui, du Monde entier, êtes venus à Lisbonne pour prendre part aux travaux du V ème Congrès International d'Ingénierie Hospitalière.

Nous remercions les congressistes qui présentent des exposés pour leur participation active, si importante comme apport à la valeur et au succès de ce Congrès.

Nous voulons remercier, aussi, pour leurs importantes collaborations, les Services officiels suivants: Secretaria-Geral et Direcçao-Geral dos Hospitais (MAS); Direcçao-Geral das Construçoes Hospitalares (MHOP); Direcçao-Geral do Turismo (MCT); Instituto Nacional da Investigaçao Científica (MEC) et Câmara Municipal de Lisboa.

Nous remercions encore la Fondation Calouste Gulbenkian qui nous a permis l'utilisation de ses installations magnifiques.

Nous voulons remercier également la Presse, la Radio et la Télévision pour la couverture du V ème Congrès, et, finalement, tous ceux qui nous ont donné leur collaboration désintéressée et dévouée.

À tous, au nom du Comité d'Organ-

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Course Members at the Intermediate Course in July felt they would like to mark the connection of Keele and Falfield in some way, and at the same time to pay some form of tribute to the Principal and staff of the Centre for their co-operation and understanding in helping to establish the Keele Courses at Falfield.

To this end it was decided that the 1978 Intermediate Course should inaugurate a set of Regalia, by presenting the first pieces comprising three fine silver 'three candle candelabra'. These were presented to the Chief Engineer, Mr T. A. Nicholls, at the course dinner for safe keeping at the Centre. It was suggested that future courses might wish to contribute to the Regalia, which should be known as the 'Keele/Falfield Regalia'.

This wish was soon followed by the Advanced Course in September making a similar contribution, but this time comprising two silver 'five candle candelabra'. It will be of particular interest to members to hear that Mr J. R. Harrison, President of the Institute, who attended both courses, also very generously presented a silver 'five candle candelabrum' in the name of the Institute of Hospital Engineering. The Tutorial Panel, together with staff from the Department who were connected with the courses added their contribution of a handsome walnut wood gavel.

All three presentations were made at the course dinner in September, to Mr John Bolton, Director General of Works, for safe keeping with the other items. The Regalia now comprises nine separate pieces made up as follows:—

3 Silver Candelabra (three candle pieces): Intermediate Course, 1978.
2 Silver Candelabra (five candle pieces): Advanced Course, 1978.
1 Silver Candelabra (five candle piece): J. R. Harrison, 1978.
1 Walnut Gavel: Tutorial Staff, 1978.
1 1974 Keele Challenge Cup: Intermediate Course, 1974.
1 Shield for the Most Improved Speaker of the Week: M. J. Burke, 1977.

When a suitable position has been found at Falfield, the various pieces will be labelled and put on display.

It is to be hoped that the inauguration of the 'Keele/Falfield Regalia' will not only enhance the course dinners and other functions, but will also strengthen the bonds between the Department and the Institute, which has always been one of the underlying factors in the Keele Courses.

The 1979 courses have now been fixed for:—

Intermediate Course: July 8 to 13.
Advanced Course: September 16 to 21.

Since both these courses were oversubscribed in 1978, early application is advised. Further information may be obtained from the Principal, Hospital Engineering Centre, Eastwood Park, Falfield, Wotton-under-Edge, Gloucestershire GL12 8DA.

Mr W. A. J. Whiffin

It is with deep regret that we have to report the sudden death of Mr W. A. J. Whiffin (Wally), who passed away on October 16, 1978, at the age of 58 years. He leaves a wife and two married daughters. Mr Whiffin's most recent post was that of District Works Officer to Southampton and South West Hampshire Health District (Teaching).

Wally Whiffin.

Wally Whiffin's career had spanned over 30 years within the Health Service.

He had a wide experience of all types of health care having held appointments in Acute, Psychiatric and Mentally Handicapped hospitals. He gained a vast amount of engineering knowledge whilst serving with the Royal Engineers as Warrant Officer and first joined the NHS as an engineering fitter.

His first step into management was as an Assistant Engineer at the Central

Hospital, Warwick. He later became Hospital Engineer at the Warnefield Hospital, Leamington Spa and was involved in vast improvements to its services during his appointment, spanning ten years. In the early 'sixties he was appointed as Group Engineer to Coleshill Hospital Management Committee at Marston Green, a large Hospital Group for the mentally subnormal. Here again he was actively involved in substantial replacements and improvements both with engineering and building services.

In 1965 he was appointed to Southampton Hospital Management Committee as Group Enginer. Southampton HMC was an Acute group of hospitals which was just about to undergo a major development programme.

He soon established himself in the Wessex Region and became involved in many working parties. He was a member of the Wessex Regional Working Party which investigated and eventually established a Medical Electronic Maintenance Section within engineering departments throughout the Region, the first being established at Southampton.

Wally was deeply interested in training and as a member of the Wessex Region's Group Engineers' Association was involved with other colleagues in producing a Regional Training Programme for Assistant Engineers.

In 1975, following the re-organisation of the Health Service, he was appointed District Works Officer to Southampton and South West Hampshire Health District, a district which had become a Teaching District by the setting-up of the newly formed Medical School linked with Southampton University.

During his service in the NHS, he had been a very active member of the Institute. For many years he was not only a committee member but was also secretary of the Midland Branch, and had organised on more than one occasion the five branch meeting at Oxford. Following his transfer to the Southern Branch he had been a branch committee member for 13 years and had been elected to both Vice-Chairman and Branch Chairman during that time. He actively supported Institute conferences, seminars and symposiums and within the Southern Branch had given service on the Technical Sub Committee, organising programmes and presenting papers himself at Branch meetings.

In 1974 he received due recognition and was awarded Corporate Membership of the Institute of Mechanical Engineers.

Wally Whiffin will be remembered by his colleagues, both young and old, as an individual who had worked continuously to achieve the best works services possible from limited resources, in order to provide patients in hospitals with safety and comfort during their period of treatment. He had also striven to give to others the benefits of his own personal knowledge and experience throughout his distinguished career. He will be remembered as a man whose first priorities, at work and play no matter where he was or what he did, were care and concern for all others.

He will be sadly missed both by the Health Service and by the Institute.

Mr A. Round

Mr Round, who became Chairman of the Southern Branch earlier this year has been appointed District Works Officer to the East Birmingham Health District. This is a return to a previous 'stamping ground' and Mr Round was then active in the Institute's affairs, so that the Southern Branch's loss will be the Midland Branch's gain.

Airport Visit

In the evening of Friday, October 20, 1978 a few members from the North Western branch visited the Control Tower complex and Manchester Airport. This was a most interesting and fascinating visit which was thoroughly enjoyed by all who attended.

The members had the radio transmission, airfield lighting, radio, recording and computer equipment shown and explained, and some equipment was demonstrated to them. They were able to track aircraft within a fifty-mile radius, finally going into the control tower to see for themselves the same aircraft being talked down and landing.

It is hoped that a further visit can be arranged for members who wished to go, but had to be refused due to restricted numbers.

J. SUNDERLAND

East Anglian Branch

The September meeting was held at Fulbourn Hospital, Cambridge. The subject of the meeting was a talk on 'Corrosion Problems in Steam Condensate Lines' presented by Mr D. J. Evans BSc MSc DHSS Engineer, ably assisted by Mr R. G. Freestone and Mr K. Allison, followed by a lively discussion.

At the November meeting, held at Norfolk and Norwich Hospital, Mr L. G. Banks and Mr C. P. le Breton gave a talk on 'Energy Conservation in Hospital Kitchens'.

The practical approach to energy conservation was emphasised and supported by a great deal of valuable data. Following the talk a tour of the hospital kitchen allowed members to observe the problem, see the main areas of wastage and discuss some of the difficulties with catering staff.

Building Construction Forum Calendar of Events

Tuesday, January 16, 1979 at 6 pm — Joint BCF/BNES Meeting. 'Civil Construction on Nuclear Power Stations' to be introduced by Messrs R. H. England and N. O. E. Lakin (Taylor Woodrow Construction Ltd).

Thursday, March 1, 1979 at 6 pm. 'Telecommunications for the Future.'

Thursday, May 15, 1979 at 6 pm. Annual General Meeting followed by 'Airships for Heavy Lifts.'

Wednesday, October 10, 1979 at 10 am. (One-Day Seminar). 'Building Regulations and Development — are they relevant to present day problems?'

Monday, November 19, 1979 at 6 pm. 'Post-war Innovation of Building Materials — success or disaster?'

Wednesday, January 16, 1980 at 6 pm. — Joint BCF/IQS Meeting. 'Terotechnology and Cost in Use.'

Thursday, March 6, 1980 at 10 am. (One-Day Seminar). 'Lifts, escalators and paternosters.'

Monday, May 19, 1980 at 6 pm. Annual General Meeting followed by Joint BCF/CBI Meeting on 'Materials and Fittings — manufacturers liability.'

Further details are obtainable from J. G. Watson at the Institution of Civil Engineers, 1–7 Great George Street, Westminster, London SW1P 3AA. Tel. 01-839 3611.

John McCullough Retires

John McCullough has retired from his post as Engineer at the Mater Infirmorum Hospital, Belfast, after a proud record of 48 years' service and our good wishes go with him in his retirement.

William Nicholas of Glasgow is to retire early in 1979. He was one of

the very early members of the Institute and it is hoped that he will continue to join erstwhile colleagues at Branch meetings.

D. P. Smith of Kilmacolm, Renfrewshire, retired in June. Mr Smith is another member of long standing to whom best wishes go for a happy retirement'.

Wanted – Help for the Disabled

Help and advice is wanted on the production of a prototype portable light tubular alloy wheelchair, with a view to possible production on a commercial basis. Ideas/comments, technical or otherwise, to: Dr J. P. Furness, 21 The Green, Brompton, Northallerton, North Yorkshire.

UK Mechanical Health Monitoring Group Seminars

The MHMG have arranged the following seminars to be held in the New Year.

Tuesday, January 23, 1979. 'Vibration Monitoring' — percepts and case studies.

Wednesday, January 24, 1979. 'Bearings and Gears' — defect identification and monitoring.

Thursday, January 25, 1979. 'Surface Defect and Wear Monitoring'.

Further details from UKMGH Ltd, 92 London Road, Leicester LE2 0QR. Tel Leicester (0533) 544210.

Letter to the Editor

NHS poaching staff?

Sir,

The President of the Heating and Ventilating Contractors Association, Alfred Manly, has recently criticised Government departments (including the NHS) for 'poaching' labour from the industry without bearing their full share of training.

Mr Manly claims that a recent survey carried out by the HVCA confirms the fact that the present Government policies are contradictory, in the sense that craft wage rates are being held down within the industry, which is dutifully training young people at considerable expense, whilst the public sector is allowed to pay higher rates and so attract away the newly trained.

Mr Manly is perfectly correct in his claim that not enough training is done within certain parts of the public sector and one has only to look at craftsmen working in NHS hospitals as witness to this.

Would not a survey carried out nationally reveal that only a very small proportion of NHS craftsmen are trained through apprenticeship schemes within the service.

Mr Manly has said that employers of H & V labour (including Government departments) should have one craft apprentice for every three craftsmen, and one student apprentice for every four to five technicians and technician engineers.

These are bold statements, but it must be perfectly clear to anyone looking at the problems of recruitment and the questionable quality of craftsmen trained outside our industry, that these ratios probably represent the minimum-levels situation.

A great deal has been done over the past ten years or so within the NHS and we owe much to those who had the foresight and the grit to carry through the Falfield project.

Is this not, however, just the foundation from which we must consolidate and properly establish Regional training schemes which truly reflect the enormous demand for highly skilled craftsmen and technicians.

Ultimately, it must be recognised that changes in our strategy can only come about with the necessary revenue investment, but we must try to persuade those who hold the purse strings that it is as important to invest in Works training schemes as it is in medical, nursing and administrative schemes.

Mr Manly is reported to have asked the President of the CIBS to appeal to 'non-contractors' to bear their share of the burden of training, and this appeal will, without doubt, be taken 'on board'.

Should we not, in return, seek to persuade Mr. Manly, and the contractors his Association represents, that it is simply not sufficient to bandy around numbers when deciding training policies, but to examine carefully the need to improve the quality of training at all levels, in order to meet the increasing technical and managerial demands placed on all of us both in the public and private sectors.

Yours faithfully,

JAMES F. SANCROFT,
District Works Officer,
North East District (Teaching)
Kensington & Chelsea &
Westminster AHA (T)

ICUs – safety and comfort

Dear Sir,

In the International Federation Issue of your journal *Hospital Engineering* No 26, June 1978, page 3 found the letter of Mr A. A. Al-Abdulla, President of the Iraq State Organisation of Buildings, regarding my paper 'Common Mistakes in Planning Intensive Care Units'. May I reply to this as follows:

a. Magnetic Fields:

To block the demand circuit of a demand pacemaker, or to introduce interference in ECG recordings, only 20 Milligauss of magnetic field are necessary, as our own experimental work has demonstrated. Such weak fields can easily be found outside even metal-encased chokes (we found, at least in the USA, that the encasing of chokes in fluorescent lamps is mostly made of plastic) if such encasings are not well grounded. One way of eliminating such stray fields would be to install the choke outside the room.

b. Colour Distortion:

While it is correct that in such locations colour-corrected daylight lamps are generally installed, it is equally true — at least in our experience — that these special lamps are usually replaced with anything at hand once they burn out, since the purpose for such special lamps is generally not known or understood by the maintenance electrician nor by the staff of the ICU. The colour distortion caused by incandescent lamps is, we have found, far less misleading than the distortion caused by the wrong type of fluorescent replacement.

c. Light Flicker:

As we had mentioned in the original paper, we have taken time-lapse movie pictures of the human eye exposed to flourescent light and found that the eye responded accordingly.

While the flicker is less disturbing with twin tube fittings, provided these are connected to opposing phases, the

flicker is still clearly recognisable in these films, ie it is definitely not completely eliminated, even if tubes with special coatings or fillings are used.

May I take this opportunity to thank Mr. Al-Abdulla for his remarks which I regard as a positive contribution to fact-finding discussions without which scientific achievements would be not possible.

Yours sincerely,

Prof HANS A. von der MOSEL,
Director of MEC

International Federation News

I.F.H.E.

21st International Hospital Congress, Oslo June 24-29, 1979

The 21st International Hospital Congress is to be held at the University of Oslo, Norway, between 24–29 June, 1979, in collaboration with the Norwegian Hospital Association. Further details will be circulated to all IHF members in due course. Meanwhile, the Programme Committee for the Congress has decided that the following main discussion group themes should be included in the Congress programme:

Accident and emergency services;
Cost containment and quality control;
Care of the child;
Health care staffing in developing countries;
Hospital design — integration of engineering services.

For each of these main discussion groups there will be two half-day sessions with simultaneous translation in the three official languages of the Congress — English, French and Spanish. At each of these sessions it is proposed that there should be two main speakers giving introductory papers lasting 20–25 minutes each; this will leave about 90 minutes at each half-day session for further short contributions and discussion.

The President of the International Federation, Eduardo Caetano, will be chairman of the technical session.

The Programme Committee will select the two main speakers for each session. But in order to encourage as much participation as possible from those attending the Congress, the Committee will be glad to hear from other individuals interested in presenting short papers (about 10 minutes, 1,000 words, or less), particularly in relation to the planning and management aspects of the five main themes. The Committee will then decide which of these short papers can be accepted for presentation at the Congress, either in one of the main plenary multi-language sessions, or in a smaller single-language follow-up session. For these short presentations, the Committee will be particularly interested to hear of innovations, developments, research studies or demonstration projects that the speaker thinks other countries could usefully study, adopt, adapt, or argue about.

Further information may be obtained from Mr Miles Hardie at the IHF, 126 Albert Street, London NW1 7NX, England.

6th Congress of the International Federation Washington 1980

The Council of IFHE have decided to hold the 6th Congress of the Federation in Washington, USA.

A Congress Committee has been established and it is now confirmed that the Congress will be held at the Sheraton Washington Hotel from July 7 to 11, 1980.

The Committee have also decided that the following subjects will be addressed:

Hospital Planning and Construction;
Hospital Engineering Services and Systems;
Safety, Environment and Infection Control;
Plant Equipment and Maintenance;
Telecommunications in Health Care;
Hospital — Medical Instrumentation Management (Clinical Engineering);
Energy Systems and Conservation;
Managing the Engineering Functions (Hospital Engineering Administration).

During the next few weeks the Committee will be sending out announcements requesting abstracts for papers on the above topics which will probably take the form of a detailed summary of approximately 300 words or a full paper to be submitted in duplicate prior to June 1, 1979.

The summary (abstracts) should be sent to Judy Fowlkes, Social Director, American Society of Hospital Engineering, 840 North Lake Shore Drive, Chicago, Illinois 60611. Tel. (312) 645 9440.

Future Meeting of IFHE Council

Arrangements are now being made for the next meeting of Council to be held in Holland, probably on April 8, 1979.

Letter from the President

This letter was sent by the President of the IFHE, Eduardo Cætano, to all the members of the IFHE Council concerning the international issues of the journal.

Dear Colleague,

As you know, the present situation of the International Issues of the Journal is a matter of concern for the IFHE.

This subject has been examined in the course of the Council Meeting in Lisbon, and a Committee set up to further study the theme within a broader scope of the problems of 'Communication' among us.

Meanwhile, the Council has already taken some decisions on the matter and I have been asked to relate them to all members.

1. I am fully confident that (as decided at the meeting) your National Association feels resolved, and is willing and ready, to send for publication in the Journal:

a. **news-letters** (however short) on your Association's activities and the corresponding programmes;

b. **papers** presented at your Conferences and Seminars, that may be of interest to hospital engineers in other countries;

c. a very brief **information** on technical articles and books published in your country (even a simple bibliographical mention).

2. A practical way towards the compliance with these resolutions is the proposed nomination of a **correspondent for the Journal** by each National Association. This is, of course, a very important step and I am sure that the General Secretary is going to hear from you soon about such nomination on the part of your Association.

3. At the Council's request, the rep-

resentatives of National Associations in the Council are invited to take immediate practical steps within their organisations to promote the production by individual members, or teams, of technical articles for the Journal. It might be emphasised that the publication ensures an almost worldwide distribution of their contributions.

4. The representatives, in their own Association's Councils and Assemblies, are also kindly invited to devise particular ways and means, and **to take appropriate action,** to support an effort to subscribe a number of copies of the Journal proportionate to the number of your national associates.

The decision to publish the International Issues in bilingual form (English and French) should, in many cases, powerfully contribute to the success of such efforts.

I must also recall an interesting suggestion of the Institute of Hospital Engineering, of the UK, towards improving the financial situation of the Journal. It seems important to me, that we should want to break the vicious circle of 'limited means of the Journal → limited number of subscriptions → limited number of copies → limited means of the Journal → limited number . . .'

In fact, our Journal travels to well over thirty countries. This wide distribution among professional men of Hospital Engineering throughout the world should encourage advertisements from member countries (and elsewhere).

This being so, National Associations are invited to establish and send to the General Secretary — or directly to Mr Ashton — a list of names and addresses of major companies in the 'Hospital field' in their countries, so that the publisher may contact them with a view to advertising in the Journal.

If there are such companies in your country, I earnestly hope that, pretty soon, YOU will do something about it, and about the other items in this letter. Then we'll all have helped to change the situation of the Journal for the better.

However, if any of the suggested steps does not seem practical in your case, for whatever reason, PLEASE write your suggestions to us.

That, too, shall be a sign of lively collaboration.

Best wishes,

E. A. CAETANO,
The President

Fifth International Congress of Hospital Engineering

Lisbon, May 28 - June 2, 1978

The last International Federation issue of Hospital Engineering *in September, contained a brief first report of the Lisbon Congress, since there was not enough time to prepare full coverage. We are therefore delighted to devote substantially the whole of this issue to the Congress, and to print several of the papers given there. More will appear in our next International Federation issue, in March 1979. Every effort is being made to publish French translations of the synopses of the papers, and in one case the paper (by Jean Swetchine on pages 19 to 21) has been reprinted in its original language.*

See pages 24-25 for a full report on the 12th Meeting of the International Federation Council, which was held during the Congress.

Hospital Engineering *is pleased to be the means of communication between health care engineers in more than thirty countries, and fully supports the President of the Federation, Eduardo Caetano, in his efforts to improve the content, and therefore the communication value, of the Journal.*

CHRISTOPHER TANOUS, *Editor.*

The 5th International Congress of Hospital Engineering was held in Lisbon, Portugal, from May 28 to June 2, 1978.

The Gulbenkian Foundation building in Lisbon, with its support facilities, created an excellent atmosphere as the venue for the Congress. The Portugese Government, its Ministers and Officers together with the Organising Committee of the IFHE are to be congratulated on their efforts to ensure success of the Congress.

It is understood that during the Lisbon Congress the Council of the International Federation made a significant decision to enter the field of formal training and education in those specialist subject areas of hospital engineering which are of common interest and demand throughout the world. This is an important development which will be reported in detail in future issues of *Hospital Engineering.*

The Congress was attended by more than 1.000 delegates from thirty countries and this in itself is a measure of its success and increasing recognition given to the work of the International Federation.

The 6th International Congress of Hospital Engineering will be held during 1980 in the USA, probably in the Washington or Baltimore area.

Our thanks and appreciation were expressed to the immediate past president, Monsieur Jacques Ponthieux of France for his valuable work in the development of the IFHE during his years of office.

Mots d'Ouverture

Mesdames et Messieurs,

Nous saluons, en vous souhaitant la bienvenue, tous les participants et accompagnants qui, du Monde entier, êtes venus à Lisbonne pour prendre part aux travaux du V ème Congrès International d'Ingénierie Hospitalière.

Nous remercions les congressistes qui présentent des exposés pour leur participation active, si importante comme apport à la valeur et au succès de ce Congrès.

Nous voulons remercier, aussi, pour leurs importantes collaborations, les Services officiels suivants: Secretaria-Geral et Direcçao-Geral dos Hospitais (MAS); Direcçao-Geral das Construções Hospitalares (MHOP); Direcçao-Geral do Turismo (MCT); Instituto Nacional da Investigaçao Científica (MEC) et Câmara Municipal de Lisboa.

Nous remercions encore la Fondation Calouste Gulbenkian qui nous a permis l'utilisation de ses installations magnifiques.

Nous voulons remercier également la Presse, la Radio et la Télévision pour la couverture du V ème Congrès, et, finalement, tous ceux qui nous ont donné leur collaboration désintéressée et dévouée.

À tous, au nom du Comité d'Organ-

isation, je dis merci beaucoup.

J'ai le plaisir de vous annoncer que sont avec nous plus de mille congressistes, représentant 28 pays. Nos amis sont venus des pays suivants: Afrique du Sud, Allemagne (Rép. Féd. Allem.), Australie, Autriche, Barbados, Belgique, Brésil, Canada, Egypte, Espagne, Etats-Unis d'Amérique, Finlande, France, Grèce, Hollande, Inde, Iran, Irlande, Israel, Italie, Nigéria, Nouvelle Zélande, Portugal, Royaume-Uni, Suède, Suisse, Yugouslavie, Danemark.

D'autres congressistes encore sont attendus, d'après les inscriptions reçues, quelques uns de pays non indiqués précédemment.

Nous regrettons l'absence de nos collègues des pays de l'Est Européan. Nous estimons que les comparaisons et les débats sur les technologies de l'ingénierie hospitalière employées à l'Ouest et à l'Est seraient utiles à tous.

Nous avons contacté plusieurs fois les ambassades de ces pays à Lisbonne. Ceux qui ont répondu regrettaient qu'aucun représentant ne viendrait au Congrès.

Nous souhaitons que lors des prochains Congrès d'Ingénierie Hospitalière nous pourrons compter sur la présence de ces collègues, pour le profit mutuel.

Ayant en vue le resserrement des liens entre notre Fédération et d'autres organisations techniques et scientifiques internationales du domaine de la santé notamment en liaison avec l'ingénierie hospitalière, nous avons fait quelques invitations. Le Président de la Fédération Internationale des Hôpitaux, par exemple, a regretté ne pas pouvoir nous joindre, comme il l'aurait souhaité, du fait qu'il doit participer au 'Voyage d'Etudes' de la FIH aux Etats-Unis d'Amérique, qui aura lieu précisément les mêmes jours de notre Congrès!

The President, Eduardo Caetano, of Portugal, gives his opening address.

Après Rome, Londres, Athènes et Paris, et avant les EUA où aura lieu le VI ème Congrès International d'Ingénierie Hospitalière, nous sommes a Lisbonne pour communiquer et échanger entre nous nos connaissances, a fin de nous actualiser techniquement et nous enrichir du point de vue humain.

À nos vieux liens d'amitié et de camaraderie d'autres nouveaux se joindront, augmentant ainsi la grande famille de ceux qui travaillent dans l'ingénierie hospitalière.

C'est incontestable que l'importance, absolue et relative, de l'ingénierie hospitalière a augmenté dernièrement de façon considérable et s'accroîtra continûment à un rythme accéléré.

Chaque jour viennent de paraître, et paraîtront, de nouveaux appareils pour sauver des vies et réduire la souffrance humaine. Le futur n'est pas lointain où le monde de la santé sera peuplé de nouveaux et imprévisibles moyens techniques.

À ce moment-là, il sera bien difficile d'établir la frontière entre l'ingénieur de la bio-médicine et le médecin de la bio-ingénierie. Nous nous y trouvons, nous qui travaillons dans l'ingénierie de la santé. C'est pourquoi nous devrons commencer à nous préparer dès maintenant pour relever le défit et le gagner.

Nous, techniciens de l'ingénierie hospitalière, devrons toujors conditionner nos actions par rapport aux trois paramètres basiques: le technique, l'économique et l'humain. Le dernier est le plus important car tout ce que l'on fera dans notre champ d'activité aura des implications sur lui.

C'est pourquoi nous sommes d'accord avec les idéaux du Dr René Sand en ce qui concerne l'équilibre entre le progrès technique et le progrès humain. Autrement, le désiquilibre serait bien pénible pour l'Homme. Dans cette perspective, pour nous, travailleurs de l'ingénierie hospitalière, ça ne veut pas dire grande chose que certains hôpitaux soient appelés les 'meilleurs' hôpitaux du monde (quoiqu'ils soient les plus avancés techniquement) si les coûts en deviennent insurpportables ou si les malades ne s'y sentent pas bien. Ce qui nous intéresse avant tout c'est que les solutions soient les plus efficaces techniquement, économiquement supportables et, particulièrement, appropriés du point de vue humain.

A technical discussion in progress.

Les thèmes des sept séances de travail couvrent pratiquement tout le domaine de l'ingénierie hospitalière. En effet, ils concernent:

La planification hospitalière. La programmation des hôpitaux;
La construction hospitalière moderne;
L'industrie et l'équipement hospitalier;
Les installations techniques à l'hôpital;
La sécurité et le confort à l'hôpital;
La maintenance de l'hôpital;
Les ingénieurs hospitaliers dans l'hôpital. Formation des techniciens hospitaliers.

Il y a des exposés très importants et du plus haut intérêt ainsi que vous aurez l'occasion de constater. Nous vous prions de prendre une part active aux débats. Vos commentaires auront une grande importance. Que ce soit votre accord ou votre discordance, vos doutes ou vos explications, toutes vos interventions seront utiles et enrichiront les séances de travail, car chacun de nous se trouve parmi des collègues et amis, et notre objectif commun est l'amélioration de l'ingénierie hospitalière.

Quelques exposés, sélectionnés, seront publiés dans le journal de la FIIH, le *Hospital Engineering*. Nous devrons promouvoir l'expansion et divulgation de cette publication en faveur de notre Fédération.

Nous souhaitons à tous un bon et fructueux travail et, aussi, un agréable séjour.

Nous seronsheureux de vous aider à résoudre vos difficultés, s'il y en avait.

Nous aimerions que le souvenir que vous emporterez des gens et des choses du Portugal fût plaisant.

Nous voulons que le V ème Congrès soit le cinquième maillon de la chaîne de fraternité qui nous unit, renforçant l'amitié entre nous, qui représentons des peuples différents d'une seule humanité, dans l'accord de notre object commun de bien-faire: aider à sauver des vies et à réduire et alléger la souffrance humaine.

Fifth International Congress of Hospital Engineering

This paper was presented at the Lisbon Congress under the subject title of 'Hospital Engineering Services.' The authors are Hospital Engineers from Portugal.

Harnessing Solar Energy for use in Hospital Buildings

Utilisation de l'Energie Solaire dans les Hôpitaux

J. SALES GRADE and J. HENRIQUE ARANDES

Synopsis/Resumé

Considerations Generales

L'énergie solaire est en général concurrentielle avec d'autres formes d'énergie à partir de 2.000 heures d'insolation par an, pour une latitude inférieure à 45°N. Au Portugal, 97,5% de la surface métropolitaine a une insolation supérieure à celle indiquée. Dans notre pays, la radiation solaire moyenne est à peu près de 1.750 kWh/m2 par an, ou 4,8 kWh/m2 par jour.

Le rendement de captation de l'énergie solaire est de 40 à 50% environ, avec des collecteurs solaires plats en verre simple, et surface d'absortion peinte en noir terne, pour le chauffage d'eau.

Il est possible de dimensioner une installation de mise en valeur de l'énergie solaire pour une économie, relativement à l'énergie totale nécéssaire, à peu près de 60%.

Ces données, et d'autres que nous indiquerons à suivre, nous ont été transmises par le Laboratoire d'Essais Mécaniques de la DGC, dont les techniciens se sont dévoués à l'étude de la mise en valeur de l'énergie solaire dans notre pays, et qui nous ont rendu de bons services pour ce travail.

Aspects Favorables des Etablissements Hospitaliers

Implantation sur le terrain

Les établissements hospitaliers portugais présentent une orientation géographique extrêmement favourable pour la mise en valeur solaire, car les zones d'internement sont en général tournées au midi, le Portugal étant situé à l'hemisphère nord.

La façade la plus longue de l'édifice a, donc, l'orientation sud. En ce qui concerne l'orientation Sud, nous allons indiquer les pourcentages de mise en valeur de l'énergie solaire, pour des collecteurs solaires montés perpendiculairement aux rayons solaires, entre les latitudes de 35° et 40°N:

Sud	100%
Sud ± 20°	97%
Sud ± 30°	92%
Sud ± 45°	78%
Sud ± 60°	65%

Besoins thèrmiques

Les besoins thèrmiques d'un établissement hospitalier sont nombreux, et présentent plusieurs aspects:

Chauffage central;
Thermoventilation;
Climatisation;
Production d'eau chaude sanitaire;
Equipement de stérilisation;
Equipement de cuisine;
Equipement de blanchissage.

En utilisant l'eau comme fluide principal pour le transport de chaleur.

Le dévélopement actuel de la mise en valeur solaire se rapport surtout au chauffage de l'eau. Il est donc facile de l'introduire dans les établissements hospitaliers en plusieurs applications, telles que:

Chauffage direct d'eau chaude de circulation des systèmes de chauffage central, thermoventilation, climatisation et production d'eau chaude sanitaire;

Pré-chauffage de l'eau de compensation de la Centrale Thèrmique.

Refroidissement de l'eau de climatisation à travers de unités du type d'absortion.

Schema Basique de l'Etude Economique

L'économie totale (ET), en valeur actuelle, que l'on obtient avec la mise en valeur solaire, pour une vie moyenne n et une taxe i d'intérêt donnée, est obtenue par l'expression:

$ET = Pee \times C \times a_{\overline{n}|i}$

où,

Pee = Pourcentage moyen annuel d'énergie rendue économique par la mise en valeur solaire, relativement à l'énergie annuelle nécéssaire;
C = Coût de l'unité d'énergie;
E = Energie annuelle nécéssaire;
$a_{\overline{n}|i}$ = Facteur financier (valeur actuelle, par rapport au commencement de la première période d'un rendement entier immédiat, avec n termes unitaires normaux, dont la période est égale à la taxe i).

Le surcoût de la mise en valeur solaire est donné par la différence des premiers investissements des installations avec mise en valeur solaire et simplement conventionnelle.

La viabilité économique de la mise en valeur solaire impose:

ET > Surcoût.

Etude Economique Tres Sommaire

On étudie le cas concrêt d'un Centre de Santé constitué fondamentalé ment par une zone de consultations et une zone d'internement avec 25 lits, en utilisant comme combustible conventionnel, unique, le gaz propane embouteillé.

On applique l'énergie solaire à la production d'eau chaude sanitaire. On fait l'application des valeurs moyens, générales, référés au litre:

Energie annuelle nécéssaire	210×10^3 kWh
Pourcentage de l'énergie économisable	60%
Energie annuelle économisable	$210 \times 10^3 \times 0{,}60 = 126 \times 10^3$ kWh
Radiation solaire annuelle	1.750 kWh/m²
Rendement de mise en valuer	50%
Radiation solaire annuelle économisable	$1.750 \times 0{,}50 = 875$ kWh/m²
Surface d'absortion	$126 \times 10^3 : 875 = 144$ m²
Surcoût estimé	$144 \times 4.000\$00 = 600.000\$00$
Coût du kWh (gaz propane)	$70
Facteur financier (vie moyenne de 20 ans et taxe d'intérêt de 10%)	8,5
Economie totale	$126 \times 10^3 \times \$70 \times 8{,}5 = 750.000\$00$

Donc, en des termes moyens et très généraux, on peut déjà juger de la viabilité économique de la mise en valeur solaire et, surtout, de l'économie de divises qu'elle signifie.

Full paper

Solar energy is usually considered competitive with other forms of energy when there is a minimum of 2,000 hours of sunshine per year, at a latitude of less than 45°N. In Portugal, 97.5% of the country is above this value — the average solar radiation is about 1,750 kWh/m² per year, or 4.8 kWh/m² per day.

The efficiency of solar energy collection is about 40 to 50% for plain solar collectors, constructed from single glass and matt black absorbent surfaces, intended for heating water. It is possible to conceive a sun-powered installation for an economy of about 60% compared to the necessary total energy.

These details were obtained from the Mechanical Testing Laboratory of Fuel General Committee (LEM-DGC), where technicians have long been dedicated to the study of harnessing solar energy in Portugal, and have given us most valuable co-operation in preparing this paper.

The installations using solar energy are already numerous, both abroad and in our country. In France domestic solar water-heating installations are in operation in hundreds of households, offices, schools, nurseries, swimming pools, airports, cinemas. They are also being installed for similar uses in England, Germany, Switzerland, Soviet Union, Israel, South Africa, etc.

In the United States, in 1975 alone, 200,000 m² of solar panels were installed. Just one specialised company manufactures up to 30,000 m² of solar panels per year. Companies manufacturing solar heating equipment number over a hundred — thousands of buildings use solar energy for water-heating.

In Portugal, primarily through the initiative of technicians from LEM-DGC, several solar domestic water heating systems have been installed in schools, colleges, residences, mansions, inns, etc. Recently, designers of Hospital Construction General Direction (DGCH), with the help of technicians from LEM-DGC, concluded a project for solar domestic water heating installations in about ten health centres of 25 beds each. Projects for another three health centres, each of fifty beds, will be starting soon.

Domestic water heating installations by means of solar energy for the District Hospitals of Guimaraes and Beja, each one having around 500 beds, are being planned.

Favourable Aspects in Hospital Buildings

Hospital Site

Portuguese hospital facilities present an extremely favourable geographic position as far as the use of solar energy is concerned, since the internment zones almost always face South (Portugal being in the Northern Hemisphere). The longer building façade, consequently, faces South.

We have already referred to the average characteristics of sunshine hours and solar radiation in our country above. With a Southerly orientation for solar panels mounted perpendicularly to sunlight, between 35° and 40°N latitudes, the percentage reductions in solar energy collection efficiency are as follows:

South	100%
South ± 20°	97%
South ± 30°	92%
South ± 45°	78%
South ± 60°	65%

Heating Needs

The heating needs of a hospital facility are great and present several aspects:

Central heating;

Space heating ventilation;

Air conditioning;
Domestic water heating;
CSSD equipment;
Kitchen equipment;
Laundry equipment;

All of them use water as the main fluid for heat transfer. The present stage of development of solar energy utilisation is aimed, above all, at water heating.

In these circumstances, it is easy to utilise solar energy for several purposes in hospital buildings, such as:

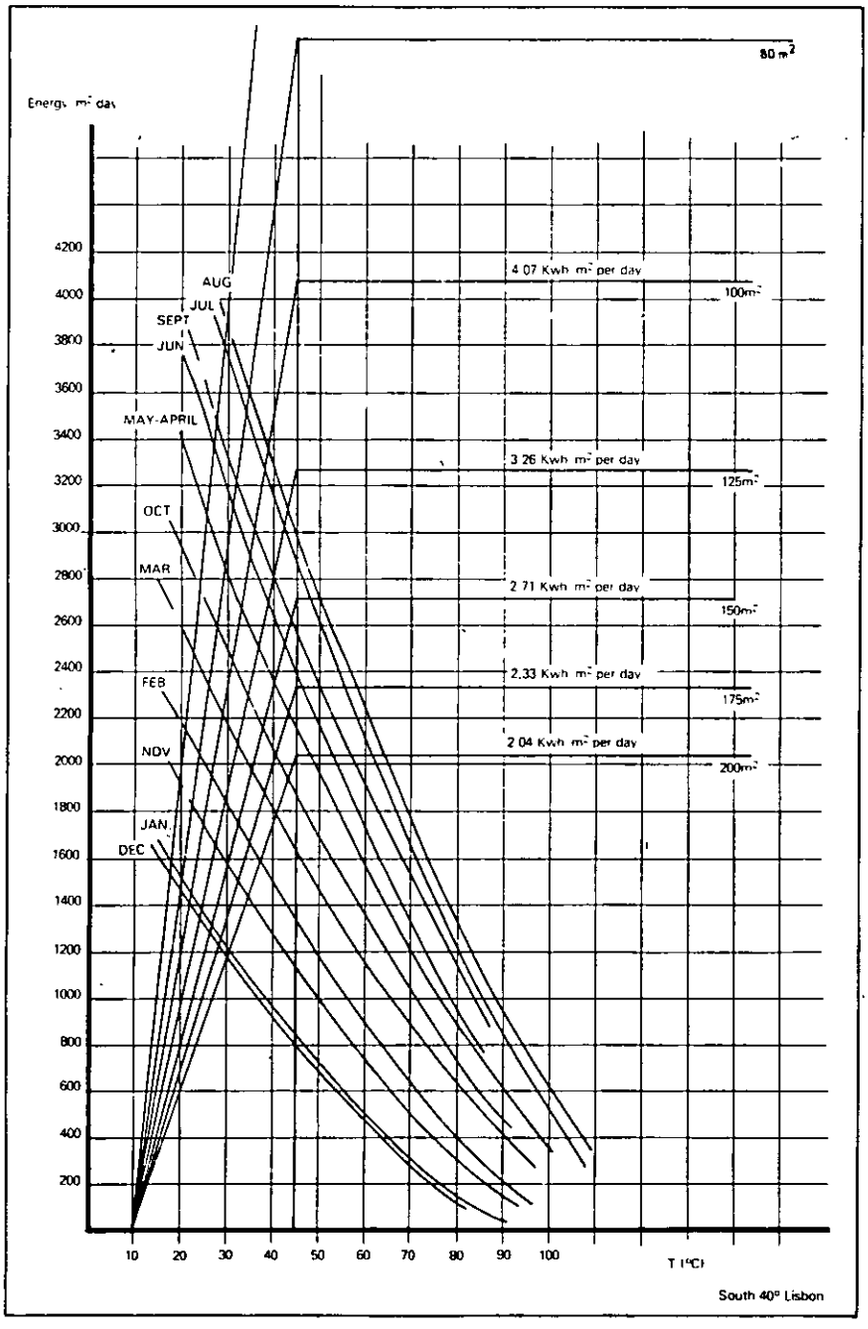
a. Direct heating of circulating hot water for central heating, space heating ventilation, air conditioning and preparation of domestic hot water;

b. Pre-heating of compensating water for the heating plant;

c. Cooling of air conditioning water system by means of absorption-type chillers.

There are as yet few hospital solar applications and, even those are intended mainly to the preparation of domestic water-heating. Nevertheless, amongst others, the Miami Hospital can be already mentioned for instance, where solar energy utilisation is applied to all air conditioning installations.

Figure 1.



Although not related to hospitals, Corritos City Hall, California must be mentioned, whose new building benefits from solar energy for central heating, air-conditioning and preparation of domestic hot water. In that building, about 60% of the annual energy needed is supplied by solar sources.

Fighting Pollution

It is not sufficient to analyse the pure specific and local advantages, when it is intended to replace in a hospital building a dirty fuel (gas, fuel-oil, etc) with a clean fuel (solar radiation). It must also be remembered that gas or fuel-oil, before being available for use, have already caused devastation of land (mines), air pollution (refineries) and sea pollution (oil transport).

Electricity, considered incorrectly as a clean fuel, besides the disadvantages referred to above, has inconveniences due to its production (thermo-electric plants) and to land occupation by pylons, etc, for its transmission.

Under these circumstances, and due to the ever-increasing aggravation of pollution, the use of solar energy appears as a powerful means of fighting ambient air deterioration.

Basic Economic Study

Total Economy (TE), in present day value, obtained from using solar energy for a given average life time n and a given rate interest i, may be expressed as follows:

$$TE = Pee \times E \times C \times a_A$$

where,

Pee = Yearly average percentage of saved energy due to the use of solar power in comparison with total annual energy requirement;
E = Annual energy requirement;
C = Cost of energy unit;
a_A = Financial factor (present day value, related to the beginning of the first period of an actual complete revenue, with n equal unitary terms, whose period is the same as that of rate interest i).

The economical feasibility of the use of solar energy requires:

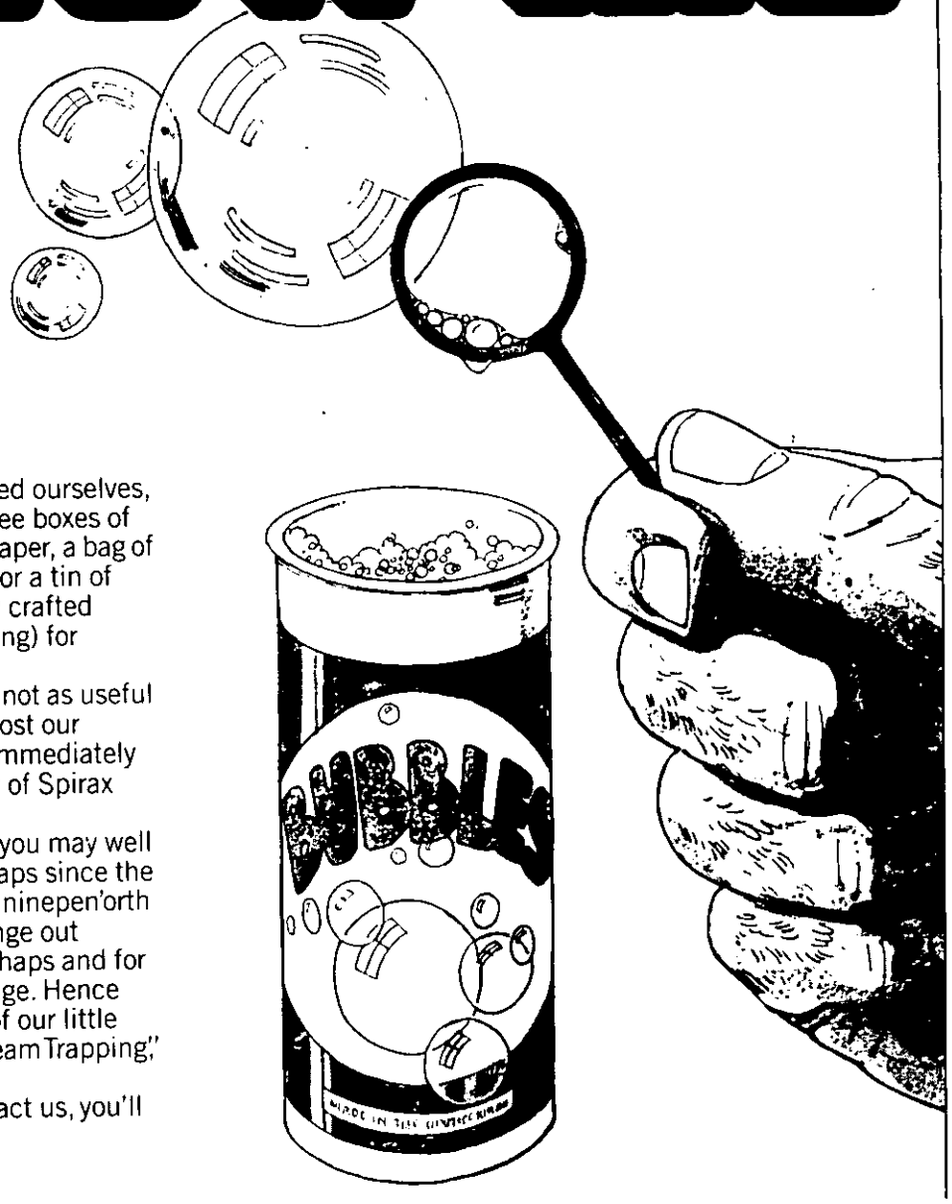
TE > SURPLUS COST

Very Brief Economic Study

a. General conditions

Let us consider a Health Centre, fundamentally consisting of a consulting zone and a 25-bed ward area, using

BLOW ME



What can you buy, we asked ourselves, for 9p these days? Oh, three boxes of matches, a Certain Newspaper, a bag of hundreds-and-thousands or a tin of soapy stuff (with specially crafted either-hand formulation ring) for blowing bubbles.

All good fun really. But not as useful as a first-class stamp to post our Request Slip, which will immediately produce the concise story of Spirax steam traps.

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propane gas as the conventional and only fuel, the average cost of 10^3 kcal being about Escudos $8,235 (1 kWh nearly Escudos $70).*

The solar energy is intended for domestic hot water preparation.

The solar system includes plain collectors, single glass and matt black painted absorbent surface, measuring about 2 m².

*£1 = 91 Escudos (Portuguese).

The average installation life n is estimated to be 20 years, and the rate of interest i 10%, implies a financial factor a_n equal to 8.514.

Taking into consideration the results of recent local market studies, the cost of a solar collector has been evaluated at Escudos 6,000 and that of fixed installations (piping, pumps, water storage tank, valves, controls, etc) at about Escudos 300,000.

b. Specific conditions

Locality	Lisbon
Exposure	South
Collector angle	40°
City water temperature	10°C
Hot water temperature	45°C
Hot water daily requirements	10 m³
Daily heating needs	350,000 kcal (407 kWh)

c. Calculation of Pee

For the above mentioned conditions, the technicians from LEM–DGC have kindly worked out the tables shown, from which the Pee has been calculated according to different hypotheses of solar energy collection.

d. Summary of Pee calculations

	Collector area	Pee
A	100 m²	59.6%
B	125 m²	69.6%
C	150 m²	77.6%
D	175 m²	83.8%
E	200 m²	87.3%

e. Total economy (in present day value)

A.	TE = 0.596 × 180,000 × $8,235 × 8.514 = Escudos 752,000$00
B.	TE = 0.696 × 180,000 × $8,235 × 8.514 = Escudos 878,000$00
C.	TE = 0.776 × 180,000 × $8,235 × 8.514 = Escudos 979,000$00
D.	TE = 0.838 × 180,000 × $8,235 × 8.514 = Escudos 1,058,000$00
E.	TE = 0.873 × 180,000 × $8,235 × 8.514 = Escudos 1,102,000$00

f. Savings by use of solar energy

A.	50 × 6,000$00 + 300,000$00 = Escudos 600,000$00
B.	62.5 × 6,000$00 + 300,000$00 = Escudos 675,000$00
C.	75 × 6,000$00 + 300,000$00 = Escudos 750,000$00
D.	87.5 × 6,000$00 + 300,000$00 = Escudos 825,000$00
E.	100 × 6,000$00 + 300,000$00 = Escudos 900,000$00

g. Favourable differences for solar system

	Absolute differences	Intercalate differences
A.	152,000$00	
		+ 51,000$00
B.	203,000$00	
		+ 26,000$00
C.	229,000$00	
		+ 4,000$00
D.	233,000$00	
		− 31,000$00
E.	202,000$00	

The graph of absolute differences in function of solar energy collection area may be looked at.

h. Conclusions

1. The use of Solar energy is economically feasible, even considering an average life period which is obviously low.
2. Fuel savings, and therefore foreign currency savings, amount to values between 75% and 85%, in the Lisbon area.

Constructional Features of a Practical Installation

Size

a. Collection area

Taking into consideration the values already calculated, it was decided to settle on a solar collection area of 150 m² (75 collectors).

b. Water storage tank

There are no significant changes in the economies to be made from panels between 75 and 300 l/m² of collection area. Some authors mention values from 40 to 50 l/m² of collection area.

On the other hand, the tank capacity must provide for daily needs. The tank height must be as large as possible to allow for temperature stratification.

Considering these stipulations, the capacity of the storage tank has been fixed at 8,500 litres.

c. Electric pumps

The electric pump's flow was calculated on the basis of 15 to 30 l/h per m² of collection area.

Description

The solar energy system installation is composed of 75 solar collectors, each measuring about 2 m², mounted on the South-facing pitched concrete roof of the ward area. The pitched concrete roof has been established at an angle of 40°.

Solar collectors have been distributed in three rows of 25, with independent supplies and inverse return to facilitate hydraulic equilibrium.

To achieve the smallest possible number of apertures through the concrete roof, collectors have been grouped two by two, but avoiding placing more than 16 tubes in parallel.

Two sets of isolating valves, in the supply and the return, make it possible to take any of the rows out of service. From the two sets of valves,

therefore, two piping lines (supply and return) run to the Heating Plant, where they are connected to the storage tank for the water pre-heated by the sun.

Water circulation between the storage tank and the solar collectors is by means of two electric pumps (one as stand-by), with automatic control by differential types of thermostat. The water is forced to circulate whenever the difference between the average water temperature in the solar collectors and the water temperature at the bottom of the storage tank is 5°C or more.

The storage tank is supplied direct from the cold water mains, but after being treated (soft water). In turn, the storage tank supplies the conventional domestic hot water tank through a motorised three-way valve, which does not allow, in any case, temperature of the water heated by the sun to rise above 50°C. For that purpose, the third inlet of the valve is connected to the cold water mains.

The hot water outlet temperature of the conventional accumulation tank is thermostatically controlled, at the heating coil, to a maximum of 45°C.

In that way, it is intended to give first priority of use to the water heated by the sun, on the one hand, and, on the other hand, to compensate the circulating losses of the domestic hot water in the distribution ring piping, without resorting to the conventional heating system, whenever that will be possible.

Solar Panels

Construction

Essentially solar collectors consist of:
Collector casing;
Thermal insulation;
Absorption plate;
Transparent cover.

Collector casing

Their dimensions are approximately 2,100 × 1,100 × 100 mm.

Thermal insulation

This is achieved with basalt wool mantels of the following thicknesses:
bottom ..... 50 mm
walls ..... 25 mm

Absorption plate

It consists of a galvanised steel sheet (2,000 × 1,000 m), a fully welded coil and an absorbent coating.

The coil consists of seven longitudinal galvanised steel pipes ½ in. size, welded to two main pipes ¾ in. size.

The absorbent coating is applied on

Methodology of solar heating project — calculation sheet

Location: Lisbon

Solar Collectors
(Orientation South
(inclination 40°
(collection area 100m²

Month	Exterior Temperature (°C)	Daily energy by sq.metre of collector area: Kwh/m² required per day	Median solar usage Kwh/m² per day	Difference Kwh/m² per day	Storage Temperature (°C)	Total monthly energy: Required Kwh/month	Solar usage Kwh/month	Difference Kwh/month	% Solar energy
January 31		4,07	1,44				4464		
February 28		"	1,94				5432		
March 31		"	2,21				6851		
April 30		"	2,68				8040		
May 31		"	2,68				8308		
June 30		"	2,89				8670		
July 31		"	3,27				10137		
August 31		"	3,33				10323		
September 30		"	3,01				9030		
October 31		"	2,45				7596		
November 30		"	1,76				5280		
December 31		"	1,41				4370		
Year		148 555					88,501		59,6

Methodology of solar heating project — calculation sheet

Location: Lisbon

Solar Collectors
(Orientation South
(inclination 40°
(collection area 125m²

Month	Exterior Temperature (°C)	Daily energy by sq.metre of collector area: Kwh/m² required per day	Median solar usage Kwh/m² per day	Difference Kwh/m² per day	Storage Temperature (°C)	Total monthly energy: Required Kwh/month	Solar usage Kwh/month	Difference Kwh/month	% Solar energy
January 31		3,26	1,38				5348		
February 28		"	1,84				6440		
March 31		"	2,08				8060		
April 30		"	2,50				9375		
May 31		"	2,50				9688		
June 30		"	2,69				10088		
July 31		"	3,02				11703		
August 31		"	3,09				11974		
September 30		"	2,80				10500		
October 31		"	2,28				8835		
November 30		"	1,66				6225		
December 31		"	1,34				5193		
Year		148555					103429		69,6

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Methodology of solar heating project — calculation sheet

Location: Lisbon

Solar Collectors

(Orientation South
(inclination 40°
(collection area 150m²

Month	Exterior Temperature (°C)	Daily energy by sq metre of collector area: Kwh/m² required per day	Median solar usage Kwh/m² per day	Difference Kwh/m² per day	Storage Temperature (°C)	Total monthly energy: Required Kwh/month	Solar usage Kwh/month	Difference Kwh/month	% Solar energy
January 31		2,71	1,32				6138		
February 28		"	1,74				7308		
March 31		"	1,96				9114		
April 30		"	2,34				10580		
May 31		"	2,34				10881		
June 30		"	2,57				11295		
July 31		"	2,71				12602		
August 31		"	2,71				12602		
September 30		"	2,62				11790		
October 31		"	2,95				9998		
November 30		"	1,58				7110		
December 31		"	1,29				6952		
Year		148555					115320		77,6

Methodology of solar heating project — calculation sheet

Location: Lisbon

Solar Collectors

(Orientation South
(inclination 40°
(collection area 175m²

Month	Exterior Temperature (°C)	Daily energy by sq metre of collector area: Kwh/m² required per day	Median solar usage Kwh/m² per day	Difference Kwh/m² per day	Storage Temperature (°C)	Total monthly energy: Required Kwh/month	Solar usage Kwh/month	Difference Kwh/month	% Solar energy
January 31		2,33	1,26				6836		
February 28		"	1,66				8134		
March 31		"	1,88				10199		
April 30		"	2,23				11708.		
May 31		"	2,23				12098		
June 30		"	2,33				12233		
July 31		"	2,33				12640		
August 31		"	2,33				12233		
September		"	2,05				11121		
October 31		"	1,51				7928		
November 30		"	1,23				6673		
December 31		"							
Year		148555					124443		83,8

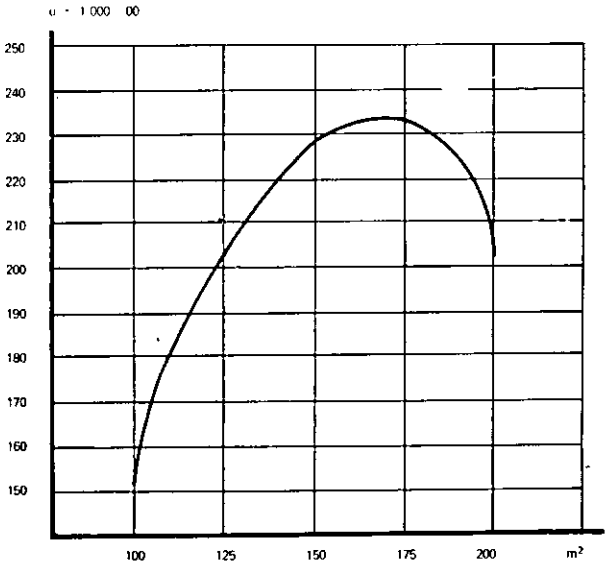
Methodology of solar heating project — calculation sheet

Location: Lisbon

Solar Collectors

(Orientation South
(inclination 40°
(collection area 200m²

Month	Exterior Temperature (°C)	Daily energy by sq metre of collector area: Kwh/m² required per day	Median solar usage Kwh/m² per day	Difference Kwh/m² per day	Storage Temperature (°C)	Total monthly energy: Required Kwh/month	Solar usage Kwh/month	Difference Kwh/month	% Solar energy
January 31		2,035	1,205				7471		
February 28		"	1,59				8848		
March 31		"	1,79				11036		
April		"	2,035				12210		
May 31		"	2,035				12617		
June 30		"	2,035				12210		
July 31		"	2,035				12617		
August 31		"	2,035				12617		
September 30		"	2,035				12210		
October 31		"	1,94				12028		
November 30		"	1,43				8580		
December 31		"	1,17				7254		
Year		148555					129698		87,3



Continued overleaf.

the face of matt black paint to which the pipes are welded. The painting specifications were defined after absorption and ageing tests.

Transparent cover
It consists of a fixing structure, a transverse joint and two single glasses, 4 to 5 mm thick.

Future Perspectives

The increasing shortage of fossil fuels and the improvements already accomplished in the technology of solar energy make sure that the harnessing of this energy source will be intensified in the near future.

Not only sun-powered installations will be more and more numerous, but also their fields of application will be more and more wide-ranging, eventually breaking through the boundaries of pure domestic hot water production.

Plans are already being established for the exclusive use of solar energy to satisfy all the heating needs of whole cities, as is the case of 25 new towns to be erected in South Arabia. It is believed that by the year of 2000, solar energy will provide about 25% of all the heating in the United States. For the time being, sun-powered installations in hospitals are not yet many, even in the United States (Miami Hospital, etc). But we are sure that, in the near future, sun-powered installations in hospitals will become more and more numerous.

This paper was presented at the Lisbon International Congress of Hospital Engineers in the section devoted to 'Hospital Engineers Inside the Hospital — Hospital Engineer Training.' Vinson Oviatt is Chief of the Environmental Safety Branch, Division of Research Services, the National Institute of Health, USA.

Hospital Engineering Education in the U.S.A.

La Formation Administrative des Ingénieurs Hospitaliers

V. OVIATT

Synopsis/Resumé

Recruter et retenir des ingénieurs hospitaliers professionnellement qualifiés est une préoccupation permanente pour les hôpitaux, les éducateurs, le gouvernement et les associations professionnelles d'ingénieurs.

Aux Etats Unis l'ingénierie hospitalière a commencé à prendre une importance croissante comme profession, dans les années 50 - à une époque d'expansion rapide de la construction et modernisation des installations hospitalières de ce pays.

En ce temps-là le développement très rapide des systèmes électromécaniques d'appui au traitement des malades et l'investissement croissant en des installations physiques très complexes ont démontré la nécessité d'ingénieurs professionnellement qualifiés. Les années suivantes ont assisté à la création de systèmes de sustentation de la vie et d'aide au diagnostic chaque jour plus complexes et qui maintenant exigent les services d'une organisation d'appui technique hautement qualifiée.

La Société Américaine d'Ingénieurs Hospitaliers (ASHE) a été fondée en 1962 pour promouvoir la formation permanente des ingénieurs hospitaliers et le développement de la profession de l'ingéniere hospitalière. Au cours des dernières seize années, la ASHE, en collaboration avec le gouvernement et des institutions de l'enseignement, a crée une série continuelle de programmes destinés à atteindre ces buts.

Les programmes peuvent être classés en trois groupes:- de formation permanente, de formation technique et d'ingénierie professionnelle. Tous ces trois types de programmes comprennent l'étude de problèmes d'ordre administratif. Le programme de formation permanente se prête particulièrement bien à cette perspective. La ASHE a crée et présenté un cours spécial de capacitation en gestion pour ingénieurs hospitaliers.

Le recrutement d'ingénieurs diplomés avec de l'expérience professionnelle est l'objet d'un effort permanent. Jusqu'à present il n'y a pas de curriculum officiellement reconnu permettant l'obtention d'un diplôme académique en ingénierie hospitalière. Plusieurs tentatives ont été faites auprès d'Ecoles d'Ingénieurs, sans

succès, pour que soient créés de tels curricula. En conséquence, la ASHE a créé des programmes destinés à donner à des ingénieurs doplômés une formation adéquate en ce qui concerne l'administration et gestion des programmes hospitaliers. De tels programmes comprennent des dispositions pour des études de travail, un programme d'obtention d'une lience et un programme pour des résidents.

Le présent exposé décrit en detail les programmes créés aux Etats Unis aussi bien en vue de la formation d'ingénieurs hospitaliers, que destinés à ceux-ci.

Les programmes qui ont obtenu le plus de succès concernent la formation administrative dans le cadre de la formation permanente, et les programmes divers de formation technique.

Le programme actuel de la ASHE pour résidents promet beaucoup dans le sens du recrutement d'ingénieurs diplomés et avec de l'expérience professionnelle.

Full paper

The recruitment and retention of skilled, professional hospital engineers is of continuing concern to hospitals, educators, the government and professional engineering societies. Emphasis on hospital engineering as a profession in the United States began in the 1950s — a time of rapid growth in the construction and modernisation of the nation's health care facilities. At that time the rapid development of electrical and mechanical systems to support patient care, and the rising capital investment in complex physical facilities, indicated the need for professionally qualified engineers.

The succeeding years have witnessed increasingly complex diagnosis and life support systems which now dictate the service of a highly qualified engineering support organisation. At the same time, several local hospital engineering organisations (in cities containing major medical centres) and the American Hospital Association began offering one- and two-day training courses to update the skills of the practising engineers.

This led to the formation of the American Society for Hospital Engineering in 1962, which has promoted the professionalisation of hospital engineering as a basic tenet. This thrust has centred around the continuing education of engineers now in practice, and the recruitment of graduate, professionally trained engineers.

Education

The emphasis of continuing education programmes has changed according to the needs of the time. Education programmes are in the form of short courses usually of two or three days' duration.

Topics include:

Construction Fundamentals — design and management of construction and renovation projects, contract management;

Public Health and Safety — infection control, environmental protection, electrical safety, occupational hazards, pollution control;

Preventive Maintenance — design, operation and administration of 'PM' programme. This is a continuing topic offered several times a year in various locations throughout the nation;

Engineering Problems of Small Hospitals — application of engineering programmes to facilities with less than 100 beds;

Engineering Administration — administrative fundamentals to provide the Director of Engineering necessary skills to manage his organisation.

The annual meetings of the American Society for Hospital Engineering (ASHE) concern the continuing education programme. These four-day programmes are planned to provide the most current administrative and technical information on topics of immediate concern. The June 1977 conference considered unionisation, energy management, codes and standards for clinical engineers, inhalation anæsthetics, fire safety and telecommunications.

The ASHE, in conjunction with the AHA, also convenes two- or three-day workshops on particular engineering matters. These meetings are called to explore the pros and cons of the subject, so that policy and technical advice may be formulated for affected hospitals. Such workshops usually are related to new programmes, legislation or technical advances. Examples of workshop topics are solid waste management, control of operating room pollution (waste anæsthetic gas), and life safety code and fire safety equivalencies.

Engineering administration education is of particular interest. In 1964 the federal government conducted a survey of supervisory personnel characteristics, and position requirements for hospital engineering departments. The nationwide study indicated that the greatest area of educational need was in administration and management. The government, reacting to this need in co-operation with the ASHE, developed a comprehensive programme in management skills for hospital engineers. Topics covered were policy and procedures development, recruitment and selection of employees, management skills, staff relations, work order procedures and budgeting. Two unique features were built into the programme. One was that it was based on the hospital environment and its attendant problems. The second feature was that the presentation was programmed to a systems approach stressing input, process, output and feedback. The course was originally designed to be a self-study programme, but was never produced in that format because of cost. It has been presented instead in classroom settings.

The most intensive in-service courses presented in the USA were those in hospital engineering problems at the University of Minnesota. The course, co-sponsored by ASHE, was over five weeks, and was presented every summer from 1964 to 1971. These courses combined classroom lectures with the solution of common administrative and technical engineering problems.

Technical Courses

Technical education in engineering trades serves two groups in the hospital engineering organisation. One is the skilled craftsman and/or technician who needs to expand his current skills, or who must learn a new trade to keep pace with technology. The other is the professional hospital engineer who normally does not learn the trade skills through his formal education. The 1964 national survey mentioned above revealed that, as the level of formal education increased, there was an unusual demand for increased training in the trades.

Technical education in the trade skills is not normally acquired through the two- or three-day short course. Such training is more intensive and is usually acquired through recognised trade and technical schools, or, in some instances, from the trade unions and manufacturers of specialised

equipment.

There has been an increased interest in the Junior (two-year) College approach to training foremen or department heads of the engineering organisation. There are at least two such courses in the USA. Graduates receive two years of formal class work leading to an Associate of Arts degree. A typical course curriculum is supplemented with on-the-job training in a hospital and is structured as follows:

First Semester

Fundamentals of Refrigeration ...	4
Basic Electricity	3
Fundamentals of Drafting	3
Freshman English	3
Basic Technical Mathematics	3
	16

Second Semester

Refrigeration Theory and Practice	4
Elements of Electricity	3
Memos, Reports and Letters	3
Fundamentals of Steam Power and Generation	3
Advanced Technical Mathematics	3
	16

Third Semester

Heat Power Fundamentals	4
Industrial Electronics	3
Plans and Specifications	3
Industrial Accounting	3
Fundamentals of Supervision	3
	16

Fourth Semester

Heating and Air Conditioning	4
Maintenance Engineering	3
Organisation & Management	3
Mechanics of Construction	3
Sanitation	3
	16

The on-the-job segment provides general orientation to the hospital and its engineering organisation, plus application of the classroom skills.

Professional Engineering

The recruitment of professional graduate engineers to direct hospital engineering programmes requires continual effort. The number of such engineer directors increases each year, but not at the desired rate. The majority of graduate engineers employed by hospitals have held at least one non-hospital associated position prior to their current job. Interviews reveal that most of these engineers had never considered hospital employment until they were exposed to the health care environment through some form of professional involvement. Competing salaries with other engineering employers does not seem to be a factor, so attracting young graduate engineers is perhaps only a public relations task.

Once introduced into the hospital environment, the new engineer finds his skills working. If he is a civil engineer he needs additional skills in electrical and mechanical technologies, if he is an electrical engineer he needs additional skills in mechanical and civil engineering. All basic degree engineering skills must be supplemented to some extent to satisfy the peculiar needs of a hospital engineer.

Several attempts have been made to satisfy these basic hospital engineering skill requirements through university degree courses. In 1968 a leading engineering college proposed a Bachelor of Science degree in building engineering to satisfy the hospital need as well as that of other industries. The degree combined basic elements of existing civil, electrical and mechanical curricula in building operational systems. The expanded course work extended the time to complete the degree to a minimum of five years, against four years for a basic engineering degree. The programme was never offered as students were not attracted to it, but the need for such a programme does still exist.

Some major medical centres have solved their individual graduate engineering requirements through work-study arrangements with local engineering colleges. These programmes offer the student a salary so that he can complete his education. The hospital, with the assistance of the college, generally recruits the student during his second year. Once selected, he spends alternate semesters at the college and at the hospital. The hospital increases the complexity of the work experience commensurate with progress in the academic programme. Such courses usually take five years to complete for graduation to the BS degree. In most instances the engineer is retained on a full-time basis at the hospital.

The School of Public Health, at the University of Minnesota, offers a Masters degree in hospital engineering in conjunction with its Masters of Public Health programme. In this programme, the engineer with a basic engineering degree and some experience in the health care field is admitted to the MPH course. He supplements the basic course work with additional engineering and hospital administration offerings. This programme normally results with the award of two degrees—the MPH and the MS. The programme attracts few students but is still offered.

Recognising the problems described with professional hospital engineering education and recruitment, the ASHE is currently embarking upon a residency programme. Beginning July 1, 1978, six residencies were offered to recent BS engineer graduates. The course will take 11 months, and will offer experience and training in technical systems, environmental safety programmes and management functions. The resident will spend his first sixty days with the skilled trades. In addition he must select and complete one minor and two major projects. The student will be paid the standard entrance level engineering salary. Hospitals offering the programme must be accredited by the Joint Commission on Accreditation of Hospitals and the Engineering Director must have been awarded Senior Level Membership in the ASHE.

The ASHE will control the programme beginning with selection of the residents, instructors and institutions. It will provide continuous assessment of the students through monthly reports, and final evaluation of the experience. A certificate will be presented to the resident upon successful completion of his course. Success of the course will be determined by following the career of each resident for three years following the residency. Through this system, the Society hopes that it has found a viable answer to its education and recruitment problems.

Conclusion

This paper has described the varied educational programmes offered to and for hospital engineers in the USA. Probably the most successful have been those classified as continuing education and technical education. The development of a successful graduate professional degree course presents an enigma, and maybe as such, it is not needed. If not, some other means of formal hospital engineering education is required for the graduate engineer entering this environment. At this time the work-study approach and the ASHE residency programme seem the most promising in the USA.

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Expériences Francais d'Hôpitaux-Types
Standard Hospitals – French Experience

J. SWETCHINE (France)

Synopsis/Resumé

For the last ten years France has been implementing with determination a policy of standardisation in hospital building construction.

The first type of standardised health care facility was a general hospital lending itself to capacities of between 200 and 400 beds: Standard-hospital: **Beaune.**

The second type was a general hospital of between 400 and 600 beds: the **Fontenoy**-type hospital.

The third, a new type of 200/400 bed hospital, is the **Duquesne**-type.

The three series apply to new whole hospitals.

In order to meet the needs for partial reconstruction or extension of existing hospitals, these three series have recently been complemented by the systems of **Standard Hospital Components.**

Examples of Hospital Components might for instance be an Operating Theatre complex, an X-Ray Department (Diagnostic), a Clinical Laboratories Department or Nursing Wards.

Each one of these Components is standardised for three capacities and an 'assembly kit' of the components allows the designing of composite 'custom made' hospitals or parts of hospitals.

Experience has shown that standardisation has made it possible:

to ensure a constantly high quality in the functional design and excellent material performances;
to suit different programmes and sites;
to shorten by about two-thirds the completion time;
to reduce by at least 10% construction costs;
to this saving should be added the economic influence of the sharply shortened completion time.

We have pioneered in the field of this policy and our Hospital Engineering Office has been one of the winning teams in all the official standardised design competitions.

Availing ourselves of the experience gained over some twenty standardised hospitals of the types mentioned, our full paper illustrates the main lines of the policy and its implementation.

Full paper

Depuis dix ans, la France s'est engagée dans une politique originale de construction hospitalière, basée sur des hôpitaux-types, adaptables aux programmes et aux sites et flexibles.

Bien que cette action porte également sur la santé mentale, devant l'ampleur du sujet, nous nous limiterons aux hôpitaux généraux actifs et aux hôpitaux de dégagement pour personnes âgées.

Les Principaux Phénomènes

Quels sont let principaux phénomènes observés actuellement en France?

Taille des Hôpitaux

La taille des hôpitaux (exprimée en nombre de lits) n'a cessé de décroître depuis quelques années, par suite de difficultés liées aux très grosses opérations:
coût d'investissement très élevé (difficultés de financement);
difficulté d'exploitation 'humaine';
temps nécessaire à la réalisation (ils sont obsolètes avant d'être achevés).

Cette réduction de la capacité moyenne est favorisée par différents facteurs, en particulier la baisse de la demande globale en nombre de lits dûe:
à une meilleure efficacité des hôpitaux;
à la création de lits de dégagement;
à l'amélioration de l'habitat.

On considére actuellement pour des hôpitaux neufs:
comme minimum: 200 lits environ;
comme maximum: 500 lits environ.
Il s'agit évidemment d'ordres de grandeur.

Importance des Services Médico-Techniques

L'importance relative des services médico-techniques vis-à-vis de l'hébergement n'a par contre, cessé de croître.

En dix ans, la surface 'par lit' de ces services a augmenté de 50% par suite:
du rôle 'externe' croissant de l'hôpital;
du développement de nouvelles techniques médicales.

Notion de 'Service'

La notion géographique de 'service' s'estompe au profit de la notion 'd'unité de soins', organisée autour de l'équipe de personnel soignant.

Fonction d'Enseignement

Parallèlement, on a constaté que le centre hospitalo-universitaire n'est pas obligatoirement un établissement particulier: tout hôpital général moderne peut et doit recevoir des étudiants.

Les Grands Principes de Conception Fonctionnelle

En face de ces principaux phénomènes se sont progressivement dégagés quelques grands principes qui sont à la base de la conception fonctionnelle reposant sur une programmation détaillée rigoureuse.

Premier Principe: Efficacité et Sécurité

Un hôpital doit avant tout être efficace et sûr. Ce n'est qu'à cette condition qu'il pourra aussi être humain. La priorité doit être donnée au diagnostic et aux soins: le confort hôtelier est un complément.

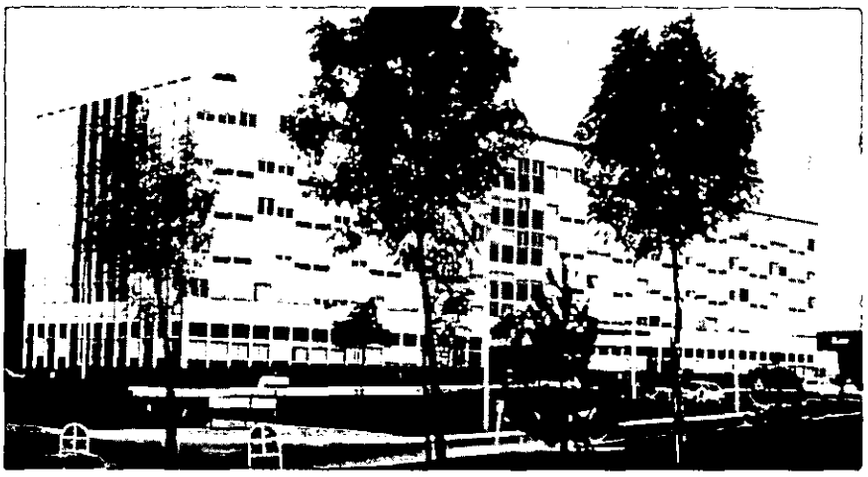
Deuxiéme Principe: Evolutivité

Toutes les dispositions prévues sont appelées à se démoder par suite de l'evolution des besoins, des techniques, de l'économie et des hommes.

L'hôpital doit pouvoir s'adapter à cette évolution:
il doit être transformable;
dans son plan (cloisonnement);
dans ses réseaux et installations;
et si possible extensible.

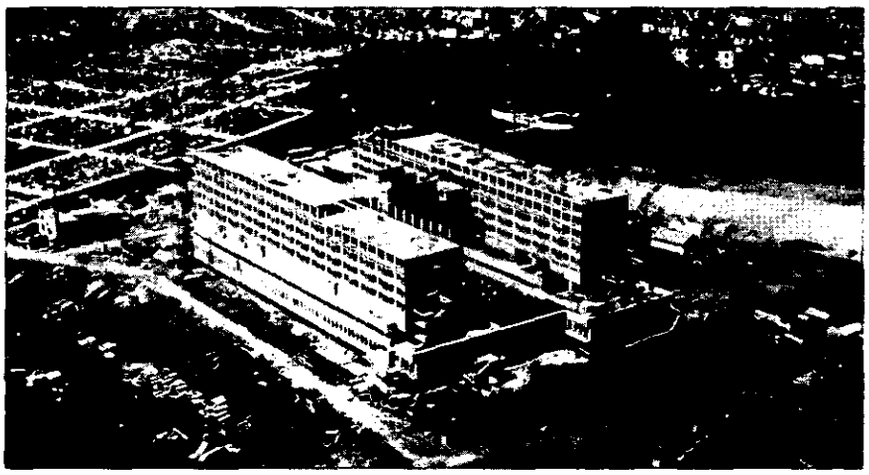
Troisième Principe: Hygiène
Les dispositions des bâtiments et les installations doivent permettre le respect de règles d'hygiène simples.
Le reste est affaire d'organisation.

Quatrième Principe: Humanisation
L'hôpital doit être:
un lieu de séjour aussi agréable que possible pour les patients;
mais aussi un lieu de travail satisfaisant pour le personnel, qui y passe souvent de nobreuses années et se livre souvent à des tâches ingrates ou difficiles.

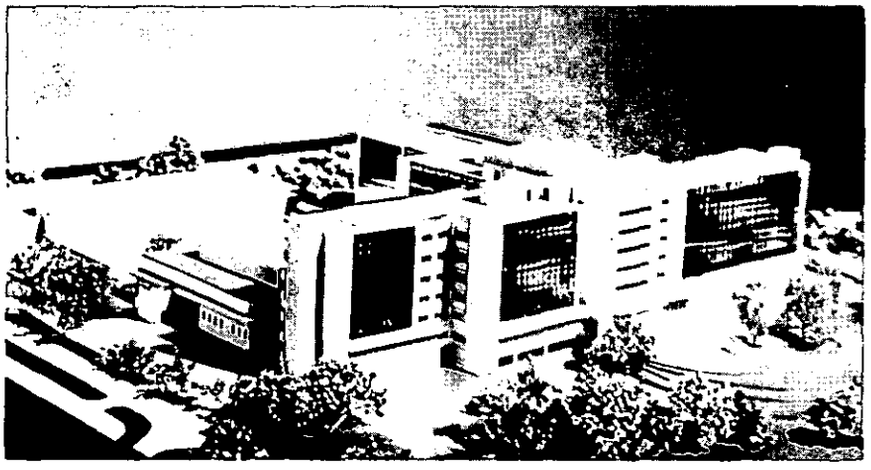


Type 'Beaune' 200/400 lits: Beaune, Provins, Martigues, Melun, Chateudun, Flers de l'Orne, Avesnes sur Helpe, Grasse, Arcachon.

Type 'Fontenoy': Tarbes (Version Y), Rennes (Version Y), Boulogne sur Mer et Quimper (Version H).



Type 'Duquesne' 200/400 lits: Romans sur Isere, Sallanches, Sens Neufchateu Bethune, Montelimar.



Le Concept Francais des Hôpitaux

Sur la base de ces principes, l'ingéniérie hospitalière francaise a progressivement élaboré, en liaison étroite avec l'Administration, le concept français d'hôpital.

Comment le caractériser en quelques mots?

Sa capacité d'hébergement est en général comprise entre 200 et 500 lits environ, complétée par des établissements de dégagement;
sa conception est rigoureuse et simple, sans 'intellectualisme' inutile: par contre, l'équipement est aussi développé que nécessaire;
les services médico-techniques sont regroupés dans un 'plateau technique', souvent dissocié des unités de soins, pour regrouper personnel et matériel;
fuyant la sophistication excessive, les 'gadgets' l'automatisme intégral, il est fiable avec un coût d'investissement et d'exploitation corrects ainsi qu un effectif de personnel raisonnable;
enfin, l'hôpital français est maintenant étudié et réalisé très rapidement dans le cadre d'un budget connu.

Sur un plan pratique, le concept français d'hôpitaux types se traduit actuellement par différentes 'filières'.

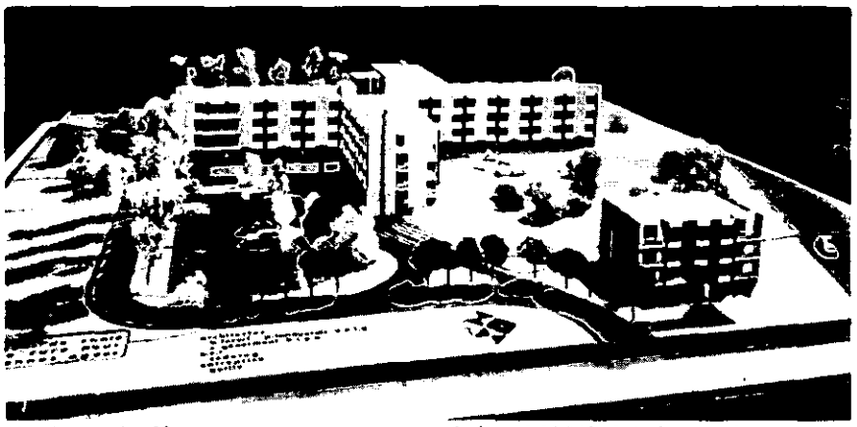
Les hôpitaux types complets
Type BEAUNE (200/400 lits) dont le succès a mis en évidence le besoin d'un modèle de capacité plus importante;

Type FONTENOY (400/600 lits) qui existe en trois versions;

Type DUQUESNE (200/400 lits) apelé à remplacer le type BEAUNE à partir de 1976, par suite de l'évolution des programmes et du contexte administratif;

Type V 120 et V 240 pour les hôpitaux de moyen et long séjour pour personnes âgées (hôpitaux de dégagement complétant les hôpitaux actifs).

Les Composants Hospitaliers types (les 'CT') qui sont des sections fonctionnelles typifiées (radio - bloc opératoire-unités de soins etc . . .) répondant à des impératifs de compatibilité permettant leur assemblage



Hôpitaux de dégagement pour personnes âgées V 120/240 (très nombreuses réalisations).

selon une 'règle de jeu'.

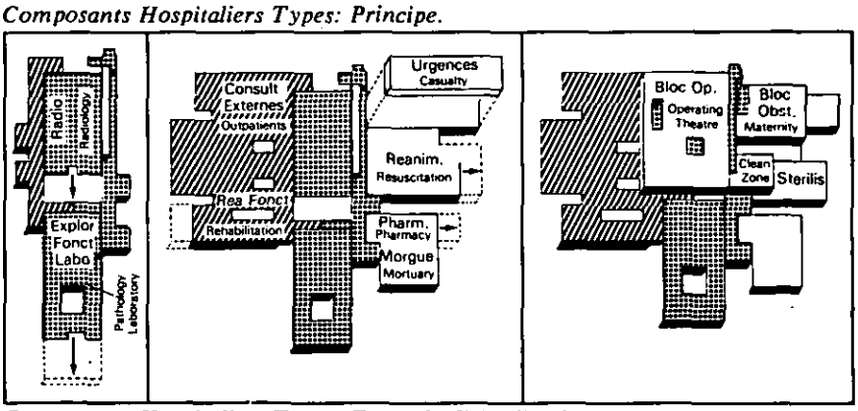
Les 'CHT' sont principalement destinés à des extensions et des modernisations d'hôpitaux existants.

Les hôpitaux types ont permis:

de réduire des 2/3 les temps de réalisation (300 lits = 18 mois);
de réduire de 10% au moins les coûts de construction, économie à laquelle s'ajoute l'incidence des délais de réalisation très courts;
de garantie d'une manière constante d'excellentes qualités de la conception fonctionnelle;
d'assurer de très bonnes prestations matérielles;
de s'adapter à des programmes et à des sites différents.

Bien entendu, la France continue évidemment à réaliser dans certains cas des hôpitaux (ou parties d'hôpitaux) 'sur mesure', conçus en fonction du programme et du site, lorsque les projets types ne conviennent pas (programme, terrain, etc . . .). Tel est également le cas pour les établissements très spécialisés et non répétitifs.

Composants Hospitaliers Types: Principe.



Composants Hospitaliers Types: Exemple d'Application.

Le Role de l'Ingéniérie

Le concept français d'hôpital et les différentes filières et exemples qui en sont l'expression, sont le fruit d'une collaboration originale et fructueuse entre l'ingéniérie privée et l'administration:

L'imbrication est telle qu'il est très difficile de savoir qui est à l'origine d'une idée.

Par contre, les rôles sont clairs:

l'administration explicite les objectifs, accorde les moyens, contrôle les résultats, apporte au besoin le fruit de son expérience d'exploitant;
l'ingéniérie assume la conception et la réalisation, en qualité de consultant ou d'ensemblier.

Les Hôpitaux-Types sont-Ils Exportables?

En général les hôpitaux ou composants-types, conçus dans un certain contexte économique — celui de la France des années 70 — ne sont pas 'exportables' tels quels dans n'importe quel pays, encore que ce fait concerne surtout l'hébergement et certains services externes, ainsi que certaines caractéristiques climatiques et de technologiques de bâtiment.

Il est par contre certain que l'ingéniérie française a acquis et expérimenté un 'savoir s'y prendre' (Know-how) de classe internationale qui lui permet d'étudier et de réaliser rapidement à partir de données particulières, les solutions les plus adaptées et d'un coût normal, ainsi bien sûr que les établissements de la plus haute technicité lorsqu'ils sont requis.

Elle peut intervenir, au choix, en qualité de consultant ou d'ensemblier.

L'Administration (Ministère de la Santé et de la Sécurité Sociale Centre National d'Equipement Hospitalier, Assistance Publique à PARIS etc . . .) peut de son côté apporter certains concours d'expertise prélables ou complémentaires, ainsi qu'une assistance à l'exportation mais elle n'assume pas par elle-même de missions d'ingéniérie.

L'ensemble de cette expérience nous parait présenter des caractéristiques originales susceptibles d'intéresser d'autres pays.

Fifth International Congress of Hospital Engineering

Ripple Control of Electrical Services in Hospitals

Contrôle de Fluctuation des Reseaux Electriques dans les Hôpitaux

H. ROBERTS *Senior Engineer, Mental Health Authority, Victoria Australia.*

In Australian hospitals it has been customary to rely on the electrical supply authorities for the provision of electrical energy. Until recently it was not considered necessary to provide on-site power generation as the external supply was reliable, especially in the major cities where ring main systems of reticulation have been installed.

When emergency electrical supply was first introduced into hospitals, it was to provide stand-by power for operating theatres, for lighting and for the small amount of electrical equipment used by the surgical teams in those days.

As recently as 1963 a new hospital of 400 beds was built in Melbourne with a 110 volt DC system consisting of nickel iron cells which supplied limited lighting for stairwells, theatres, wards, the basement and telephone switchboard. This system could provide electrical energy for a maximum of four hours.

In contrast a ward block of similar size was recently opened in another Melbourne hospital. It contained two diesel driven alternators with a combined output of 1,750 kVA. These two examples illustrate the growth of emergency electrical power requirements in 15 years. In this time the amount of life-supporting electrical equipment has increased enormously. No longer is continuous power required only in operating theatres, but in many other areas in the hospital as well. To compound the problem there is some equipment which cannot tolerate any interruption to electrical supply without placing patients' lives at risk. These equipments are provided with 'no break' supply.

While it is comparatively easy to provide adequate stand-by power in new hospitals, there are financial limitations on what can be done in older hospitals. As an example of the former, a new 200 bed hospital in South Australia, opened in 1973, had installed generating sets with a total output of 7 megawatts. It was not intended that the generating sets would operate only in an emergency situation, but operate continuously to provide power to the hospital. The generating sets were internal combustion engines, using natural gas for fuel and driving both alternators and centrifugal compressors for refrigeration, which in turn provided chilled water in summer to air condition the hospital. The exhaust from the engines and the cooling water for the jackets (which are pressurised) provided heat to generate low pressure steam for domestic hot water for kitchens and, in winter, for air conditioning or, in summer, for absorption chiller units. It was intended originally that this would be a 'total energy' project, but other influences prevailed and its electrical output is now sufficient to supply essential services only in an emergency situation. Duplicate cabling was provided to areas and services nominated 'essential' and 'non essential'.

Since that time the classifications have increased in number to three, namely *critical*, *essential* and *non essential*. Critical services are provided with 'no break' equipment consisting of an AC/DC rectifier, secondary cells and a static DC/AC inverter. Essential services are supplied with power from alternators driven by internal combustion engines or gas turbines. There is some time delay before power can be restored to essential areas and the time is dependent on whether the machines are started manually or automatically. Diesel engines starting automatically, with the jacket water and lubricating oil maintained at operating temperatures at all times, can restore power within sixty seconds.

In an ideal situation, the hospital would be provided with 100% stand-by power generation equipment. Twin generating units would be located in each building, together with twin 'no break' units. One generating set and one 'no break' unit would supply the essential services and the other the non-essential services. In an emergency situation, if either the generator or the 'no break' unit supplying the essential services failed, its twin would take over.

This concept of individual supplies in each building has the advantage over the central generating station concept, in that the breakdown of a single unit effects one building only, whereas the breakdown of a unit in a central station would reduce the power output by 100% if only one unit was installed, 50% of two units were installed and so on. In addition, the failure of the reticulation between the central station and the buildings would be disastrous, whereas buildings supplied with individual units would not be affected. This concept would be feasible if a new hospital was being designed, when provision could be made for suitable areas for the generating plant.

However, the majority of hospitals could not meet this ideal, and the need is to increase the amount of stand-by power to meet current and future requirements. If something less than 100% of the maximum electrical demand is to be installed, then a decision has to be taken—which areas of the hospital are to lose their electrical supply in the event of an external power failure? Assuming that the decision has to be taken to divide the hospital into 'no break', 'generated power' and 'interrupted supply' class

fications, the problem remains how to segregate the services. If it is not feasible to provide individual generating sets in each building, a central generating station would be required and should be established close to the main sub-station to reduce cabling costs between the two. The 'no break' supply should be located as close as possible to the equipment requiring this service, otherwise the risk of cable faults is increased. Cable duplication would reduce the risk but is more expensive. With the 'no break' supply close to essential equipment, two instead of three reticulation services are required.

One method of segregating the services is to provide a separate cable from the central generating station to each sub-board, and to connect all essential circuits to this cable, which under normal circumstances would transmit external power. A less expensive method is to use the existing cabling, and to segregate the services at the sub-boards by fitting circuit breakers which are closed by magnetic coils. The circuit breakers supply the non essential areas. They open automatically on power failure and must be manually reset. The disadvantage is that manual resetting is time consuming, especially in areas where power failures of short duration are frequent, and/or when the emergency generating plant is test operated frequently.

The other method is to fit circuit breakers to all circuits instead of just to non essential circuits. The essential circuits would be fitted with automatic resetting on resumption of power after a short interruption, or when the emergency generating plant came into operation. This is a more flexible system as circuits could be changed from essential to non-essential or vice versa as the need arose. The change from automatic to manual resetting and vice versa is a simple operation.

In designing an emergency generation system, it must be assumed that all the essential services would be supplied with their maximum demand. There are times during the day, and especially at night, when the demand would be much lower than the maximum designed demand, and in times of external power failure the output from the generators could be well below their rated output. At the same time some areas of the hospital would be without power. This could be overcome if every circuit breaker could be remotely controlled from some central area. If conventional circuit breakers were used, individual cables from each operating coil to the central area would be required and the cost of installation could be prohibitive. Unless an adequate number of spare cables were provided, any additional circuits needed in the hospital would require an expensive cable-run to the control area.

However, there is another method available to control each circuit breaker remotely without the need for control wires. This is known as ripple control and uses the existing electrical reticulation as a conductor for the remote control signal to the circuit breakers. The control signal is an audio frequency impulse which is superimposed on the mains voltage.

There are a number of systems available. One of them operates as follows. Each circuit breaker is fitted with a mains voltage synchronous motor which, through a speed reducing gear box, drives a cam disc through one revolution in thirty seconds. Each cam disc operates two switches in sequence during each revolution. The cam disc can be manually adjusted so that the switching action occurs at one of 25 positions around the circumference of the disc. A relay in series with the two switches supplied mains voltage to the circuit breaker operating coil. The relay is operated by the audio frequency impulse.

When a switching operation is required, the audio frequency impulse is generated and transmitted to each circuit breaker. The relays close and start the synchronous motors. Once the motors have been started and run for five seconds they will continue to run and complete one revolution of the cam discs before stopping. After five seconds the relays drop out and are ready to perform the second function, that is to supply mains voltage to the circuit-breaker operating coil via the switches on the cam discs. When the programmed impulse is sent out, the relays close, and if the cam disc has closed one of the operating switches on one of the circuit breakers, then it can be operated, either to close or open depending on which switch has been closed by the cam at that moment.

This is a very flexible arrangement as each of 25 circuit breakers can be controlled individually. However, if more than one circuit breaker is to be operated in any thirty second period, then more impulses are transmitted and other circuit breakers are operated during the thirty second period. In an emergency load-shedding operation, the impulse would be transmitted continuously over the thirty second period, and because the 'off' switch follows the 'on' switch on the cam disc, all circuit breakers would be in the 'off' position at the end of the thirty second period.

In hospitals all the circuits could be graded into 25 classifications according to priority. When the external power supply fails, and the emergency generating plant is in operation, the supply could be re-connected in 25 steps in a thirty second period. If the maximum optimum output of the generating plant was reached before all 25 groups had been connected, the impulse signal would be terminated and remainder left in the 'off' position. If the load fluctuated during the period of emergency generation, the number of circuits supplied could be varied automatically so that the output was constant and at the optimum. Although reference has been made to 25 classifications possible with this equipment, it should not be assumed that this is all that is available. In fact, the number of classifications can be extended to a far greater number than this with other types of equipment using ripple control.

While emphasis has been given to the use of ripple control for power generation situations, it is not restricted to this field but can be used to control any equipment electrically.

Some examples are:

air conditioning fans;
exhaust fans;
heating coils;
chilled water coils;
pumps;
lighting in areas unattended at night;
security lighting;
lighting of grounds;
clocks.

In conclusion, it can be said that ripple control has its applications in the hospital field and will be used more extensively as its flexibility becomes more recognised.

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Le Contrôle de Fluctuation des Services électriques dans les Hôpitaux – Sommaire

Quand on a commencé à faire usage de l'électricité de secours, la raison principale était de fournir énérgie de réserve au bloc opératoire, pour l'illumination et pour un petit nombre d'appareils alors utilisés par les chirurgiens.

Depuis, la quantité d'equipement électrique a augmenté énormément et aussi la quantité d'énergie de secours nécéssaire. On a besoin de cette énérgie au bloc opératoire et ailleurs dans l'hôpital.

Par conséquent, des problèmes de réticulation très coûteux à résoudre ont surgit. Les batteries qui originellement étaient la source de l'énérgie électrique de secours ont été remplacés par les alternateurs poussés par moteurs à combustion interne. Le coût de ces unités est tellement grand qu'une seule station génératrice est fournie mais ce méthode fait naître le problème des réseaux en duplication et triplication dans zones de l'hôpital qu'on a appelé 'absolument essentiel', 'moyennement essentiel' et 'non essentiel'.

Si ce méthode de système de ségregation est adopté le coût de substitution de la récticulation électrique existente peut devenir très élevé. Quelques bâtiments pourront avoir besoin de trois services séparés. Comme l'usage d'équipement électrique éssentiel augmente toujours et surtout dans secteurs qui auparavant n'étaient considérés d' 'absolument éssentiel', on aura besoin d'adopter une solution différente d'autre façon le problème ne finira jamais.

Deux méthodes ont été proposés:

(i) Création de deux services électriques séparés. Les zones 'non éssentiels' resteront isolés quand a lieu une panne générale dans l'alimentation électrique de l'hôpital. Les zones 'absolument essentiels' auront des batteries qui 'flotteront' sur l'alimentation électrique et par la voie d'un inverseur fourniront une alimentation permanente. Les zones 'moyennement essentiels' resteront sans énergie jusq'au moment de la liaison du générateur au réseau électrique.

(ii) L'usage du contrôle de fluctuation évite les problèmes mentionnés parce qu'il n'y a pas d'altération pour la réticulation.

L'installation actuel reste, mais les converseurs, batteries et inverseurs sont nécessaires pour les zones d'énergie électrique permanente. Les zones moyennement et non essentiels seront munies de relais pour controler les disjoncteurs quand se produit une panne. Les relais sont controlés par un impulse d'audio frèquence surimposé à l'alimentation électrique principale. Le résultat est un système de contrôle à partir d'un point central, très flexible.

Les deux zones 'moyennement essentiel' et 'non essentiel', peuvent avoir une échelle de priorités de 1 à 22. S'il y a une panne tous les disjoncteurs ouvriront automatiquement sauf ceux des zones absolument essentiels, et quand le générateur de secours travaille, le contrôle de fluctuation peut alors fermer les disjoncteurs des circuits classifiés comme priorité 1 dans les zones moyennement essentiels, suivant ceux de la priorité 2 etc, juqu'à maximum production du générateur de secours.

Le nombre des circuits électriques en charge varierait avec la demande de l'hôpital à l'occasion de la panne.

Council Meeting

12th Meeting of IFHE Council, Lisbon, May 28-June 1

Members present:

J. Ponthieux, President
E. A. Cætano, Vice-President
O. Amato, Past President
G. A. Rooley, Past President
Z. Tzartzanos, Past President
B. Massara, General Secretary
E. Milone, Treasurer
K. Ashton, United Kingdom
K. Murray, United Kingdom
P. Gras, France
I. Pavlidis, Greece
J. C. Mealha, Portugal
M. F. da Costa, Portugal
N. Snel, Holland
A. Vertegaal, Holland
V. Oviatt, USA
V. Atwater, USA
F. Sessa, Italy
R. D. Etheridge, Barbados
G. Parker, New Zealand
H. Roberts, Australia
L. Irwin, Australia
W. D. S. Clinkscales, RSA
J. J. Nieuwoudt, RSA
A. O. Faluyi, Nigeria
P. B. Oyebolu, Nigeria
A. J. Bonnin Vila, Spain
Miss Maria Pérez Sheriff, Spain
J. Flury, Switzerland
P. L. Kuchler, Switzerland
E. Rahat, Israel
J. A. Silva, Brazil
M. Soheili, Tran.

Nils Tjerneld (Sweden) also present on behalf of Mr J. Thorp, unable to attend meeting.

Apologies for absence received from: Mr Wullært, Belgium; Mr Guy, USA.

Acceptance of New Members

The Council approved the application for transfer of the 'Association Suisse des Ingénieurs Hospitaliers' from associate to full Member. Representation of this Association will come from Mr J. Flury and Mr P. L. Küchler.

The council approved the application for membership of 'Sigehus Maskinmestrenes Samvirke' of Denmark, being the official representative body for hospital engineering in that country. The Council representatives will be Mr A. Olesen and Mr J. Roesgaad.

Replacement of Council Members

The Council was informed of the following changes in national representation:

ANIHEP (France), Mr L. Dubuile will replace Mr P. Vanier;

NAHE (Nigeria), Mr P. B. Oyebolu will replace Mr Von der Mosel;
IHE (UK), Mr J. Johnson will replace Mr K. Ashton;
Fe NATO (Italy), Mr F. Sessa will replace Mr G. Zedda.

Mr Ashton will continue as Chairman of the UK Publications Committee for the Journal. The Council warmly thanked Mr Ashton for his very fruitful collaboration.

Election of New President
In accordance with the Statute the Vice President, Mr E. Cætano, was duly elected President for the period 1978–1980. Council then elected Mr V. Oviatt as Vice-President for the same period, who announced that he would be commencing work immediately to organise the 1980 Congress in either Washington or Baltimore.

Associate Membership
The President announced the application of Mr Hassan Sha'rawi (Egypt) for associate membership. The application was approved by Council and Mr Sha'rawi was welcomed to the meeting. Mr Sha'rawi is Chief Engineer at Cairo University which has a teaching hospital and medical school.

Two further applications for Associate Membership came from Mr Ivo Gersic (Yugoslavia), and Mr Sher Mohammed (Pakistan). The applications were approved by the Council.

New General Secretary and Treasurer
The President confirmed the reappointment of Mr Massara (General Secretary) and Mr Milone (Treasurer), approved unanimously by the council. Mr Massara announced that he would wish to be relieved of his appointment in due course. The council agreed to the proposal to appoint an Assistant Secretary to Mr Massara who might eventually assume the rôle of General Secretary. During all council sessions Mr Galvao assisted the Secretary by acting as translater. The council thanked Mr Galvao for his collaboration.

The Journal
Mr Ashton referred to the fact that only 16 technical papers and articles had been received from member countries for publication in the international issues of the Journal. Greater support was called for from members of National Associations. There is a need for short articles or letters to the editor which provide general information so that communication between member countries through the written word can be established. All submissions should be written in English with a synopsis in the language of origin. Subscriptions to the Journal were considered and all members were asked to encourage their national association to increase the number of subscriptions in reasonable proportion to their total membership.

Proposed Regional Groups
Messrs Parker and Roberts presented a proposal on behalf of New Zealand to establish Regional Groups within IFHE to enable closer communication between member countries in the Pacific area.

The proposal was considered and discussed at length by the council and the principle of Regional Groups was finally approved. Australia and New Zealand were encouraged by the council to continue their activities in Australasia in support of the less developed areas in the southern hemisphere.

Training Courses
Dr Murray (UK) reported on the development of training courses for senior hospital engineering personnel to be held in the UK and to be made available to candidates from any country who wished to participate. The first course, organised by the Department of Health and Social Security (UK), will be held in the summer of 1979. The approximate fee for each student would be £800 stirling.

Council approved and supported the arrangement.

International Hospital Federation Congress — Oslo 1979
It was reported that the IHF had extended invitations to engineers and architects to present papers at their Oslo Congress. The President of IFHE had been invitd to be Chairman for the technical session of the Congress and had accepted.

Free Circulation of Professional Men in Europe
The Italian Association tabled a motion that IFHE should support and actively pursue the implementation of the Treaty of Rome in the Common Market area on the matter of free circulation of professional men in Europe. Although council members agreed that this was a matter of great importance to professional engineers, it would require long and tedious debate before reaching any conclusion on the matter.

It was agreed that this matter be placed on the agenda for detailed consideration at the next meeting.

Activities of Sub-Committee

The following Committees of Council have been established and their membership and brief is as follows:

Finance: Mr Milone, Treasurer; Mr Oviatt, Vice-President; Mr Roberts.

To examine the income and expenditure commitment of IFHE and future financial viability. The following recommendations were approved by the council:

a. To increase Associates' fees to 10,000 Italian lire commencing 1979;
b. to increase Members' fees by 25% commencing 1979;
c. to conduct a study of the cost and distribution of the Journal;
d. to conduct a study of a new fees scale.

Constitution and Regulations: Mr Parker, Dr Murray, Mr Massara.

To review the constitution of the IFHE in the light of growth and development and the effect of regional group activities.

Congress Evaluation and Organisation: Mr Clinckscales, Mr Rahat, Mr Soheili, Mr Atwater, Miss Maria Perez Sheriff.

To evaluate the 1978 Lisbon Congress and consider organisational arrangements for future Congressional assemblies.

Journal and Communication: Dr Murray, Mr Gras, Mr Faluyi.

To consider methods of communication between IFHE members and associates individually and collectively through National Associations, and the use of the Journal for this purpose. Council agreed the allocation of £500 stirling per annum to meet translation costs of articles and information published in the Journal.

General Resolutions

The council resolved that each member country of IFHE should nominate a correspondent to collect and edit information and articles for publication in the Journal.

The council acknowledged with thanks the offers of financial contribution to the Federation from Mr Soheili (Iran) and the South African Association.

Next Meeting of Council
It was agreed that the next meeting of Council will be held in Holland (Amsterdam) in April/May, 1979.

Product News

Fully Automatic Surgical Instrument Washing, Disinfecting and Drying Machine

The new Mark XI conveyorised five-stage washing, disinfecting and drying machine for soiled surgical instruments, is fully automatic and ensures complete protection from infection for staff handling instruments after the cleaning process. The instruments are fully disinfected when emerging from the machine and therefore there is no danger to staff and the chances of cross infection are minimised.

Designed for use in Theatre Sterile Supply Units (TSSU) and also Central Sterile Supply Departments (CSSD), the machine can handle 146 sets of soiled instruments of 1,246 lbs (565 kg) weight in a normal eight-hour shift. Only one operator is needed to process the day's output. The operator has only to load the machine, which is fully automatic and can therefore undertake additional duties. The total time through the five stages is 24 minutes, with a potential throughput of one basket every three minutes from the machine.

There is a washing machine, ultrasonic cleaner, drying machine, all combined in one fully automatic machine with an added disinfection cycle.

Further information from: Dent & Hellyer Limited, Grosvenor Works, Walworth Road, Andover, Hants SP10 5AA. Tel: 0264 62111.

Western Medical Flotation Unit

This is a therapeutic appliance providing low pressure conditions for body support. Continuous pressure reduction is achieved and the patient may remain in a static position.

The effect of flotation on a waterbed is extremely beneficial in relieving pressures on susceptible parts of the body. The average critical pressure which causes restricted blood flow is about 38 gms/cm² (28 mm Hg).

Many large area, deep sores can be healed in six to eight weeks which may take months by conventional nursing methods on standard beds or other devices.

It has been reported that about 40% of patients may develop bedsores within seven to ten days on a normal bed after one hour on a hard operating table. This can be avoided.

Close temperature control of the supporting surface prevents perspiration.

The unit is compatible with normal ward equipment and provides patient security with ease of operation and virtually no maintenance requirements.

The system was developed in conjunction with hospital medical staff and to meet mechanical and electrical safety requirements. The effectiveness of the Western Medical waterbed system has been proven in hospitals throughout the world.

Patient pain and discomfort can be minimised and nursing effort and time can be reduced.

The bed has been designed to include many features beneficial to operation by nurses and for the convenience of patients. The manufacturers say that the need to disturb patients during rest periods for the purpose of turning is eliminated. The bed may be relocated for most effective utilisation. The use of these units can save considerable costs of patient treatment. Minimum resistance of the supporting mattress permits muscle exercise by gentle exertion. Skin friction and irritation are reduced. The waterbed provides patient comfort during long-term confinement in static positions with ease of turning a patient, and no pumping system to create disturbance.

Although used for assisting healing of pressure sores, its greatest benefit is in their prevention.

Operational costs are minimal because of low power consumption. There are no moving electrical parts requiring maintenance and the bed is easily cleaned and handled.

The purchase price of the unit is little more than the price of certain hospital beds with other devices.

A unit of this type provides further accommodation for the most susceptible patients in a ward and can be in continuous use even when there is no healing required.

It is economically priced compared to other methods of obtaining continuous pressure reduction.

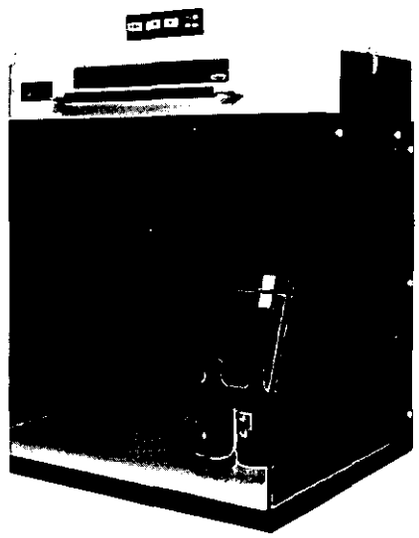
The unit has a low cost/benefit ratio and rapidly pays for itself, which contributes to its popularity.

Details from Western Medical, 26 New Cavendish Street, London W1. Tel: 01-935 7209.

Independent Fume Filtration Cabinets

The easy-to-install Erlab independent fume filtration cabinets are announced by Bigneat Limited of Havant who specialise in a range of clean room equipment for industry.

The Bigneat Erlab fume filtration cabinet.



The Erlab fume cabinets are made from tough transparent acrylic and can be bench-mounted or easily moved on a trolley. Objects can be seen vertically through a sloping front. Each cabinet can be installed without fixing of any kind and operational within half an hour. No ducting is required, therefore, no installation costs. The unique filtration system mounted on top of the cabinet eliminates odourless and noxious gases and no additional air consumption is required for air-conditioned premises. Erlab is ideal for industrial and hospital laboratories, research and school use, and for the handling of acids, solvents, gases, odourless materials and chemical preparations.

Full technical data is available from Bigneat Limited, 4 Solent Road, Havant, Hants PO9 1JH. Tel: (0705) 476831.

Leak Detector Spray

Leaks in gas and compressed air systems are rarely audible in noisy factories — electronic and other highly sophisticated testing equipment is expensive to buy and run, requires skilled staff to operate and will only confirm the presence of a leak, not its precise location — and 'soapy water' is not an efficient alternative.

Even at pressure as low as 5 mbar, Galutec will show up the smallest leak instantly. It produces a foam of very good micro porosity and stability.

It is useful for spot checks on bottles containing various gases, air compressors, testing air-brakes, tubes in tyres.

The active ingredient consists of a pure aqueous solution. It is water soluble, contains no solvents or alcohols of any kind, it leaves no deposits, nor will it damage paintwork or other materials. It will not cause stress corrosion in plastic piping and will maintain its full operational efficiency even over extended storage periods. The propellant gas is CO_2.

It is also non-inflammable (could even be used as a fire-extinguisher in an emergency), non-corrosive (contains corrosion inhibitor), non-toxic, harmless to skin, biodegradable — both active ingredient and corrosion inhibitor.

Further details from: Gotec Trading Limited, 13 Warner Road, Hornsey, London N8 7HB. Tel: 01-348 1160.

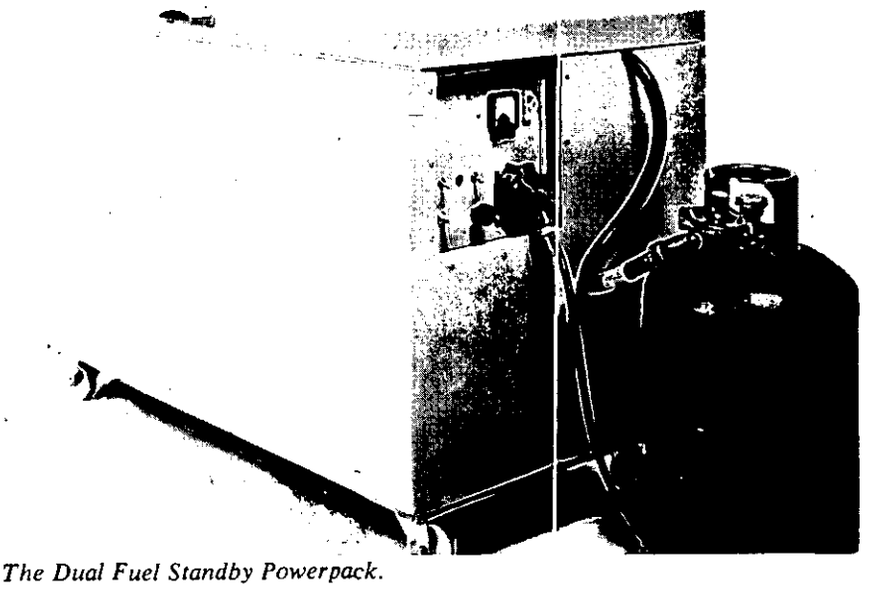
New Quiet Compact Mobile Generator

This new quiet running 5kVA power generator has been introduced to provide power when normal electricity supply fails, or during sudden power cuts.

Developed by L. E. Phillips & Co Ltd, the Dual Fuel Standby Powerpack is extremely compact, taking up only 8¼ sq ft of floor space. Mounted on easy-glide castors, the set is fully mobile and easily manoeuvrable through an average doorway.

As this generator runs on propane or natural gas, the offensive odours associated with petrol/diesel engines are eliminated. It can be sited in any room with an adequate supply of fresh air, near an open window or door.

If gas fuels become temporarily unobtainable, the set can be easily converted to petrol operation by a simple toggle switch. It must then be used out of doors to avoid the risk of fire and toxic exhaust fumes. If placed outside, the removable casing also provides weather protection.



The Dual Fuel Standby Powerpack.

The single-phase 240 volt Powerpack is operated by an on/off switch, starting from a 12 volt storage battery, which recharges as the set operates. As a refinement, automatic starting can also be incorporated to give almost immediate power. It is operational within seconds of a mains failure.

Further information can be obtained from Phillips, at *Little Kingshill, Great Missenden, Bucks HP16 0DX. Telephone: Great Missenden (02406) 4626.*

Carrying Better Coals to Newcastle . . .

Licensing agreements just signed with Belgian and German companies are expected to earn over £¼ million for a Wakefield firm over the next ten years.

Dieter Oehm, major landscaping contractors of Tempelhoferstrasse, Wiesbaden, have taken the exclusive licence for Grasscrete in Western Germany — ironically where the idea of mixing grass and concrete originated some twenty years ago.

The reason for opting for British Grasscrete, said Mr Walker, was that it is considered the best system available because it is the only one which is continuously reinforced and capable of withstanding ground movement.

Dieter Oehm will have the backing in Germany of a national cement producer and Hoechst — one of the world's largest companies with substantial investments in plastics — who are both keen to see their products used to beautify the environment, whereas traditionally they might have been criticised for the drab appearance produced by plastics and concrete.

Agreements were also signed with two Belgian companies, EPB SA and Eurobrevets, both of Brussells. The first — a subsidiary of the major Compagnie Générale Industrielle — has already brought specifications for the use of Grasscrete in Belgium and Kuwait. The second gives Eurobrevets exclusive selling rights in 12 former French colonies in West and Central Africa who have maintained strong links with the West.

Grasscrete is an *in situ* patented process, which produces a grass surface with the hidden loadbearing strength of continuously reinforced concrete. It has been widely used in Britain and abroad on large and small landscaping projects.

Apart from its attractive lawned look, it has important advantages over concrete surfaces, particularly in hot countries, since its self-draining properties help water conservation — 70% of rainwater finds its way back into the ground instead of running off as waste — and because it is a natural grass, it banishes solar glare and keeps the surface temperature well below that found in a concrete or asphalt area.

For further information about Grasscrete, contact: Walker House, 22 Bond Street, Wakefield, Yorks WF1 2QP. Tel: 0924 75997.

Classified Advertisements

APPOINTMENTS AND SITUATIONS VACANT

HOSPITAL CHIEF ENGINEER

Saudi Arabia

A General Hospital, now under construction, is situated in an agreeable climatic area, and is due to open in mid 1979. Candidates must have an HND HNC with electrical mechanical endorsements and a minimum of 5 years' hospital experience with at least two years as Deputy or Chief Engineer. Experience in the Middle East would be an advantage.

His duties will cover the following: The operation and maintenance of a wide range of plant and equipment including generating, water treatment, air-conditioning, sewage, transport, cold stores and all the usual medical facilities of a hospital. The recruitment and training of staff and tradesmen will be his responsibility, with direction from London.

A substantial salary will be negotiated, and a full range of benefits for expatriates provided, including furnished accommodation, car and education allowance for children. The initial contract, with a British company, will be for two years renewable by agreement.

Candidates should send detailed career details to D. Reid, Managing Director, Charles Martin Associates Ltd, Executive Selection Consultants, 23 College Hill, London EC4R 2RT. (01-248 1709). All applications will be treated in strict confidence and divulged to no-one without permission after interview. Ref. E3304.

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Mech. and/or Elect. Services in Hospitals; use of current DHSS Publications, etc.

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Elec. Engineering for Industry; MV and LV Systems; Switchgear Design and Selection; Engineering for Special Hazard Applications, etc.

The Firm: Long-established Consulting Engineers; 150 total staff; pleasant open plan head office in Dublin suburbs.

Benefits: Good salary; staff car; half-yearly reviews; free Pension, Life Assurance and Income Protection Schemes; flex-time; assistance with relocation expenses; good promotion prospects and opportunities for interdisciplinary working.

Apply to: B. K. Reilly, Varming Mulcahy Reilly Associates, Tramway House, Dartry Road, Dublin 6. Tel: 01-975716. Telex: 30405.

Closing Dates

Recruitment advertisers are requested to set closing dates no earlier than three weeks after publication date of the Journal Monthly publications do not receive preferential treatment by the Post Office and circulation lists in hospitals also delay receipt of the Journal by many potential applicants.

To place an advertisement in the next issue of **HOSPITAL ENGINEERING**, appearing in **January/February, 1979**, please contact: **EARLSPORT PUBLICATIONS**, 17 St. Swithin's Lane, London EC4, 01-623 2235/8, by **January 23**, latest.

fications, the problem remains how to segregate the services. If it is not feasible to provide individual generating sets in each building, a central generating station would be required and should be established close to the main sub-station to reduce cabling costs between the two. The 'no break' supply should be located as close as possible to the equipment requiring this service, otherwise the risk of cable faults is increased. Cable duplication would reduce the risk but is more expensive. With the 'no break' supply close to essential equipment, two instead of three reticulation services are required.

One method of segregating the services is to provide a separate cable from the central generating station to each sub-board, and to connect all essential circuits to this cable, which under normal circumstances would transmit external power. A less expensive method is to use the existing cabling, and to segregate the services at the sub-boards by fitting circuit breakers which are closed by magnetic coils. The circuit breakers supply the non essential areas. They open automatically on power failure and must be manually reset. The disadvantage is that manual resetting is time consuming, especially in areas where power failures of short duration are frequent, and/or when the emergency generating plant is test operated frequently.

The other method is to fit circuit breakers to all circuits instead of just to non essential circuits. The essential circuits would be fitted with automatic resetting on resumption of power after a short interruption, or when the emergency generating plant came into operation. This is a more flexible system as circuits could be changed from essential to non-essential or vice versa as the need arose. The change from automatic to manual resetting and vice versa is a simple operation.

In designing an emergency generation system, it must be assumed that all the essential services would be supplied with their maximum demand. There are times during the day, and especially at night, when the demand would be much lower than the maximum designed demand, and in times of external power failure the output from the generators could be well below their rated output. At the same time some areas of the hospital would be without power. This could be overcome if every circuit breaker could be remotely controlled from some central area. If conventional circuit breakers were used, individual cables from each operating coil to the central area would be required and the cost of installation could be prohibitive. Unless an adequate number of spare cables were provided, any additional circuits needed in the hospital would require an expensive cable-run to the control area.

However, there is another method available to control each circuit breaker remotely without the need for control wires. This is known as ripple control and uses the existing electrical reticulation as a conductor for the remote control signal to the circuit breakers. The control signal is an audio frequency impulse which is superimposed on the mains voltage.

There are a number of systems available. One of them operates as follows. Each circuit breaker is fitted with a mains voltage synchronous motor which, through a speed reducing gear box, drives a cam disc through one revolution in thirty seconds. Each cam disc operates two switches in sequence during each revolution. The cam disc can be manually adjusted so that the switching action occurs at one of 25 positions around the circumference of the disc. A relay in series with the two switches supplied mains voltage to the circuit breaker operating coil. The relay is operated by the audio frequency impulse.

When a switching operation is required, the audio frequency impulse is generated and transmitted to each circuit breaker. The relays close and start the synchronous motors. Once the motors have been started and run for five seconds they will continue to run and complete one revolution of the cam discs before stopping. After five seconds the relays drop out and are ready to perform the second function, that is to supply mains voltage to the circuit-breaker operating coil via the switches on the cam discs. When the programmed impulse is sent out, the relays close, and if the cam disc has closed one of the operating switches on one of the circuit breakers, then it can be operated, either to close or open depending on which switch has been closed by the cam at that moment.

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Depuis, la quantité d'equipement électrique a augmenté énormément et aussi la quantité d'énergie de secours nécéssaire. On a besoin de cette énérgie au bloc opératoire et ailleurs dans l'hôpital.

Par conséquent, des problèmes de réticulation très coûteux à résoudre ont surgit. Les batteries qui originellement étaient la source de l'énérgie électrique de secours ont été remplacés par les alternateurs poussés par moteurs à combustion interne. Le coût de ces unités est tellement grand qu'une seule station génératrice est fournie mais ce méthode fait naître le problème des réseaux en duplication et triplication dans zones de l'hôpital qu'on a appelé 'absolument essentiel', 'moyennement essentiel' et 'non essentiel'.

Si ce méthode de système de ségregation est adopté le coût de substitution de la récticulation électrique existente peut devenir très élevé. Quelques bâtiments pourront avoir besoin de trois services séparés. Comme l'usage d'équipement électrique éssentiel augmente toujours et surtout dans secteurs qui auparavant n'étaient considérés d' 'absolument éssentiel', on aura besoin d'adopter une solution différente d'autre façon le problème ne finira jamais.

Deux méthodes ont été proposés:

(i) Création de deux services électriques séparés. Les zones 'non éssentiels' resteront isolés quand a lieu une panne générale dans l'alimentation électrique de l'hôpital. Les zones 'absolument essentiels' auront des batteries qui 'flotteront' sur l'alimentation électrique et par la voie d'un inverseur fourniront une alimentation permanente. Les zones 'moyennement essentiels' resteront sans énergie jusq'au moment de la liaison du générateur au réseau électrique.

(ii) L'usage du contrôle de fluctuation évite les problèmes mentionnés parce qu'il n'y a pas d'altération pour la réticulation.

L'installation actuel reste, mais les converseurs, batteries et inverseurs sont nécessaires pour les zones d'énergie électrique permanente. Les zones moyennement et non essentiels seront munies de relais pour controler les disjoncteurs quand se produit une panne. Les relais sont controlés par un impulse d'audio frèquence surimposé à l'alimentation électrique principale. Le résultat est un système de contrôle à partir d'un point central, très flexible.

Les deux zones 'moyennement essentiel' et 'non essentiel', peuvent avoir une échelle de priorités de 1 à 22. S'il y a une panne tous les disjoncteurs ouvriront automatiquement sauf ceux des zones absolument essentiels, et quand le générateur de secours travaille, le contrôle de fluctuation peut alors fermer les disjoncteurs des circuits classifiés comme priorité 1 dans les zones moyennement essentiels, suivant ceux de la priorité 2 etc, juqu'à maximum production du générateur de secours.

Le nombre des circuits électriques en charge varierait avec la demande de l'hôpital à l'occasion de la panne.

Council Meeting

12th Meeting of IFHE Council, Lisbon, May 28-June 1

Members present:

J. Ponthieux, President
E. A. Cætano, Vice-President
O. Amato, Past President
G. A. Rooley, Past President
Z. Tzartzanos, Past President
B. Massara, General Secretary
E. Milone, Treasurer
K. Ashton, United Kingdom
K. Murray, United Kingdom
P. Gras, France
I. Pavlidis, Greece
J. C. Mealha, Portugal
M. F. da Costa, Portugal
N. Snel, Holland
A. Vertegaal, Holland
V. Oviatt, USA
V. Atwater, USA
F. Sessa, Italy
R. D. Etheridge, Barbados
G. Parker, New Zealand
H. Roberts, Australia
L. Irwin, Australia
W. D. S. Clinkscales, RSA
J. J. Nieuwoudt, RSA
A. O. Faluyi, Nigeria
P. B. Oyebolu, Nigeria
A. J. Bonnin Vila, Spain
Miss Maria Pérez Sheriff, Spain
J. Flury, Switzerland
P. L. Kuchler, Switzerland
E. Rahat, Israel
J. A. Silva, Brazil
M. Soheili, Tran.

Nils Tjerneld (Sweden) also present on behalf of Mr J. Thorp, unable to attend meeting.

Apologies for absence received from: Mr Wullært, Belgium; Mr Guy, USA.

Acceptance of New Members

The Council approved the application for transfer of the 'Association Suisse des Ingénieurs Hospitaliers' from associate to full Member. Representation of this Association will come from Mr J. Flury and Mr P. L. Küchler.

The council approved the application for membership of 'Sigehus Maskinmestrenes Samvirke' of Denmark, being the official representative body for hospital engineering in that country. The Council representatives will be Mr A. Olesen and Mr J. Roesgaad.

Replacement of Council Members

The Council was informed of the following changes in national representation:

ANIHEP (France), Mr L. Dubulle will replace Mr P. Vanier;

NAHE (Nigeria), Mr P. B. Oyebolu will replace Mr Von der Mosel;
IHE (UK), Mr J. Johnson will replace Mr K. Ashton;
Fe NATO (Italy), Mr F. Sessa will replace Mr G. Zedda.

Mr Ashton will continue as Chairman of the UK Publications Committee for the Journal. The Council warmly thanked Mr Ashton for his very fruitful collaboration.

Election of New President
In accordance with the Statute the Vice President, Mr E. Cætano, was duly elected President for the period 1978–1980. Council then elected Mr V. Oviatt as Vice-President for the same period, who announced that he would be commencing work immediately to organise the 1980 Congress in either Washington or Baltimore.

Associate Membership
The President announced the application of Mr Hassan Sha'rawi (Egypt) for associate membership. The application was approved by Council and Mr Sha'rawi was welcomed to the meeting. Mr Sha'rawi is Chief Engineer at Cairo University which has a teaching hospital and medical school.

Two further applications for Associate Membership came from Mr Ivo Gersic (Yugoslavia), and Mr Sher Mohammed (Pakistan). The applications were approved by the Council.

New General Secretary and Treasurer
The President confirmed the reappointment of Mr Massara (General Secretary) and Mr Milone (Treasurer), approved unanimously by the council. Mr Massara announced that he would wish to be relieved of his appointment in due course. The council agreed to the proposal to appoint an Assistant Secretary to Mr Massara who might eventually assume the rôle of General Secretary. During all council sessions Mr Galvao assisted the Secretary by acting as translater. The council thanked Mr Galvao for his collaboration.

The Journal
Mr Ashton referred to the fact that only 16 technical papers and articles had been received from member countries for publication in the international issues of the Journal. Greater support was called for from members of National Associations. There is a need for short articles or letters to the editor which provide general information so that communication between member countries through the written word can be established. All submissions should be written in English with a synopsis in the language of origin. Subscriptions to the Journal were considered and all members were asked to encourage their national association to increase the number of subscriptions in reasonable proportion to their total membership.

Proposed Regional Groups
Messrs Parker and Roberts presented a proposal on behalf of New Zealand to establish Regional Groups within IFHE to enable closer communication between member countries in the Pacific area.

The proposal was considered and discussed at length by the council and the principle of Regional Groups was finally approved. Australia and New Zealand were encouraged by the council to continue their activities in Australasia in support of the less developed areas in the southern hemisphere.

Training Courses
Dr Murray (UK) reported on the development of training courses for senior hospital engineering personnel to be held in the UK and to be made available to candidates from any country who wished to participate. The first course, organised by the Department of Health and Social Security (UK), will be held in the summer of 1979. The approximate fee for each student would be £800 stirling.

Council approved and supported the arrangement.

International Hospital Federation Congress — Oslo 1979
It was reported that the IHF had extended invitations to engineers and architects to present papers at their Oslo Congress. The President of IFHE had been invitd to be Chairman for the technical session of the Congress and had accepted.

Free Circulation of Professional Men in Europe
The Italian Association tabled a motion that IFHE should support and actively pursue the implementation of the Treaty of Rome in the Common Market area on the matter of free circulation of professional men in Europe. Although council members agreed that this was a matter of great importance to professional engineers, it would require long and tedious debate before reaching any conclusion on the matter.

It was agreed that this matter be placed on the agenda for detailed consideration at the next meeting.

Activities of Sub-Committee

The following Committees of Council have been established and their membership and brief is as follows:

Finance: Mr Milone, Treasurer; Mr Oviatt, Vice-President; Mr Roberts.

To examine the income and expenditure commitment of IFHE and future financial viability. The following recommendations were approved by the council:

a. To increase Associates' fees to 10,000 Italian lire commencing 1979;
b. to increase Members' fees by 25% commencing 1979;
c. to conduct a study of the cost and distribution of the Journal;
d. to conduct a study of a new fees scale.

Constitution and Regulations: Mr Parker, Dr Murray, Mr Massara.

To review the constitution of the IFHE in the light of growth and development and the effect of regional group activities.

Congress Evaluation and Organisation: Mr Clinckscales, Mr Rahat, Mr Soheili, Mr Atwater, Miss Maria Perez Sheriff.

To evaluate the 1978 Lisbon Congress and consider organisational arrangements for future Congressional assemblies.

Journal and Communication: Dr Murray, Mr Gras, Mr Faluyi.

To consider methods of communication between IFHE members and associates individually and collectively through National Associations, and the use of the Journal for this purpose. Council agreed the allocation of £500 stirling per annum to meet translation costs of articles and information published in the Journal.

General Resolutions

The council resolved that each member country of IFHE should nominate a correspondent to collect and edit information and articles for publication in the Journal.

The council acknowledged with thanks the offers of financial contribution to the Federation from Mr Soheili (Iran) and the South African Association.

Next Meeting of Council
It was agreed that the next meeting of Council will be held in Holland (Amsterdam) in April/May, 1979.

Product News

Fully Automatic Surgical Instrument Washing, Disinfecting and Drying Machine

The new Mark XI conveyorised five-stage washing, disinfecting and drying machine for soiled surgical instruments, is fully automatic and ensures complete protection from infection for staff handling instruments after the cleaning process. The instruments are fully disinfected when emerging from the machine and therefore there is no danger to staff and the chances of cross infection are minimised.

Designed for use in Theatre Sterile Supply Units (TSSU) and also Central Sterile Supply Departments (CSSD), the machine can handle 146 sets of soiled instruments of 1,246 lbs (565 kg) weight in a normal eight-hour shift. Only one operator is needed to process the day's output. The operator has only to load the machine, which is fully automatic and can therefore undertake additional duties. The total time through the five stages is 24 minutes, with a potential throughput of one basket every three minutes from the machine.

There is a washing machine, ultrasonic cleaner, drying machine, all combined in one fully automatic machine with an added disinfection cycle.

Further information from: Dent & Hellyer Limited, Grosvenor Works, Walworth Road, Andover, Hants SP10 5AA. Tel: 0264 62111.

Western Medical Flotation Unit

This is a therapeutic appliance providing low pressure conditions for body support. Continuous pressure reduction is achieved and the patient may remain in a static position.

The effect of flotation on a waterbed is extremely beneficial in relieving pressures on susceptible parts of the body. The average critical pressure which causes restricted blood flow is about 38 gms/cm^2 (28 mm Hg).

Many large area, deep sores can be healed in six to eight weeks which may take months by conventional nursing methods on standard beds or other devices.

It has been reported that about 40% of patients may develop bedsores within seven to ten days on a normal bed after one hour on a hard operating table. This can be avoided.

Close temperature control of the supporting surface prevents perspiration.

The unit is compatible with normal ward equipment and provides patient security with ease of operation and virtually no maintenance requirements.

The system was developed in conjunction with hospital medical staff and to meet mechanical and electrical safety requirements. The effectiveness of the Western Medical waterbed system has been proven in hospitals throughout the world.

Patient pain and discomfort can be minimised and nursing effort and time can be reduced.

The bed has been designed to include many features beneficial to operation by nurses and for the convenience of patients. The manufacturers say that the need to disturb patients during rest periods for the purpose of turning is eliminated. The bed may be relocated for most effective utilisation. The use of these units can save considerable costs of patient treatment. Minimum resistance of the supporting mattress permits muscle exercise by gentle exertion. Skin friction and irritation are reduced. The waterbed provides patient comfort during long-term confinement in static positions with ease of turning a patient, and no pumping system to create disturbance.

Although used for assisting healing of pressure sores, its greatest benefit is in their prevention.

Operational costs are minimal because of low power consumption. There are no moving electrical parts requiring maintenance and the bed is easily cleaned and handled.

The purchase price of the unit is little more than the price of certain hospital beds with other devices.

A unit of this type provides further accommodation for the most susceptible patients in a ward and can be in continuous use even when there is no healing required.

It is economically priced compared to other methods of obtaining continuous pressure reduction.

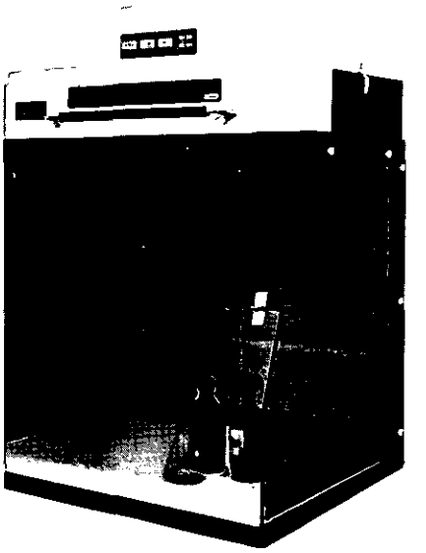
The unit has a low cost/benefit ratio and rapidly pays for itself, which contributes to its popularity.

Details from Western Medical, 26 New Cavendish Street, London W1. Tel: 01-935 7209.

Independent Fume Filtration Cabinets

The easy-to-install Erlab independent fume filtration cabinets are announced by Bigneat Limited of Havant who specialise in a range of clean room equipment for industry.

The Bigneat Erlab fume filtration cabinet.



The Erlab fume cabinets are made from tough transparent acrylic and can be bench-mounted or easily moved on a trolley. Objects can be seen vertically through a sloping front. Each cabinet can be installed without fixing of any kind and operational within half an hour. No ducting is required, therefore, no installation costs. The unique filtration system mounted on top of the cabinet eliminates odourless and noxious gases and no additional air consumption is required for air-conditioned premises. Erlab is ideal for industrial and hospital laboratories, research and school use, and for the handling of acids, solvents, gases, odourless materials and chemical preparations.

Full technical data is available from Bigneat Limited, 4 Solent Road, Havant, Hants PO9 1JH. Tel: (0705) 476831.

Leak Detector Spray

Leaks in gas and compressed air systems are rarely audible in noisy factories — electronic and other highly sophisticated testing equipment is expensive to buy and run, requires skilled staff to operate and will only confirm the presence of a leak, not its precise location — and 'soapy water' is not an efficient alternative.

Even at pressure as low as 5 mbar, Galutec will show up the smallest leak instantly. It produces a foam of very good micro porosity and stability.

It is useful for spot checks on bottles containing various gases, air compressors, testing air-brakes, tubes in tyres.

The active ingredient consists of a pure aqueous solution. It is water soluble, contains no solvents or alcohols of any kind, it leaves no deposits, nor will it damage paintwork or other materials. It will not cause stress corrosion in plastic piping and will maintain its full operational efficiency even over extended storage periods. The propellant gas is CO_2.

It is also non-inflammable (could even be used as a fire-extinguisher in an emergency), non-corrosive (contains corrosion inhibitor), non-toxic, harmless to skin, biodegradable — both active ingredient and corrosion inhibitor.

Further details from: Gotec Trading Limited, 13 Warner Road, Hornsey, London N8 7HB. Tel: 01-348 1160.

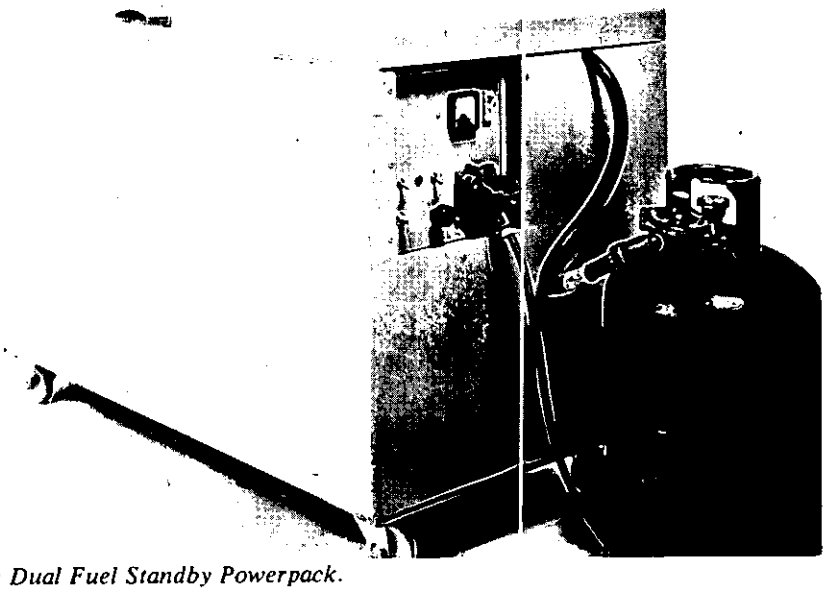
New Quiet Compact Mobile Generator

This new quiet running 5kVA power generator has been introduced to provide power when normal electricity supply fails, or during sudden power cuts.

Developed by L. E. Phillips & Co Ltd, the Dual Fuel Standby Powerpack is extremely compact, taking up only 8½ sq ft of floor space. Mounted on easy-glide castors, the set is fully mobile and easily manoeuvrable through an average doorway.

As this generator runs on propane or natural gas, the offensive odours associated with petrol/diesel engines are eliminated. It can be sited in any room with an adequate supply of fresh air, near an open window or door.

If gas fuels become temporarily unobtainable, the set can be easily converted to petrol operation by a simple toggle switch. It must then be used out of doors to avoid the risk of fire and toxic exhaust fumes. If placed outside, the removable casing also provides weather protection.



The Dual Fuel Standby Powerpack.

The single-phase 240 volt Powerpack is operated by an on/off switch, starting from a 12 volt storage battery, which recharges as the set operates. As a refinement, automatic starting can also be incorporated to give almost immediate power. It is operational within seconds of a mains failure.

Further information can be obtained from Phillips, at *Little Kingshill, Great Missenden, Bucks HP16 0DX. Telephone: Great Missenden (02406) 4626.*

Carrying Better Coals to Newcastle . . .

Licensing agreements just signed with Belgian and German companies are expected to earn over £¼ million for a Wakefield firm over the next ten years.

Dieter Oehm, major landscaping contractors of Tempelhoferstrasse, Wiesbaden, have taken the exclusive licence for Grasscrete in Western Germany — ironically where the idea of mixing grass and concrete originated some twenty years ago.

The reason for opting for British Grasscrete, said Mr Walker, was that it is considered the best system available because it is the only one which is continuously reinforced and capable of withstanding ground movement.

Dieter Oehm will have the backing in Germany of a national cement producer and Hoechst — one of the world's largest companies with substantial investments in plastics — who are both keen to see their products used to beautify the environment, whereas traditionally they might have been criticised for the drab appearance produced by plastics and concrete.

Agreements were also signed with two Belgian companies, EPB SA and Eurobrevets, both of Brussells. The first — a subsidiary of the major Compagnie Générale Industrielle — has already brought specifications for the use of Grasscrete in Belgium and Kuwait. The second gives Eurobrevets exclusive selling rights in 12 former French colonies in West and Central Africa who have maintained strong links with the West.

Grasscrete is an *in situ* patented process, which produces a grass surface with the hidden loadbearing strength of continuously reinforced concrete. It has been widely used in Britain and abroad on large and small landscaping projects.

Apart from its attractive lawned look, it has important advantages over concrete surfaces, particularly in hot countries, since its self-draining properties help water conservation — 70% of rainwater finds its way back into the ground instead of running off as waste — and because it is a natural grass, it banishes solar glare and keeps the surface temperature well below that found in a concrete or asphalt area.

For further information about Grasscrete, contact: Walker House, 22 Bond Street, Wakefield, Yorks WF1 2QP. Tel: 0924 75997.

Classified Advertisements

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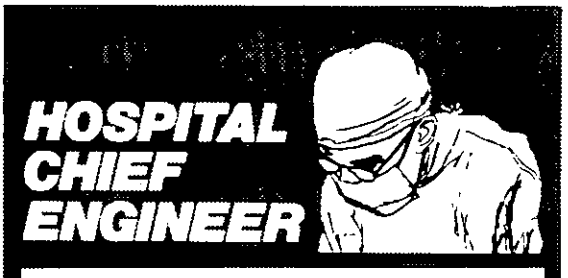

Saudi Arabia

A General Hospital, now under construction, is situated in an agreeable climatic area, and is due to open in mid 1979. Candidates must have an HND HNC with electrical mechanical endorsements and a minimum of 5 years' hospital experience with at least two years as Deputy or Chief Engineer. Experience in the Middle East would be an advantage.

His duties will cover the following: The operation and maintenance of a wide range of plant and equipment including generating, water treatment, air-conditioning, sewage, transport, cold stores and all the usual medical facilities of a hospital. The recruitment and training of staff and tradesmen will be his responsibility, with direction from London.

A substantial salary will be negotiated, and a full range of benefits for expatriates provided, including furnished accommodation, car and education allowance for children. The initial contract, with a British company, will be for two years renewable by agreement.

Candidates should send detailed career details to D. Reid, Managing Director, Charles Martin Associates Ltd, Executive Selection Consultants, 23 College Hill, London EC4R 2RT. (01-248 1709). All applications will be treated in strict confidence and divulged to no-one without permission after interview. Ref. E3304.

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Apply to: B. K. Reilly, Varming Mulcahy Reilly Associates, Tramway House, Dartry Road, Dublin 6. Tel: 01-975716. Telex: 30405.

Closing Dates

Recruitment advertisers are requested to set closing dates no earlier than three weeks after publication date of the Journal Monthly publications do not receive preferential treatment by the Post Office and circulation lists in hospitals also delay receipt of the Journal by many potential applicants.

To place an advertisement in the next issue of **HOSPITAL ENGINEERING**, appearing in **January/February, 1979**, please contact: **EARLSPORT PUBLICATIONS**, 17 St. Swithin's Lane, London EC4, 01-623 2235/8, by **January 23**, latest.

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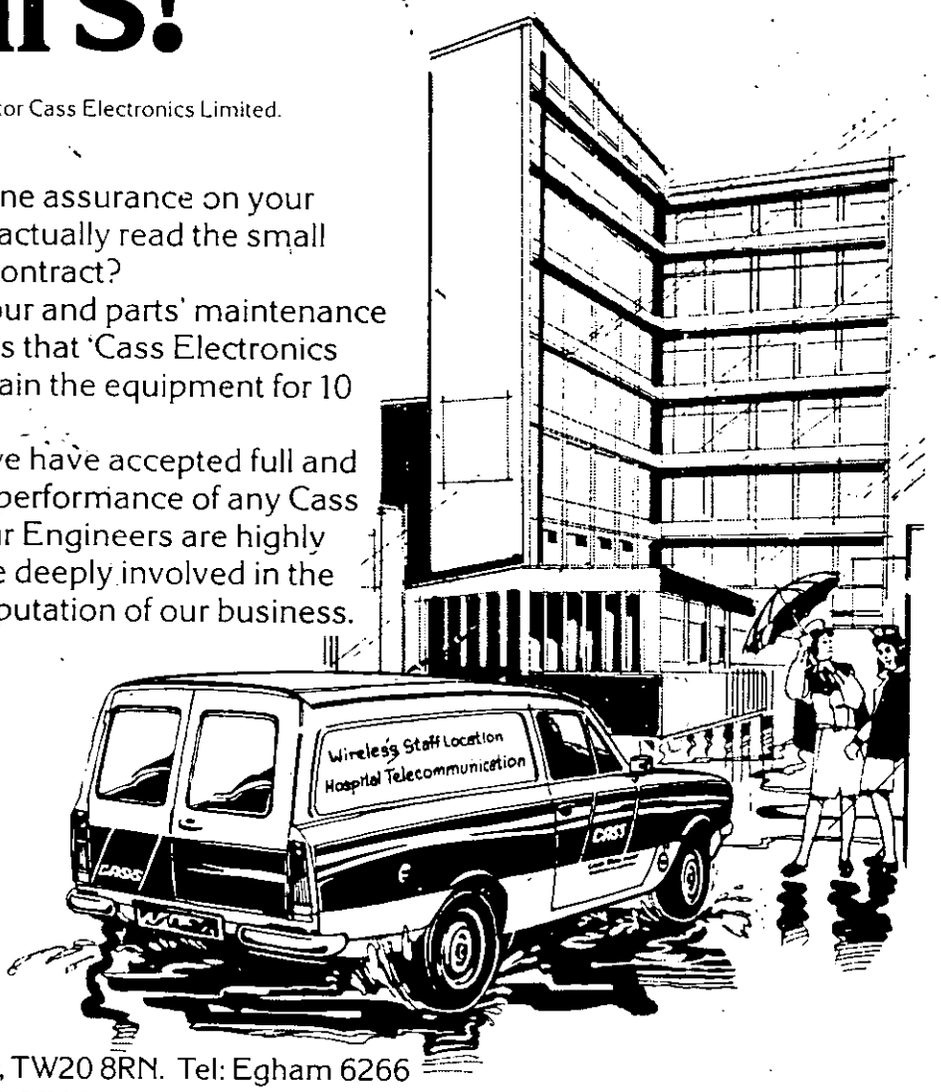

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