Educational Opportunities

— New England Hospital Assembly

PRELIMINARIES
FOR ANNUAL
MEETING SET

Everett Benoit and Bernard Dowd have tentatively scheduled the N.E.H.E.S. Annual Seminar for Tuesday, March 26, 1968, at the Hotel Lenox in Boston.

The New England Hospital Assembly will convene with its 47th Annual Meeting March 25-27 at the War Memorial Auditorium. This offers N.E.H.E.S. members an opportunity to view and partake in exhibits and educational classes, thereby affording new ideas and products in the ever widening field of hospital growth.

The educational topic for the N.E.H.E.S. meeting will be directed towards water and air pollution. Further details and reservations will be available in the Spring Newsletter.

AHA ENGINEERING SEMINAR

The American Hospital Association’s institute on hospital engineering will offer three seminars in 1968. Each seminar is sponsored by the American Society for Hospital Engineers and subsidiary organizations such as our own WEHES.

The programs are designed “to build greater engineering and management competence.” Formal presentations correlated with small group sessions and homework offer enlightenment to the hospital engineer. For more information and application forms write to:
(Continued on page 5)

— American Hospital Association Engineering Seminars

Welcome Aboard

ELAIR M. WENTWORTH
Chief Engineer
Glover Memorial Hospital
148 Chestnut Street
Needham, Massachusetts 02192

EDWIN T. GRONBERG
Asst. Plant Superintendent
Children’s Hospital
300 Longwood Avenue
Boston, Massachusetts 02115

JAMES P. MULLIGAN
Buildings and Grounds Manager
U. S. Public Health Service Hospital
77 Warren Street
Brighton, Massachusetts 02135

DONALD W. BAIL
Plant Superintendent
Maine Medical Center
Bramhall Street
Portland, Maine

*Each new member’s application should be signed by his Administrator or an approved member whenever possible.
Next Year's Problems

By Louis B. Ely, Jr.
Administrative Engineer
Mary Hitchcock Memorial Hospital
Hanover, N. H.

The health field is now the fourth largest industry in the country. The growth seems to stem from four main areas:

1. Social changes in local, state and federal legislation: Medicaid and Medicare are responsible for much of this growth.

2. The affluent society of today permits people to spend more money for better care of themselves than ever before.

3. The success of medical research over the past few years has permitted the physician to save lives through more procedures and therefore has generated the need for increased hospital facilities. (During the last 30 years, the medical knowledge explosion through research has been greater than the knowledge obtained in the previous 5,000 years.)

4. The population increase in the United States from 140,000,000 in 1940, to 200,000,000 in 1987 has also made it necessary to enlarge health facilities.

By the year 1970, nearly 50% of all hospital bill will be paid for by the federal government.

Over three-quarters of the population of this country, some 156,000,000 people, now pay a major part of their medical bills through a third party such as Blue Cross-Blue Shield, Medicaid-Medicare and other forms of assistance. Assistance to hospitals through Hill-Burton, National Institute of Health, private grants, and many other forms of subsidization, are having a profound effect on hospital construction at this time.

Costs have risen 85% in the last ten years, which places hospitals in a poor light with those who must pay the bills. The hue and cry has gone up for increased efficiency in the operation of hospitals.

What does all this mean as it relates to Hospital Engineering?

1. It guarantees more growth to the hospitals of the United States.

2. It indicates that there will be more sophisticated systems, which will be more difficult to service, harder to understand, and therefore require more manpower, brainpower, education, and equipment.

3. It will require a larger number of systems, added to all construction, both new and existing. This, in turn, suggests greater man-hours per-bed per-hospital in the United States.

4. What changes in present engineering procedures will be designed to meet the pressures as previously described?

A) The necessary formalization of the Engineering and Maintenance Department must be carried out. With this more positive organization, certain functions must be given strong consideration:

1. The space required to operate an efficient department. We so frequently see engineering departments given the cast-off space in the bowels of the institution, where they can more or less sink or swim according to the capabilities of the engineer. The actual amount of planning of shops, drafting areas, office requirements, frequently has never existed in hospitals. The engineer winds up being a scrounger, of sorts, to provide something for himself and his people.

2. The equipment that most departments have is frequently minimal and often, rather aged. Modern shop equipment, power tools, metering and testing devices, all of which are a part of a modern day program, should be budgeted-for and purchased.

3. Communications for many Engineering and Maintenance Departments are totally lacking. It isn't necessary that every man carry a two-way walkie-talkie, radio-page, or some other type of electronic device. Lights, bells, pages, and other less sophisticated equipment can be utilized affording communications between one another without (Continued on page 3)
Next Year’s Problems

(Continued from page 2)

searching, looking, passing the
word, or sending people out on time
consuming trips to obtain low-priority
information.

B) The much-maligned procedural
manual will be an absolute ne-
cessity. When all personnel are well
versed in what they must know and
have direct access to this knowledge,
in a form of a document, the engi-
near feels secure. If the men are
fully cognizant of their responsibili-
ties, be it of an emergency or rou-
tine nature, they cannot invent ex-
cuses for lack of direct documental
answers.

I. Job descriptions need to be all
inclusive and still have a catch
phrase to permit the swinging of
personnel to meet any emergency, at
any time.

This is important, since a well
documented job description creates
the basis for the rate at which a man
is to be paid. If you do not upgrade
your job descriptions periodically,
thereby making demands on your
personnel, there is the danger of
having progress pass your organiza-
tion thus making it extremely awk-
ward to catch up at a later date.

Job descriptions should be review-
ed each year and most likely updat-
ed at least every second year. This
type of leverage can be of great
value, especially when it comes to
working with administration and the
personnel department in obtaining
journeyman class mechanics.

C) Scheduling of personnel will
loom-up as an all important tool of
management in the Engineering and
Maintenance Department of a hospi-
tal.

I. All men should have their work
laid out to prevent standing around
and loss of time due to planning or
discussion of work assignments.

II. Assuming now that a hospital
has a well organized work-order sys-
tem; it should be of little trouble
to see that the assignments are avail-
able for all men of all trades well
ahead of the individuals who will
prosecute the work.

III. The supervisor, who is respon-
sible for the work assignments on
the schedules, must have the area
prepared and materials for the man
who is going to perform the work.
This takes coordination on the
part of a good shop supervisor, assis-
tant engineer, or in some cases, in
smaller hospitals, the engineer him-
self. (If a time-study man came in
with his clipboard and stopwatch,
he could make fools out of the aver-
age rank and file in hospitals to-
day.)

IV. Preventive Maintenance are
words that have been overworked
for years in the business. Here
again, the degree of sophistication
must be increased. Spare parts, the
proper lubricant, the documentation
to go with the system, and the di-
rect assignments of personnel, are
the only true answers to accomplishing
this end successfully. Men
involved in construction, projects,
and repairs, keep putting preventive
maintenance aside until a point is
reached where it is not carried out.
What could have been prevented
now, soon becomes a breakdown
requiring more time and money.

D) Education of personnel has now
become an accepted practice in many
hospitals. Adult education classes,
extension-college courses, and manu-
ufacturer’s schools have the ability to
give the knowledge needed to carry
out the requirements of technologi-
cal advances.

E) Positions within the Engi-
neering and Maintenance Depart-
ment should be worthwhile for all
those who hold them. Recognition
should start with appearances and
conclude with knowledge and per-
formance. Men who are seen in shab-
by-looking, ill-tailored, and man-
colored work clothes and carry beat-
up old tools, quite frequently point
to mediocrity at best. Men in clean
hospital uniforms, who are not
ashamed to go anywhere in the hospi-
tal, (be it a patient room, the
operating room, or the administra-
tor’s office) should be the call of
day. They should be workman-
like in their approach to their jobs
and know what is expected of them.
With the proper support from their
supervisors, they should vigorously
prosecute their work to the tune of
seven hours a day. (Seven hours
stems from the rather liberal coffee
breaks, discussions, and early quit-
ting time, where minutes are drib-
bled away.)

F) The need for specialization has
been here for several years. Despite
this fact, many large well-known
hospitals still advertise (in the
papers) for the “Handyman.” This
concept is wrong and if you do not
agree, try writing a job description
for a so-called “Handyman.”

G) The presenting of a proper pro-
spective to the administration or
controlling body of the hospital is the
responsibility of the engineer, who rep-
resents the Engineering and Main-
tenance Department. How many times have we
heard an engineer complain about
“them” or the idea that “they” will
or will not do something when the
engineer requests it. Approximately
two-thirds of all complaints have
originated from people who did not
properly document the information
to the administration being sold. A
good engineer who brings problems
to administration will also bring
answers. It is incumbent upon him
to make requests yielding plenty of
lead time for budgeting and deci-
sion making. Out of fairness to his
superior, it quite frequently is wise
to introduce the subject and then
request it be discussed further when
the administrator has an opportuni-
ty to give it more thought.

A carefully documented case can
support the administrator when he
goes to the trustees or other
persons for funds to support the
needs of the department. Many en-
gineers will accept things at
face value, as it relates to other de-
partments in the hospital and not
push their advantage when formu-
lated documentation would indicate
that their department is an excep-
tion to the rule. This is extremely
important, since The Engineering
and Maintenance Department has
certain responsibilities during em-
ergencies and disasters.

Think back to the statistics which
are facing hospitals today — the
medical and technological advances
which seem to be popping up every
month or so in the trade journals and
in the possession of various vendors
selling material and equipment to
hospitals. It is important that the
engineer attempt to regulate his life
to permit time to study, think
things out, and run a good organiza-
tion. There was a time when every-
thing depended on the mechanic,
who could affect a repair and do it
in a hurry to meet the needs of the
hospital. Today, this ability becomes
subordinate to many more important

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Coronary Care Units

By Roger R. McAlister
Administrative Engineer
St. Mary's Hospital
Waterbury, Connecticut

Equipment manufacturers provide endless information on existing Coronary Care Units that they have provided equipment for. What they don't tell you, however, is the very thing you're looking for — the experience of others' mistakes.

With the realization of the variation in electrical potential a patient could be subjected to, a study was made of the electrical power supply to the unit to assure that maximum safety was provided under conditions of instrumentation. National electrical codes offer no help. Standards suggested by the National Electrical Code, the National Fire Protection Association, and the National Board of Fire Underwriters cover hazardous areas, which include X-ray installations and operating rooms. But they do not set standards for coronary care, intensive care, or the ordinary hospital room.

Only a few very specialized areas have been designated "hazardous locations" while, in fact any location in which a patient is connected to electrical instrumentation may be hazardous for him.

Where both electrodes are on the body surface, a higher voltage can be tolerated. Tests show that a current of 20 milliamperes will cause a degree of muscular paralysis and may cause fibrillation of the heart if the flow is arm to arm. In all cases, a current of 100 milliamperes is fatal. This means that a 10 volt current can be dangerous and that 50 volts will be fatal when the electrode-to-electrode resistance is 500 ohms; a condition easily attainable with modern electrocardiographic electrodes.

Whenever electrical instrumentation is connected to a patient through a cardiac catheter and a skin electrode, a potential difference of 2 millivolts between the two points is dangerous.

Can such voltage differences occur in a hospital room? Based on personal experience and from reports, the answer is, "Yes, without doubt."

As one possibility, a cardiac monitor of the sort found in most hospitals could deliver a 65 millivolt potential across the ventricular wall because of an entirely possible leakage in one condenser. That potential is 30 times the dangerous value.

A very common fault in power cords on equipment, especially where the plug is molded onto the cord, is the failure of the ground connection in the third prong. This leaves both the chassis for the equipment and the patient grounded ungrounded, allowing a buildup of static charge. Unless there are flammable fluids present, this normally is not considered dangerous. However, if this fault is coupled with another failure in the circuit — say a blown condenser — an open circuit may develop. Under these circumstances, a current of nearly 20 milliamperes — far above the danger limits — will flow through the patient.

A less complicated real-life incident involved a regular hospital room in which a cardiogram was being taken. Each time the technician attempted to attach the leads to the patient while holding the ground lead, she got a severe shock. The trouble was traced to a bed lamp frame which was shorted to the a.c. line and was touching the bed. The patient's arm was also touching the bed. Since the ECG was grounded through a three-prong plug, 110 volts was being passed through both the patient and technician.

These examples indicate the dangers of equipment failure. But faulty design also can be the source of patient peril. Some examples of this type of problem include: defibrillators which produce excessive shock with possible attendant myocardial damage unless a very low resistance path between the electrodes exists; equipment in which chattering relays cause high voltage leakage current; a.c. operated pacemakers which are sensitive to pulses on the power line, and many more.

Some of the precautions we have taken to reduce the danger of shock accidents are as follows:

1. Proper training of all personnel using electrically operated instruments.

2. Remove moulded plugs on all equipment and be certain new plugs are clearly marked for neutral, positive and ground connectors. Reason: Manufacturers purchase cable with moulded plugs for their equipment and assembly men know the white wire goes to the chassis, but the hot and neutral wires may be green and red, or green and black and whichever way they are put on the machine will work. You think your 3 prong plug is oriented but it's a 50/50 chance it isn't. It's not worth the chance.

3. Establish rigid routine inspection of all equipment and do not permit uninspected equipment to be used. Replace tubes, condensers and relays at regular intervals.

4. Provide for interconnection, by a separate ground line, of the chassis of equipment in use on patients; this line must be independent of the power cord ground.

5. Consider any area where electrical instrumentation is to be used as a hazardous area.

6. One item still under consideration is to provide alarm circuits on all instruments and power lines which will call attention to unsafe conditions.

With the current medical technological explosion, what role will the "Hospital Engineer" play in the future? It is clear that the hospital engineer should be given custody of all mechanical and electrical devices used in the hospital, be they for transportation, communication, electronic measurement, atmospheric control, food service or whatever. What is not so clear is the extent to which he will also have responsibility for the rest of the equipment used. Where mechanical and electrical systems are used for diagnosis and treatment, the person control-

(Continued on page 6)
AHA Engineering Seminar
(Continued from page 1)
American Society for Hospital Engineers
840 North Lake Shore Drive
Chicago, Illinois 60611
Attention Mr. Robert Davis
Seminar locations, dates and fees are as follows:
Phoenix, Arizona, Feb. 12-16. Fee $95.00.
Hopeville (Atlanta), Ga. May 20-24. Fee $85.00
Chicago, Oct. 7-11. Fee $92.50.

Sam Thorpe
(Continued from page 1)
Assistant Chief Engineer in charge of the Power Plant at Harvard Brewing Company, Lowell, Mass., and Assistant Chief Engineer in charge of Maintenance for the Commonwealth Ice and Cold Storage Company.

In September, 1955, Sam obtained the Chief Engineer's position at Lowell General Hospital. Since then, he has given of his time to Hospital Engineers' organizations, to include contributions to the newsletter and Massachusetts State Representative for our own N.E.H.E.S. He is also a member of the Merrimack Valley Plant and Engineers' Association and has organized a small group of hospital engineers in the Merrimack Valley called the Middleack Engineers who meet every month. He was President of the Middleack organization for two years and Secretary-Treasurer for another two-year period. We of the society may well be assured that Sam is a contributor and organizer in the Hospital Engineering field.

Married to the former Ruth Hazelton, Sam has granted himself immortal with three sons and seven grandchildren. When spare time is afforded, he enjoys gardening, fishing, and organ playing. Finding Hospital Engineering to his distinct liking, he meets its challenges by becoming one of the society's most diligent workers. His interests lie with the expressed purpose of doing all he can to further the recognition of Hospital Engineers, not only in the State of Massachusetts but all of New England as well.

The Engineer's Bookshelf

If you have read and understood each book recommended by this newsletter you would be, presumably, the best versed and educated engineer in the country. The truth is, humans are just not made that way. For us, knowledge is not innate, hence we must know where to find it.

The procurement of the three sets of references mentioned herein, grants to the Hospital Engineer an easy index to the knowledge which may make him most proficient in his career. These references are a must on your bookshelf. They include:

1) PLANT ENGINEERING DIRECTORY AND SPECIFICATIONS CATALOG
This catalog lists manufacturers and sources of materials from air conditioning to water treatment. Each section is divided into three parts,
1. Technical Reference Data Section: Includes technical data bearing on the solution of problems facing Plant Engineers.
2. Product Directory Section: Lists various products by groups and specific types, and the manufacturers of these products.
3. Manufacturers Catalog & Specification Advertising:
Assists you in making product selections.

Technical Publishing Company
308 East James Street
Barrington, Illinois 60010
$25.00

2) THOMAS REGISTRY
Dealing primarily with mechanical equipment, these catalogs offer the Plant Engineer an up-to-date directory for virtually every manufacturer of mechanical equipment today. Indexes listing the article and manufactures will offer the basis for reference and correspondence when it is not available elsewhere.

Thomas Publishing Company
465 Eighth Avenue
New York, New York 10001
$25.00 per set

3) SWEET'S CATALOGS
Building materials manufacturers desiring the advertisement of their products will have their products brochure entered in Sweet's Architectural Catalog. A set of Sweet's Catalogs are not purchased but procured through F. W. Dodge. Architectural firms are generally given sets of Sweet's Catalogs and upon receipt of new editions yearly, will return the old set to Dodge. There is a possibility that procurement of a new or used set is available through F. D. Dodge if your hospital is undergoing a construction project. The editor recommends that the sets not be more than 3 years old due to the continual advent of new materials.

NEHES PUSHES FOR NEW MEMBERS
Fred MacInnis of the Cooley Dickinson Hospital, Northampton, Massachusetts, is Chairman. Please assist by referring capable, eligible men in the Hospital Engineering field to Fred. Each member's application should be approved by yourself or the Administrator of the hospital.

Pay Your Dues
Please mail your dues to:
William T. Doherty, Secretary
St. Francis Hospital
114 Woodland Street
Hartford, Connecticut 06105
Do not pay in person at the Annual Meeting; it causes confusion.

Proposed By-Laws
Enclosed with this issue of the Newsletter is a set of the society's by-laws. Review them. As members, we'll vote on their acceptance at the annual meeting.
Coronary Care Units
(Continued from page 4)

Next Year’s Problems
(Continued from page 3)

POSITION OPENINGS

There are a number of position openings in the New England area. Those interested in obtaining a position in Hospital Engineering should contact:

Charles Shields, President
Memorial Hospital
Worcester, Massachusetts

WORDS OF WISDOM

He who asks a question is a fool for five minutes; he who does not ask a question remains a fool forever.

Self-government, self-discipline, and self-responsibility are the triple safeguards of the independence of man.

There’s no incentive to success these days — one can live too comfortably as a failure.

items. We have a tendency to complain about poor working conditions and low pay in hospitals. We still have poor job descriptions, scheduling, and control of labor within the department. Continuation will perpetuate the sad circumstances in which many departments now reside. It’s necessary that administration realize the technological age we are in and that the engineer create this impression within the department by documenting, educating, providing the services to the hospital, and obtaining the maximum effort from all personnel. This can only be done in a well organized, comfortable, and efficient environment. If the engineer hangs around the office carrying on small talk with personnel and does not keep the “parade moving,” a sad state of affairs will be his consequence.

The health business HAS changed, it no longer is dependent on people’s charity to survive. The men within the mechanical departments should be compensated on a basis equal to that of industry and should be equal to the men of industry in brainpower, physical manpower and devotion to their job.

THINK IT OVER AND HAVE A HAPPY NEW YEAR.

CONTRIBUTIONS TO THE NEWSLETTER

Support your organization by submitting your thoughts and ideas in the form of editorials and pictures to the newsletter. This is our best notification to other organizations of the efforts being made by New England Hospital Engineers. The invitation is open; any submittal is appreciated.

VERNE R. CLOW, Editor
Plant Engineer
Mary Hitchcock Memorial Hospital
Hanover, New Hampshire

NEWSLETTER

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Associate Editor

Louis B. Ely Jr.
Associate Editor

Printed by The Reporter Press Canaan, New Hampshire

POSITIONS WANTED

Several engineering positions are desired by Engineers who are interested in the hospital field. Some are new, some wish to relocate.

President, Charles Shields, The Memorial Hospital, 119 Belmont Street, Worcester, Mass., will forward information and resume on request of the Administrator and Personnel Director. This contact must be by letter only.