



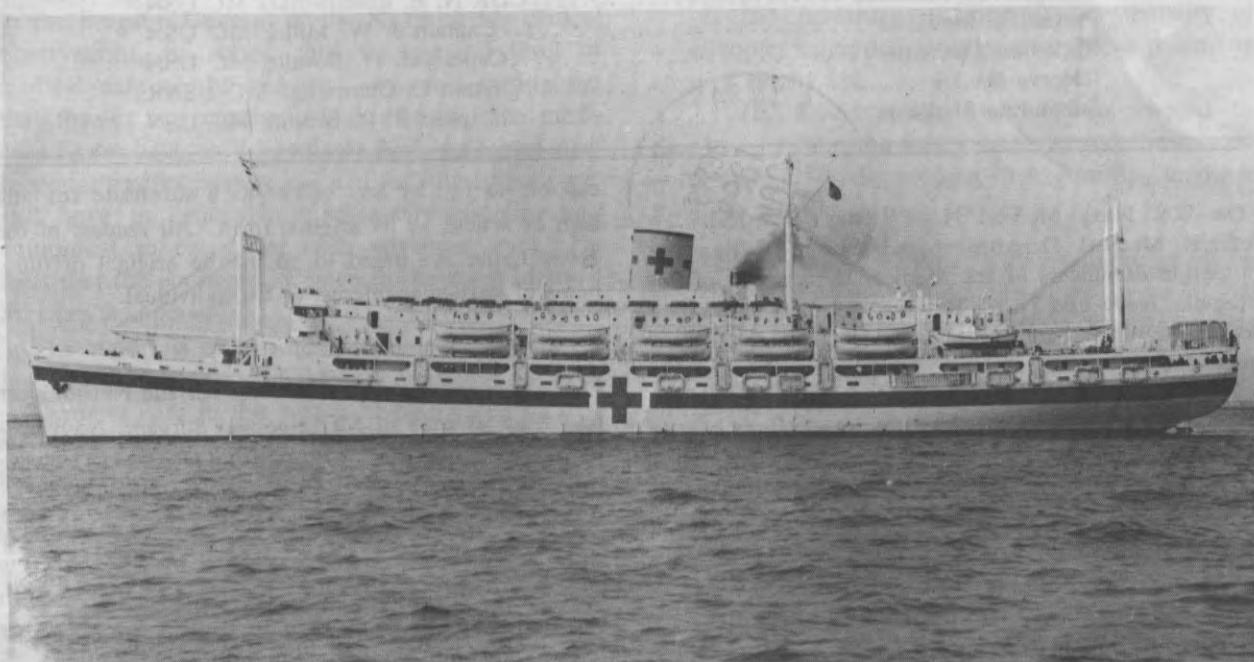
# UNITED STATES NAVY

# Medical News Letter

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ceptible to use by any officer as a substitute for any item or article, in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

#### Change of Address

Please forward changes of address for the News Letter to Editor: Bureau of Medicine and Surgery, Navy Department, Washington, D.C. 20390 (Code 18), giving full name, rank, corps, and old and new addresses.

**FRONT COVER:** USS COMFORT (AH-6). This hospital ship, the first to be manned by a Navy crew and Army medical staff, was commissioned 5 May 1944 at San Pedro, California. Assigned to the Seventh Fleet for operational control, she sailed for Brisbane, Australia 5 June. After turning back a few days for repairs she reached Australia on 15 July. Her first patients were embarked at Hollandia, New Guinea 25 July, and she spent the next few months caring for patients in that area and evacuating them to area hospitals including those in Australia. On 4 October the COMFORT disembarked 634 patients at Milne Bay, N.G., an unprecedented number for that port. By 10 October she received orders to proceed to a secret rendezvous for support of the Leyte invasion, and on the 24th underwent a three-bomb attack but was undamaged. Patients from Leyte were embarked for Hollandia on the 29th, including a large number of litter patients and some ambulatory patients received from three LST's and three PCER's.

On 16 November, 700 patients were received from Leyte and evacuated to the United States. At San Pedro, California in January 1945 the ship loaded much needed medical supplies for Leyte. During February and March she cared for and evacuated patients from Leyte, Subic Bay and Lingayen Gulf, P.I. travelling twice to Hollandia to disembark patients. Late in March at Ulithi in the Carolines she received orders to proceed to Okinawa as part of the Fifth Fleet to participate in the invasion of the Ryukyu Islands. The COMFORT was again subjected to bombing while loading patients on 6 April and again on 9 April, the latter by a mistaken American pilot, no damage resulting from either attack. On the night of 28 April near Okinawa, a Japanese Kamikaze (suicide) plane attacked and crashed into the ship, killing 28 personnel (including 6 medical officers, 6 nurses and 7 patients) and injuring 48. After undergoing repairs in California the COMFORT served as a station hospital at Subic Bay from 6 September 1945 onward. Following this unusually stormy career for a ship of mercy she was decommissioned 19 April 1946.

The issuance of this publication approved by the Secretary of the Navy on 4 May 1964.

## FEATURE ARTICLE

### EXCERPTS FROM A REPORT TO THE SURGEON GENERAL

By CAPT B. Eiseman

CAPT B. Eiseman,\* MC USNR, Professor of Surgery, University of Kentucky, Medical Corps, returned recently from a Western Pacific trip in his capacity as Surgical Consultant to the U.S. Navy. During the tour he visited medical activities in Guam, the Philippines, Vietnam, Thailand, Taipei, Hong Kong, Yokosuka, and Hawaii. In his report to the Surgeon General of the Navy on his clinical observations, he states that the general level of medical care of the sick and wounded throughout the theater is exceedingly high and that the medical officers have an exceedingly high degree of professional training, are positioned for immediate care, and have in general, the necessary supplies and equipment to carry out such advanced care. He feels that the cooperation between the three Medical Services is superb.

The report is detailed and informative. Some of his comments about wound treatment are as follows:

**Casualty care in this war is characterized by:**

(1) Helicopter evacuation plus total air and sea superiority which allows almost immediate casualty pickup and deposit within minutes at a semi-fixed installation where definitive resuscitation and surgery can be performed.

(2) Surgical specialists of an exceedingly high level of training positioned immediately adjacent to the field of conflict. Such an ideal medical situation not only results from the high level of surgical skills available from both the regular and reserve personnel, but also is made possible by:

- (a) Air superiority.
- (b) Lack of enemy artillery.

#### Air Evacuation

A. From the field, two systems are used, one by the Army utilizing helicopter ambulances, the other by the Marines using readily available gunships. Each has advantages and disadvantages.

(1) Army Helicopter Ambulance

(a) Advantages: Dispatcher can direct deposit of casualty to medical facility best able to care

\* During the past year CAPT Eiseman has sponsored several unique articles published in the U.S. Navy Medical News Letter under the general title of "What's New in the Treatment of the Injured."

for the type of injury, thus avoiding several on-and-off loadings.

(b) Disadvantage: The helicopters are not so quickly available as gunships. This ties up helicopters that could be used for other tactical purposes.

(2) Marine System: Use of Gunships

(a) Advantages: Immediate availability of a helicopter equipped to help clear its own landing zone of enemy fire.

(b) Disadvantage: No one is aboard to diagnose or treat the injury in flight and there is no good system for dispatching such gunships to other than the nearest medical facility.

**Resuscitation:** Treatment and avoidance of shock is unique in this war where casualties arrive at well equipped hospitals routinely within 30-60 minutes after wounding. This priceless medico-military opportunity results in:

(a) Salvage of casualties who would under ordinary military situations have exsanguinated or died of chest or brain damage before being seen by a physician. This will incidentally skew the wounded in action/killed in action ratio.

(b) Observance and treatment of pure hemorrhagic shock—not complicated by drugs, prolonged pain, exposure or infection.

In general, the resuscitative fluid of this war is sodium lactate given in large amounts, 2-4 liters in 30 minutes through two or more large bore *cannulae*, and laced at varying intervals with 44 meq. of sodium bicarbonate. Blood is given, in general, only after individual cross matching and by the time (30 minutes) it is available, very frequently the surgeon has stopped the bleeding. *Blood* is abundantly available, thanks to the good service of the 406th Army Laboratory.

#### Soft Tissue Injuries

A. The usual pattern of soft tissue injury of war time has been evident. By this state of the war, essentially all medical units in the field have been "blooded" and have learned (or relearned) the classic lessons of:

- (1) Early wide debridement
- (2) Abstinence from skin closure
- (3) Drainage without packing
- (4) Wound immobilization
- (5) Antibiotic coverage

#### *Delayed Primary Closure*

In general, delayed primary closure of debrided wounds is being done according to the classic techniques. In some areas particular interest is being shown in placing sutures for closure at the time of initial debridement.

In the II-IV Corps areas particular interest is being shown in "delayed primary closure" which consists of placing sutures for closure at the time of initial debridement.

#### *Through and Through Wounds*

This is an unsolved question, and is variously answered throughout the theater.

One thing is certain: The war time through-and-through injury bears no resemblance to peace time injuries and attempts to apply peace time criteria are dangerous. The problem consists of whether:

- (1) To unroof and debride widely, or
- (2) To debride from both ends of the widened wound, irrigate, and drain.

Criteria for deciding which is the better course to take are:

(1) Depth of the wound. A tract immediately beneath the skin might just as well be unroofed.

(2) Importance of overlying structures, i.e., major nerves, arteries, or muscle bundles.

(3) Amount of soft tissue injury, which in turn depends on velocity of the missile. In general, a high velocity missile leaves a large wound of exit which permits wider debridement without unroofing.

(4) Proximity to a joint and possibility of joint involvement. The latter requires complete visualization (irrigation, and closure of joint capsule, etc.).

*Cranio Cerebral Injuries:* The classic tenets of management are being practiced by strategically located well trained neurosurgeons. There is, occasionally, some inefficiency in multiple helicopter stops in getting the head case to the neurosurgeon, but once there most cases are treated vigorously.

Trial is being made of immediate decompression by turning a cranial flap. Some such cases are decompressed within 45-60 minutes following injury—an unheard of speed in other circumstances. Hemostasis, meticulous debridement and careful dehydration (fluid limitation, steroids, mannitol) are

employed until the brain can be covered with a dural patch (pericranium, fascia lata or freeze dry dura).

*Cervical Injuries:* Small fragment wounds from inconspicuous missiles are often overlooked and they might produce pharyngeal or cervical esophageal perforation. Such injuries are common as a part of the peppering a man receives from a booby trap or mine blast—particularly when he is saved otherwise by his body armor.

*Maxillo-Facial Injuries:* The major arguments concerning maxillo-facial injuries (which are largely treated by dentists and oral surgeons) is whether dependent drainage should be employed in perforating injuries into the mouth.

Buccal mucosa is closed tight as is the skin if there is not massive tissue loss.

#### *Thoracic Injuries:*

A. *General:* As might be anticipated, the better the previous surgical training, the less frequently did the Medical Officer perform a thoracotomy.

Through and through injuries of the chest and lung do not ordinarily—despite some frightening hemoptysis—require more than simple tube drainage.

Use large bore thoracotomy tubes; institute tube drainage early. These simple and well proven precepts need repetition.

B. If the surgeon is in the chest following injury—as for a thoraco-abdominal injury—he should not resect lung regardless of how traumatized it may appear.

C. Traumatic wet lung. Almost forgotten and unseen in peace time, this well described lesion appears again in time of war. I doubt that it is anything more than contusion plus atelectasis beneath an overlying contused chest wall.

#### *D. Evacuation of Casualties with Chest Wounds*

(1) Keep patients until (chest) tubes have been removed 36-40 hours.

(2) Use the flutter valve (Heimlich) thoracotomy set for patients that must be transported with chest tube in place.

#### *Abdominal Injuries:*

A. Do a formal laparotomy for any missile wound of anterior abdominal wall, back, or flank that might possibly have violated the abdominal cavity—regardless of the benign appearance of the wounds of entrance or exit.

B. Take two dimensional x-rays of the abdomen

to locate foreign bodies, but don't rely on them to decide whether laparotomy is indicated.

C. Insert catheter into bladder and check urine for blood prior to every laparotomy for gunshot wound.

D. Use long mid-line abdominal incision.

E. Each area of the abdominal cavity must be *visualized* not merely palpated as might suffice following closed (civilian-type) trauma. The track of a missile is properly notorious and every conceivable side of every intra-abdominal organ must be visualized. This includes opening the lesser sac and visualizing the posterior wall of the stomach.

F. If the posterior aspect of the upper abdomen is involved, the entire duodenum must be inspected. This will require the Kocher maneuver.

G. Large bowel injuries are at this stage of the conflict well treated by exteriorization as a rule.

H. Retroperitoneal hematomata from a wound in the flank without perforation of the peritoneum present a neat clinical problem. They should be opened at the time of laparotomy if:

(1) The hematoma is expanding.

(2) There is suspicion that the vena cava, or a major tributary are involved.

I. Missile wounds of the liver from a penetrating high velocity round do not resemble the closed civilian type of cracked liver. In war wounds the liver is characteristically shattered. Simple suture closure is seldom curative. The devitalized liver must be excised and bleeding controlled with mattress sutures. Wide infradiaphragmatic drainage is indicated. There is still no clear cut evidence that T-tube drainage of the common duct is indicated—although accumulating data may prove it to be. Hepatic lobectomy may be required in some instances.

J. Laparotomy wounds should be closed with figure-of-8 heavy stainless steel (or heavy plastic) wires. The skin should, of course, be left open.

If such is done and a large bore nasogastric tube placed in the stomach, the patient can be transported by air as soon as awake and stabilized. If either the N-G tube or through and through sutures are neglected, the incidence of wound dehiscence follow-

ing air evacuation may be 10% or greater.

*Long bone fractures* by missiles make up a large percentage of all cases wounded in action. In forward areas they are treated by wide debridement and immobilized in plaster casts (which must be then bivalved).

Hanging casts for humeral fractures should be avoided.

*Vascular Injuries:* One of the great sources of pride to the Military Medical Service and for the civilian surgical educators who have trained the majority of the medical manpower in the field, is the large number of surgeons who are capable and knowledgeable in vascular repair. In Korea vascular repairs were correctly performed only at occasional centers. In the Vietnamese conflict one can't enter even the smallest medical unit without finding a surgeon capable of performing vascular repair. Although theater wide statistics are not available, at least three series of over 80% limb salvage are known to me within the theater.

Most surgeons are using autogenous vein grafts. One of the best series almost never employs a graft interposition, however.

Fasciotomy below an area of wounding where proximal vascular compromise had existed or where a tourniquet has been in place for any protracted period, should be more widely used to prevent the possibility of later compartmental muscular atrophy.

#### *Anesthesia*

Although there is a shortage of anesthesiologists in forward areas, those available are of a very high caliber. They function not only in the operating rooms, but as important figures in the resuscitation areas.

The casualties are seen and operated on so quickly after being hit that contrary to usual military practice no narcotic or pre-operative medication normally are employed.

In other portions of his report, CAPT Eiseman lists several recommendations, and proposes some research projects all of which are under study.

# MEDICAL ARTICLE

## PNEUMONIAS CAUSED BY GRAM NEGATIVE BACILLI\*

James R. Tillotson MD† and A. Martin Lerner MD‡. Reprinted by permission of the Editor and Publisher from Medicine 45(1): 65-76, January 1966. Copyright © 1966. The Williams & Wilkins Co., Baltimore, Md. 21202 USA.

The introduction of antibiotics has resulted in an increasing awareness of the potential of Gram negative bacilli in the etiology of human infections. In 1959 Finland et al documented an increasing incidence of Gram negative bacteremia and meningitis but little or no change in the occurrence of empyemas due to Gram negative bacilli at the Boston City Hospital over recent years. Rogers also showed an increased number of Gram negative infections at the New York Hospital, but did not note any cases with pneumonia.

Many Gram negative bacteria have been reported to cause human disease of the lower respiratory tract. Pneumonias due to *Klebsiella pneumoniae* have received the greatest attention, and various clinical manifestations have been emphasized. Pneumonias have also been reported with various species of the genera—Achromobacter, Bacteroides, Brucella, Chromobacterium, Escherichia, Hemophilus, Neisseria, Pasteurella, Paracolobactrum, Proteus, Pseudomonas, Salmonella, and Shigella. Generally, however, pneumonias due to *Diplococcus pneumoniae* have been by far more frequent than those due to Gram negative bacilli. Pneumonias caused by Gram negative bacilli have usually varied from 0.5% to 6.3% of the total number of cases reported. Cutts in 1960 reported 22 cases of pneumonia caused by these organisms, and emphasized their high mortality, relatively low white blood cell count, and lack of correlation of the clinical response to antibiotics with in vitro tests.

Few reports, however, have defined specific clinical features that differentiate the pneumonias caused by the various specific organisms, with the exception of *Klebsiella pneumoniae*. This study was undertaken in an attempt to discover, if possible, clinical patterns of pneumonias due to specific species of Gram negative bacilli.

\* Presented in part at the Fifty-seventh Annual Meeting of the American Federation for Clinical Research, May 2, 1965, Atlantic City, New Jersey.

† Aided by grant (3 T1 AI-26101) from the National Institutes of Health.

‡ Trainee in Infectious Diseases and Fellow in Medicine, Wayne State University School of Medicine, Detroit, Michigan.

Associate Professor of Medicine and Associate in Microbiology and Pathology, Wayne State University School of Medicine; Director of Bacteriology Laboratory and Chief of Infectious Diseases, Detroit Receiving Hospital, Detroit, Michigan.

### Materials and Methods

Detroit Receiving Hospital is a 700 bed general hospital which primarily serves much of this city's indigent population. Suspected cases of pulmonary tuberculosis are transferred to other hospitals before admission. During the consecutive 12 mo. period of this study (July, 1963-June, 1964) there were 23,637 admissions, 1,032 of them with discharge diagnoses of pneumonias, an incidence of 4.36%.

Case records of all patients who were admitted to Detroit Receiving Hospital between July 1, 1963 and June 30, 1964 with one or more sputa or pleural fluid culture reporting Gram negative bacteria were reviewed. Only those considered to have pneumonias caused by these organisms were included here. In addition to an initial stain of the sputum or empyema fluid showing Gram negative bacilli, criteria for a final diagnosis included: 1) isolation of the same bacteria from two or more consecutive sputa; or 2) isolation of the same bacteria from cultures of blood and sputum in close temporal proximity; or finally, 3) isolation from pleural fluid. To be considered significant, this bacterium had to be present on cultures as the only or predominant organism. The clinical courses in these patients needed to be compatible with the diagnosis of parenchymal involvement of the lung to be included here. Approximately 20 records of patients with various numbers of Gram negative bacilli present in appropriate cultures, but which otherwise did not meet the requirements listed, were discarded for each case included. Appropriate therapy was begun immediately after a presumptive diagnosis by Gram stain was made.

Sputum was cultured routinely on blood agar, blood in tryptose phosphate broth. Pleural fluids were inoculated into cooked meat (beef heart) broth, and when growth occurred one to several days later, subculture was done aerobically and under reduced oxygen tension on eosin-methylene blue (EMB) and blood agars. When Gram negative bacilli were isolated they were streaked onto EMB agar. Gram negative bacilli were specifically identified by Gram stain, fermentation of sugars

(dextrose, lactose, sucrose, and maltose), decomposition of urea, production of acetyl methylcarbinol, utilization of citrate, production of indol, and by the methyl red test. Intermediate forms of the Coli-Aerogenes group of enteric bacteria were reported as *E. coli* (*intermedium*). All mucoid colonies belonging to *Klebsiella-Aerobacter* genera were typed with specific anti-klebsiella sera.\* *Hemophilus influenzae* was identified by colony morphology, Gram stain, and occasionally was grown with an appropriate strain of staphylococcus to demonstrate "satellite formation." Gram negative bacteria were tested for antibiotic sensitivities by the disc method.† Results of sensitivity tests have been statistically standardized in this laboratory, and were reported to the attending hospital physicians in millimeters of inhibition of growth.‡

### RESULTS

#### General

During this study period pneumonias caused by Gram negative bacilli were seen in 38 patients, accounted for 3.68% of all pneumonias due to any etiology, and represented 0.16% of all hospital admissions. There were 34 cases which were not preceded by another pneumonia, and 27 of these were present on admission. The remaining seven patients represented nosocomial infections. These two groups will be referred to as "primary" pneumonias.

\* These sera were prepared, and then supplied by the Michigan State Department of Health.

† Antibiotic discs were obtained from Baltimore Biological Laboratories.

‡ We are especially indebted to Miss Ruth Mandeville and her assistants in the Bacteriology Laboratory of the Detroit Receiving Hospital, Miss Elaine Leider and Mrs. Ruth Bollinger.

The other four cases entered the Hospital with pneumococcal pneumonia, and later had clinical exacerbations. Appropriate Gram stains of sputa and cultures revealed many Gram negative bacteria, but no pneumococci. This latter group will be referred to as "secondary" pneumonias. Three cases were considered "mixed" pneumonias, having both Gram negative bacilli and pneumococci or tubercle bacilli implicated etiologically.

Among these 38 patients with pneumonias caused by Gram negative bacteria were cases due to infections with *Escherichia coli*, *Pseudomonas aeruginosa*, *Hemophilus influenzae*; and others due to several species of the genera, *Klebsiella-Aerobacter*, *Bacteroides*, *Proteus*, and *Achromobacter* (Table 1). "Secondary" pneumonias developed in 4 patients while they were in the hospital; these were attributable to *Escherichia coli* (1 case), *Klebsiella-Aerobacter* group (2 cases), and *Pseudomonas aeruginosa* (1 case), and occurred 5, 11, 16, and 32 days after admission. All of the secondary cases developed symptoms and signs within two days after cessation of treatment for an initial pneumococcal pneumonia. In each case Gram negative bacilli were cultured from sputa as the predominant organism, and other data were consistent with the interpretation that pneumonia had recurred. The three "mixed" pneumonias were due to *Klebsiella pneumoniae* + *Diplococcus pneumoniae*, *Klebsiella pneumoniae* + *Mycobacterium tuberculosis*, and *Proteus mirabilis* + *Diplococcus pneumoniae*.

The overall mortality was 45% (17 deaths among 38 patients). The fatal cases included six patients with pneumonia due to the *Klebsiella-Aerobacter*,

TABLE 1  
Patients and Bacteria Associated with Pneumonias Caused by Gram Negative Bacilli

| Bacteria                      | Number of cases | Apparent pathogen |           | Death     | Mortality  | Number of males | Average age |
|-------------------------------|-----------------|-------------------|-----------|-----------|------------|-----------------|-------------|
|                               |                 | Primary           | Secondary |           |            |                 |             |
| <b>Usual</b>                  |                 |                   |           |           |            |                 |             |
| <i>Klebsiella-Aerobacter</i>  | 12              | 10                | 2         | 6         | 50%        | 12/12           | 52          |
| <i>Hemophilus influenzae</i>  | 1               | 1                 | 0         | 0         | 0%         | 0/1             | 41          |
| <b>Unusual</b>                |                 |                   |           |           |            |                 |             |
| <i>Escherichia coli</i>       | 10              | 9                 | 1         | 5         | 50%        | 6/10            | 53          |
| <i>Pseudomonas aeruginosa</i> | 7               | 6                 | 1         | 5         | 72%        | 7/7             | 59          |
| <i>Bacteroides</i>            | 4               | 4                 | 0         | 1         | 25%        | 3/4             | 45          |
| <i>Proteus</i>                | 3               | 3                 | 0         | 0         | 0%         | 3/3             | 51          |
| <i>Achromobacter</i>          | 1               | 1                 | 0         | 0         | 0%         | 0/1             | 52          |
| <b>Total</b>                  | <b>38</b>       | <b>34</b>         | <b>4</b>  | <b>17</b> | <b>45%</b> | <b>31/38</b>    | <b>50</b>   |

5 each due to *E. coli* and *Ps. aeruginosa*, and 1 to *Bacteroides*. Mortality of the primary pneumonias was 44%, of the secondary pneumonias 50%, and of the mixed pneumonias 67%. Mortalities were highest with pneumonias due to *Pseudomonas aeruginosa* (72%), while none of the five patients with *Proteus*, *Hemophilus*, or *Achromobacter* infections died.

#### Season

With the exception of June, at least one patient with a pneumonia due to Gram negative bacteria was admitted each month of the year. Twenty-two of the patients (58%) were seen during the months January through April when upper and lower respiratory diseases are registered with their peak morbidity and mortality. Pneumonias due to *Escherichia coli* occurred during this period, while others due to *Klebsiella-Aerobacter* were distributed throughout the year. Pneumonias caused by *Bacteroides* occurred in the spring, and those due to *Pseudomonas aeruginosa* in summer or autumn.

#### Race, Sex, and Age

Negroes comprise 65% of the total number of patients admitted to this hospital, and similarly were represented by 53% of the Gram negative pneumonias. Likewise, the various causative bacilli produced pneumonias equally in Negro and Caucasian, with the possible exceptions that five of seven patients with *Pseudomonas aeruginosa* infections were white, while all four patients with infections due to species of *Bacteroides* were colored.

Admissions to the hospital were about equally divided between sexes. However, here 31 of the 38

patients (82%) were male. They included all the pneumonias due to *Klebsiella-Aerobacter*, *Proteus*, and *Pseudomonas*. The average age was 50, with a range of 5 to 86 years. Four patients (10.5%) were under 35 years of age, whereas 3 (8%) were over 75. Seventy-four percent (28 cases) were between the ages of 40 and 70. The average age was about the same in the different etiologic groups.

#### Underlying Disease

Serious chronic disease was present in 36 of the 38 patients (Table 2). There were 18 alcoholics, 18 patients with heart disease (10 in congestive heart failure), 17 diabetics, 8 with chronic lung disease either chronic bronchitis, bronchiectasis, emphysema, or fibrosis, 2 with hypothyroidism, and 1 patient each with carcinoma of the breast and rheumatoid arthritis. Chronic renal disease, either pyelonephritis or arteriolar nephrosclerosis was present in 11 patients. The two cases of pneumonia due to Gram negative bacilli without serious underlying disease were those of a 5 year old boy who had just been discharged from Detroit Receiving Hospital after recovering from measles and epididymitis, and of a 17 year old boy with a stab wound penetrating through the chest wall into the left ventricle.

Other patients with pre-existing conditions were nine with one or more previous episodes of pneumonia (excluding those with chronic lung disease), four (previously noted) with an immediately preceding pneumococcal pneumonia, four patients recovering from surgery, three in coma, three with severe chest trauma, and one each with chronic otitis and sinusitis, and frank delirium tremens.

There were three epileptics who, however, had no recent convulsions, and two patients with schizophrenia. Both of these latter groups of patients were receiving various anticonvulsants or sedatives. Two patients had had recent cerebrovascular accidents.

#### Symptoms (Table 3)

Adequate histories were not available in 12 patients because of language barrier, coma, delirium, or severe chest trauma. Some of the others were confused, while a few were in no distress. Severe dyspnea was present in half of the patients admitted with these pneumonias. Most of them on admission or at the time of onset of their pneumonia had fever, one or more chills, profuse diaphoresis, cough, sputum, and pleuritic chest pain, the latter usually being immediately over the area of involvement. Less common complaints were rhinorrhea, epistaxis, sore throat, vomiting, or diarrhea. In seven a loss of 10 lb or more was documented.

Hemoptysis was present only in patients with infections due to *Klebsiella-Aerobacter* or *Proteus*. The tenacious bloody sputum typical of Friedländer's pneumonia, however, was not seen. When sputum was described, it was purulent except in three cases of pneumonias due to infections (*Klebsiella-Aerobacter*) where it was bloody. Sputa were grey or white in three other patients with pneumonias due to *Klebsiella-Aerobacter* where the character of the sputum was specifically described.

Gastrointestinal complaints were prominent only in *Bacteroides* infections. In all four of these pa-

tients there was nausea, vomiting, or diarrhea. Two patients had hematochezia. Two had urinary symptoms, one of whom had had two previous episodes of "kidney disease" and one had a positive urine culture. Average durations of these pneumonias due to Gram negative bacilli were three weeks for those patients with *Proteus* or *Bacteroides* infections, but only three to six days for the others.

#### Signs (Table 3)

Temperature elevations were usual. The four patients who were afebrile included two with no symptoms of pneumonia, one with myxedema, and one in shock apparently as a result of sepsis. Four patients presented in shock (3 due to *Klebsiella-Aerobacter* groups and 1 *Escherichia coli*). In addition, nine patients had systolic blood pressures on admission of less than 110 mm/Hg [*E. coli* (5 patients), *Klebsiella-Aerobacter* (3 patients), and *Proteus* (1 patient)]. All four patients entering in shock died, three within ten hours after admission, and one five days later. Two of the nine hypotensive patients died. Rales, dullness, increased or decreased breath sounds, rhonchi, and wheezes were noted. Despite the frequent presence of empyema or pleural effusions, only in one patient was a pleural friction rub described. Hepatomegaly was common, and cardiomegaly with murmurs or congestive failure was seen in approximately 20% of the patients. Pharyngitis or rhinitis was found in one-third.

TABLE 2  
Serious Underlying Disease in Patients with Pneumonias Caused by Gram Negative Bacilli

| Etiologic bacteria           | Heart disease              |                         | Diabetes | Alcoholism | Chronic pulmonary disease | Chronic renal disease |
|------------------------------|----------------------------|-------------------------|----------|------------|---------------------------|-----------------------|
|                              | Without congestive failure | With congestive failure |          |            |                           |                       |
| <i>Klebsiella-Aerobacter</i> | 5/12                       | 2/5                     | 5/9      | 7/9        | 3/12                      | 2/9                   |
| <i>Hemophilus influenzae</i> | 0/1                        | —                       | 0/1      | 0/1        | 1/1                       | 0/1                   |
| <i>Escherichia coli</i>      | 6/10                       | 2/6                     | 9/10     | 4/5        | 2/10                      | 5/10                  |
| <i>Pseudomonas</i>           | 5/7                        | 4/5                     | 3/7      | 2/2        | 0/7                       | 3/7                   |
| <i>Bacteroides</i>           | 1/4                        | 1/1                     | 0/4      | 2/4        | 1/4                       | 1/4                   |
| <i>Proteus</i>               | 1/3                        | 1/1                     | 0/3      | 3/3        | 1/3                       | 0/3                   |
| <i>Achromobacter</i>         | 0/1                        | —                       | 0/1      | 0/1        | 0/1                       | 0/1                   |
| Total                        | 18/38                      | 10/18                   | 17/35    | 18/25      | 8/38                      | 11/35                 |

TABLE 3  
Clinical Symptoms and Signs in Patients with Pneumonias Caused by Gram Negative Bacilli

| Symptom                       | Number of patients | Percent | Sign                 | Number of patients | Percent |
|-------------------------------|--------------------|---------|----------------------|--------------------|---------|
| Cough                         | 17/20              | 85.0    | Rales                | 28/32              | 87.5    |
| Shortness of breath           | 18/22              | 81.8    | Hepatomegaly         | 15/32              | 46.9    |
| Fever                         | 19/24              | 79.2    | Hypotension/shock    | 13/38              | 34.2    |
| Chest pain                    | 17/22              | 77.3    | Pharyngitis/rhinitis | 9/29               | 31.0    |
| Sputum                        | 17/22              | 77.3    | Cardiomegaly         | 7/33               | 21.2    |
| Chill(s)                      | 13/20              | 65.0    | Rhonchi              | 6/32               | 18.8    |
| Sore throat or rhinorrhea     | 6/11               | 54.5    | Edema                | 6/33               | 18.2    |
| Hemoptysis                    | 6/23               | 26.1    | Wheezes              | 5/32               | 15.6    |
| Nausea, vomiting, or diarrhea | 8/38               | 21.1    | Splenomegaly         | 2/32               | 8.2     |
|                               |                    |         | Pleural rub          | 1/32               | 4.1     |
|                               |                    |         | Cyanosis             | 1/32               | 4.1     |
|                               |                    |         | Jaundice             | 1/38               | 2.6     |

#### Laboratory Data (Table 4)

**Hematology.** The average hemoglobin at admission was 12.2 g/100 ml with a range of 8.0 to 15.8. Sixteen of 34 patients with several hemoglobin determinations during hospitalization showed decreases of more than 2 g/100 ml. One patient with Friedländer's pneumonia had a hemolytic anemia; otherwise decreasing hemoglobins were considered due to a combination of the known hypoplastic bone marrow response to severe infection and dehydration. Ten patients required transfusions. One patient with cirrhosis and an elevated prothrombin time, bled terminally.

Initial white blood cell counts averaged 15,100/mm<sup>3</sup> with a range of 5,100 to 40,600. The average maximum white blood cell count was 19,200/mm<sup>3</sup>. Only two patients demonstrated white cell counts of less than 5,000 at any time during their course; one, an alcoholic man with an early leukocyte count of 2,500, and the other, a woman with a pneumonia caused by Achromobacter and a carcinoma of the breast which had previously been treated by irradiation therapy.

All except two of the patients showed a "shift to the left" in their peripheral smears with an average of 86% polymorphonuclear leukocytes, 15% of which were immature forms. Only two patients had less than 70% neutrophiles at admission, and both were afebrile throughout.

Initial erythrocyte sedimentation rates were over 40 mm/hr (Westergren) in 15 of 17 patients, and

reached peak values of more than 60 mm/hr in 16 of 17 patients. Nine patients had sedimentation rates greater than 100 mm/hr.

**Liver Function.** Serum glutamic-oxalacetic transaminases were greater than 50 Sigma-Frankle units (normal 0-40) in 18 of the 21 patients in whom this test was done. Serum albumins were frequently decreased, and globulins increased. Serum bilirubin was elevated in 6 of 17 patients.

**Renal Function.** Albuminuria was common, hematuria occasional, and pyuria infrequent. Pneumonias caused by *E. coli*, *Ps. aeruginosa*, or *Bacteroides* tended to have more urinary abnormalities. Twenty-four of 32 patients had plasma urea nitrogen (BUN) determinations of more than 15 mg/100 ml. In eight patients the BUN was elevated on admission and subsequently fell to normal, only to rise again in half of them. Ten patients had a persistently elevated BUN. Three patients who had a normal BUN on admission developed rises later. The average admission BUN was 27 mg/100 ml with a peak average of 39 mg/100 ml.

**Pleural Fluid.** Pleural fluid from nine patients was examined. In general, they showed few differences between the various types of pneumonias. Specific gravities were noted in three cases; 1.015, 1.018, and "too high to measure." Protein contents ranged from 2.1 to 6.8 g/100 ml with an average of 4.7. Among eight protein determinations in pleural fluids, only one was less than 3.5 g/100 ml.

TABLE 4  
Laboratory Data in Patients with Pneumonias Caused by Gram Negative Bacilli

| Determination                          | Result                   | Number of patients | Other                       |
|--|--------------------------|--------------------|-----------------------------|
| Hemoglobin (initial)                   | <10.0 g/100 ml           | 3/35               | av. (initial) 12.2 g/100 ml |
|  | <12.0 g/100 ml           | 14/35              |                             |
| White blood cells (initial)            | 5-10,000/mm <sup>3</sup> | 8/36               |                             |
|  | 10-15,000                | 14/36              | av. (initial) 15,100        |
| Erythrocyte sedimentation rate         | 15-20,000                | 6/36               | av. (max.) 19,200           |
|  | 20-40,000                | 8/36               |                             |
| Serum glutamic oxalacetic transaminase | >40 mm/hr                | 15/17              | av. (initial) 72            |
|  |                          |                    | av. (max.) 91               |
| Serum albumin                          | >50 units                | 18/21              |                             |
|  | <3.0 g/100 ml            | 9/19               |                             |
| Serum globulin                         | >3.0 g/100 ml            | 9/19               |                             |
|  | >1.2 mg/100 ml           | 6/17               |                             |
| Bilirubin                              | >30 mg/100 ml            | 17/32              |                             |
|  | >50 mg/100 ml            | 9/32               |                             |

Glucose content was less than 20 mg/100 ml in two cases, and 99 mg/100 ml in a third. Cell counts were done in four; they contained 825, 1,500, 5,950, and 12,600 white blood cells per mm<sup>3</sup>, of which 80-88% were polymorphonuclear leukocytes.

#### Bacteriology (Table 5)

Clinically significant bacteria were isolated from sputa in 33 of the 38 cases. In the other five cases the organism was identified in pleural fluid. Of the 13 patients from whom pleural fluids were cultured, 11 yielded Gram negative bacilli. However, initially these bacteria were seen on Gram stain in only 9 of 23 sputa, but were cultured from 21 of 31 initial sputum cultures.

Blood cultures were positive in 7 of 33 patients. These bacteremias were due to *Escherichia coli* in 3, *Pseudomonas aeruginosa* in 1, and *Klebsiella-Aerobacter* in 3.

TABLE 5  
Bacteriological Data in Patients with Pneumonias Caused by Gram Negative Bacilli

| Bacteria                      | Source |               |       |       |
|-------------------------------|--------|---------------|-------|-------|
|                               | Sputum | Pleural fluid | Blood | Urine |
| <i>Klebsiella-Aerobacter</i>  | 11/12† | 2/3           | 3/11  | 1/7   |
| <i>Hemophilus influenzae</i>  | 1/1    | 0/0           | 0/0   | 0/0   |
| <i>Escherichia coli</i>       | 10/10  | 4/4           | 3/10  | 5/6   |
| <i>Pseudomonas aeruginosa</i> | 7/7    | 1/2           | 1/6   | 0/4   |
| <i>Bacteroides</i> *          | 0/4    | 4/4           | 0/3   | 0/2   |
| <i>Proteus</i>                | 3/3    | 0/0           | 0/3   | 0/3   |
| <i>Achromobacter</i>          | 1/1    | 0/0           | 0/0   | 0/0   |
| Total                         | 33/38  | 11/13         | 7/33  | 6/22  |

\* Anaerobic cultures were done on pleural fluids only.

† Numerator indicates number of patients with positive cultures. Denominator indicates number of patients from whom specimens for culture were obtained.

Urine cultures yielded greater than 100,000 colonies per ml in six patients. Five were diabetics with chronic pyelonephritis and pneumonia due to

*E. coli*. Throat cultures were obtained from 10 patients. From four of these the same bacterium suspected of causing pneumonia was isolated, including three with species of *Proteus* and one with *Ps. aeruginosa*. Spinal fluid was examined in eight patients, and in all of them cultures were sterile, and cell counts and chemistries were normal.

#### Chest X-rays (Table 6)

All patients had one or more chest x-rays. Twenty of the 38 cases of pneumonia due to Gram negative bacilli showed lobar or confluent lobular infiltrations, and 18 peribronchial infiltrates. Patients with infections due to the *Klebsiella-Aerobacter* or *Proteus* had lobar consolidations, whereas in all four with pneumonia due to *Bacteroides*, and in most of those due to *Ps. aeruginosa* or *E. coli* the infiltrates were patchy. All of the secondary pneumonias were lobar in distribution.

TABLE 6

Chest X-rays in Patients with Pneumonias Caused by Gram Negative Bacilli

| Etiologic bacteria            | Lobar pneumonia | More than one lobe involved | Abcess | Empyema |
|-------------------------------|-----------------|-----------------------------|--------|---------|
| <i>Klebsiella-Aerobacter</i>  | 12/12           | 6/12                        | 2/12   | 4/12    |
| <i>Hemophilus influenzae</i>  | 0/1             | 1/1                         | 0/1    | 0/1     |
| <i>Escherichia coli</i>       | 2/10            | 5/10                        | 1/10   | 7/10    |
| <i>Pseudomonas aeruginosa</i> | 2/7             | 2/7                         | 0/7    | 4/7     |
| <i>Bacteroides</i>            | 0/4             | 0/4                         | 0/4    | 4/4     |
| <i>Proteus</i>                | 3/3             | 1/3                         | 1/3    | 2/3     |
| <i>Achromobacter</i>          | 1/1             | 0/1                         | 0/1    | 0/1     |
| Total                         | 20/38           | 15/38                       | 4/38   | 21/38   |

In two patients pneumonia due to *E. coli* was lobar: one was a secondary pneumonia, and the other had a large abscess in the center of a right upper lobe with solid consolidation. At post mortem, this last patient had bronchopneumonia of the left lower lobe as well.

Infiltrates were seen most frequently in the lower lobes, the right lower in 23 patients and the left lower in 17. The right upper lobe was involved in 12 patients, the right middle lobe in 11, and the left

upper lobe in 5. Pneumonia was present in one or both lower lobes in 32 out of 38 patients (85%) whereas one or both upper lobes were involved in 19. The right lung was involved in 31, the left in 18, and both lungs in 11 patients. Infiltrates were limited to the right lung in 20 cases, and the left lung in 7. *Pseudomonas aeruginosa* infections predominated in the left lung, while other Gram negative bacteria more frequently caused pneumonia on the right.

There were 15 cases with infiltrates in multiple lobes, and 11 of these were Klebsiella-Aerobacter groups of *E. coli* infections of the lower respiratory tract. One lobe was involved in 23 cases, 2 lobes in 6; 3 lobes in 4; 4 lobes in 4; and 5 lobes in 1 case. The diaphragm was elevated in 13 cases, atelectasis with a tracheal shift toward the side of the pneumonia was noted in 5, and a bulging inter-lobar fissure in 2 patients (both with right upper lobe Friedländer's pneumonia). Empyemas or effusions were noted at x-ray in 21 cases. These were present on admission in 9, while 12 were found 1 to 9 days later. Large empyemas were a prominent feature of pneumonia due to *E. coli* (6 of 10) and the Bacteroides group (4 of 4). Lung abscesses were noted in four cases, and in two of them (both Friedländer's infections) cavitation had occurred. No post-pneumonic sterile effusions were seen.

#### Antibiotic Treatment

The Gram negative bacilli isolated were sensitive to a number of antibiotics with the exception of *Pseudomonas aeruginosa*, *Proteus*, and *Achromobacter* which were more resistant. Thirty-one of the patients had not received antibiotics prior to the diagnosis of their pneumonia. A single injection of penicillin was given to one patient before admission, and six others received antibiotics after admission, but before the onset of their pneumonia. A variety of antibiotics was used, including penicillin, chloramphenicol, streptomycin, tetracycline, methicillin, kanamycin, colistin, cephalosporin C, erythromycin, polymyxin, or sulfonamides. Although these antimicrobials were vigorously administered, recovery seemed to be significantly influenced by the serious underlying antecedent diseases.

#### Other Treatment

A number of other drugs as indicated and several surgical procedures were used in these seriously ill patients. Digitalis, tolbutamide or insulin, vasopressors, hydrocortisone, and blood transfusions were

prescribed. Surgery included tracheotomy, bronchoscopy, thoracentesis, insertion of chest tubes for drainage, liver biopsy, simple mastectomy, and one open thoracotomy with decortication of the pleura. Exploratory laparotomies were done twice, to drain an abdominal abscess in one, and to rule out intestinal obstruction in another patient.

#### Clinical Course

The mean hospital stay was 27 days, with an average of 15 days in the 17 patients who died, and 37 days for the 21 who survived. The apparent mortality due to infection was 24% while that attributable to associated conditions was 21%. Deaths from pneumonia usually occurred within eight days after admission. Four of these deaths occurred within 24 hours after admission, and of these three were admitted in shock.

Death due to associated conditions occurred later. These included cardiac arrhythmia, myocardial infarction, intracerebral hemorrhage, renal failure, acute pyelonephritis, and pancreatitis with ultimate renal failure. Transient clinical improvement was noted after therapy in 4 of the 17 fatal cases.

Among the patients who recovered from their Gram negative infection of the lower respiratory tract, fever lasted an average of two weeks. Temperatures remained elevated somewhat longer in pneumonias due to the Klebsiella-Aerobacter or Bacteroides, and for shorter periods in those with *E. coli*, *H. influenzae*, and *Achromobacter* (Table 7). Temperatures ranged from 97 to 106°F, with a peak average of 102°F. Maximum temperatures were higher than 103°F in 15 patients, including 7 with Friedländer's pneumonias. The fevers were continuous in nine, remittent in nine, and intermittent in ten. Three patients were afebrile throughout. In 18 patients, fevers resolved by lysis during hospitalization. Termination of fever by crisis occurred in three others, but their temperatures lasted less than 1 day. Temperature peaks occurred between 6 and 10 P.M. in 14 patients, at 2 P.M. in 2 others, and was variable in 8. Reversal of that usual diurnal temperature pattern was seen in two patients, one with peaks at 6 A.M., the other at 10 A.M.

Follow-up examinations were possible in 16 of the 21 survivors for an average of 3½ months after recovery. During this time ten had symptoms of chronic respiratory disease, and 13 had abnormal chest x-rays. Four patients were readmitted with empyema, atelectasis, or tension pneumothorax.

TABLE 7  
Fever in Patients with Pneumonias Caused by Gram Negative Bacilli

|                          |          |
|--------------------------|----------|
| Mean temperature         | 102°F    |
| Range                    | 97-106°F |
| Type of fever            |          |
| None                     | 3/31     |
| Continuous               | 9/31     |
| Intermittent             | 10/31    |
| Remittent                | 9/31     |
| Time of peak temperature |          |
| 6 A.M.                   | 1/26     |
| 10 A.M.                  | 1/26     |
| 2 P.M.                   | 2/26     |
| 6-10 P.M.                | 14/26    |
| variable                 | 8/26     |
| Termination of fever     |          |
| Lysis                    | 18/21    |
| Crisis                   | 3/21     |

#### Autopsy Findings

Postmortem examinations were done in seven of the fatal cases. Many of the extrapulmonary findings were those of other co-existent chronic diseases or shock. Arteriosclerotic heart disease and cardiomegaly were the most common. One patient with pneumonia due to *Ps. aeruginosa* had an acute thrombosis of the anterior descending branch of the left coronary artery with myocardial infarction. Hepatomegaly, portal fibrosis, and acute or chronic or passive congestion of the liver also were frequently seen.

A striking acute hepatitis with polymorphonuclear leukocytic infiltration about the portal areas was noted in both fatal cases of pneumonia caused by *Ps. aeruginosa*. Splenitis with leukocytic infiltration into the sinuses and cords occurred in both cases due to Klebsiella-Aerobacter, and one each due to *E. coli* and *Ps. aeruginosa* pneumonias. An acute interstitial nephritis was also seen in both of the fatal *Pseudomonas* cases. Renal tubular degeneration was seen in five patients. Glomerulitis probably secondary to kanamycin therapy was seen in a patient with acute and chronic pancreatitis. Cholecystitis, cholelithiasis, pancreatic calculi, and recent and old cerebral infarctions were other findings. Hemorrhage into the base of the zona reticularis and decreased lipids were seen in the adrenals in one case each. Six cases showed chronic passive congestions of the adrenals.

The autopsied cases included pneumonia due to Bacteroides, Friedländer's bacillus, *E. coli*, and

*Ps. aeruginosa*. Each presented with a distinctive pathology. The illnesses were of varying duration before terminus, and this may have accounted for some of the histologic differences seen. Sections of the lung from lobar consolidation in cases of pneumonia due to Klebsiella-Aerobacter showed marked leukocytic exudation into the alveoli, predominantly polymorphonuclear. Serum and fibrin were scant. There was moderate dilatation of blood vessels and some necrosis of the alveolar septae. Red cells and hemosiderin were present focally within areas of consolidation. Alternate atelectasis and emphysema was not seen.

In contrast, in pneumonia due to *Escherichia coli*, atelectasis and emphysema were prominent features of the patchy infiltrate, and cellular infiltrate within alveoli was much less dense than that of Friedländer's pneumonia. Pneumonias due to *E. coli* had predominantly mononuclear cells and moderate red cell infiltration with only a few polymorphonuclear neutrophiles within alveoli. Macrophages were replete with hemosiderin, and some serum was seen in the alveolar walls blood vessel dilatation and congestion were evident.

Pneumonias caused by *Ps. aeruginosa* resembled those due to *E. coli* in that here, too, a mononuclear cell infiltrate was seen within alveoli. Alternate atelectasis with emphysema and serum within alveoli were also seen. In addition, red cells in alveoli, hemosiderin deposition, and alveolar wall congestion were noted. Striking, however, were areas of abscess with partially walled-off loci of dense collections of polymorphonuclear leukocytes, severe localized necrosis, and areas of hemorrhage within or separate from necrotic foci. In some areas fibrin was deposited heavily within alveoli.

The single case of bronchopneumonia due to Bacteroides showed a moderate infiltrate of mononuclear and polymorphonuclear leukocytes with some areas of atelectasis adjacent to areas of emphysema. Similar cells were present in alveolar septae, within which some necrosis was seen. Blood vessel dilatation, congestion, hemosiderin, and fibrin were not noted.

There were no fatalities in patients with pneumonias caused by *H. influenzae*, *Proteus*, or *Achromobacter*.

#### Comments

Gram negative bacteria have been described as causative agents of pneumonia since Friedländer's first report in 1882. However, except for Klebsiella and *Hemophilus*, little has been written concerning

the clinical or pathologic characteristics of pneumonias caused by Gram negative bacilli. *Klebsiella-Aerobacter* were the most common bacteria found in our cases, closely followed by *E. coli*. Other bacteria causing pneumonia in order of decreasing frequency were *Pseudomonas*, *Bacteroides*, *Proteus*, *Hemophilus*, and *Achromobacter*. This variety of organisms is similar to that reported by Cutts and Becker and Kerr. Chronic disease in middle-aged men, alcoholism, diabetes, and heart disease were regularly found in these reports, and was confirmed here. These factors have also been found prevalent in *Klebsiella pneumoniae* pneumonias.

Premonitory upper respiratory symptoms are common in pneumococcal pneumonia. Respiratory symptoms before hospital admission were noted during the preceding three weeks in pneumonias due to *Bacteroides* and *Proteus*. Illnesses due to other Gram negative bacilli began shortly before entering the hospital without preceding upper respiratory symptoms.

Viscous, tenaceous, mucoid or bloody sputum is the classic description of *Klebsiella pneumoniae* pneumonias. This was not seen here, nor by Manfredi et al. Hemoptysis, however, was described in seven patients, all of whom had Friedländer's or *Proteus* lobar pneumonias.

Low or normal white blood counts have been reported in pneumonias due to Friedländer's bacillus, but here pneumonia associated with various Gram negative bacilli had a moderate leukocytosis, and in 13 cases the white blood cell count was greater than 20,000 cells/mm<sup>3</sup>. In these latter cases local purulent complications were usual. On the other hand, patients with pneumonia due to *Bacteroides* or *Achromobacter* usually had normal white blood cell counts with predominantly mature neutrophiles.

Findings on x-rays could be divided into two groups. *Bacteroides*, *E. coli* and *Pseudomonas aeruginosa* produced predominantly lower lobe bronchopneumonias, frequently with large empyemas. *Proteus* and *Klebsiella-Aerobacter* infections, on the other hand, usually involved the upper lobes with dense, confluent lobular or lobar infiltrates, and empyema was less common.

The high mortality of these pneumonias due to Gram negative bacilli found here is similar to that reported by others. Chronic heart or kidney disease, greater than 50, and bacteremia were factors tending to increase case fatality (Table 8). Half of these patients apparently died more directly as a result of other conditions, rather than of their pneumonias or septicemia.

TABLE 8  
*Factors Influencing Mortality in Patients with Pneumonias Caused by Gram Negative Bacilli*

|   | Total number | Number survivors | Number deaths | Percent mortality |
|---|--------------|------------------|---------------|-------------------|
| Pneumonias, associated with Gram negative bacillary infection | 38           | 21               | 17            | 45                |
| Associated conditions   |              |                  |               |                   |
| Chronic pulmonary disease                                     | 8            | 2                | 6             | 75                |
| Heart disease   | 18           | 5                | 13            | 72                |
| Positive blood culture  | 7            | 2                | 5             | 71                |
| Age over 50 yrs.  | 22           | 8                | 14            | 64                |
| Diabetes mellitus   | 17           | 9                | 8             | 47                |
| Alcoholism  | 18           | 11               | 7             | 39                |
| Two lobes involved  | 6            | 4                | 2             | 33                |
| Three or more lobes involved                                  | 9            | 5                | 4             | 45                |

Two deaths in *Ps. aeruginosa* pneumonias are of interest in that both were due to myocardial infarction. Vascular thromboses were not seen in other organs. Hepatitis, splenitis, and interstitial nephritis were seen as well. It seems very possible that these changes were induced by known toxins or other products of *Pseudomonas aeruginosa* growth such as hemolysin, lecithinase, lipases, protease, deoxyribonuclease, elastase, mucolytic enzyme, gelatinase, fibrinolytic enzymes, or toxic extracellular slime.

Local complications, namely empyema or delayed resolution with resultant residual pulmonary signs and symptoms were common. Lung abscesses were seen in four. Acute massive atelectasis such as has been described in pneumococcal pneumonia was not seen. Distant metastatic infectious sequelae were also infrequent. Pericarditis, meningitis, or arthritis were not observed. Falling hemoglobins were seen in 16 of 34 patients, probably reflecting the anemia of infection.

Aspiration from the upper respiratory passages, bacteremia with subsequent seeding of the lungs, and direct blunt or penetrating trauma to the chest are usual mechanisms in the production of pneumonias. Chest trauma seemed important in three

cases. Fractured ribs (*Ps. aeruginosa*), gun shot wound of the chest and abdomen (*E. coli*), and a stab wound to the chest (*Klebsiella-Aerobacter*) were specifically noted.

In aspiration pneumonias, pulmonary infiltrates frequently are in the posterior segment of the right upper lobe or upper portion of the right lower lobe. *Klebsiella pneumoniae* has been reported to occur in from 5 to 25% of normal throats. Thus, Erasmus, noted a high percentage of dental or gingival sepsis in 17 cases of Friedländer's pneumonia with infiltrates in the proper lobes to postulate aspiration. In fact, he found a striking proclivity toward posterior segment, right upper lobe pneumonias. Pneumococcal pneumonias may also be acquired by aspiration. There were four instances here in which throat cultures showed the same microflora causing pneumonias. Three of these were in patients with pneumonias due to *Proteus*, and all had dense right upper lobe infiltrates. Pneumonias associated with *Proteus*, like Friedländer's pneumonias, produced consistently lobar or confluent lobular infiltrates. Aspiration may well have been a primary event in these pneumonias, and when bacteremia occurred, it was secondary.

On the other hand, *E. coli*, *Pseudomonas aeruginosa*, and *Bacteroides* pneumonias could have occurred after bacteremias usually following primary urinary tract infections. They might then differ from Friedländer's, *Proteus*, or pneumococcal pneumonias which usually follow aspiration from the upper respiratory passages.

*Pseudomonas aeruginosa* infections in man have been associated with vasculitis and a generalized Schwartzman reaction with extensive intravascular coagulation. The role of endotoxins, exotoxins, enzymes, or metabolic products in the pathogenesis of disease, particularly pneumonia by Gram negative bacilli awaits clarification. Particularly, attempts have been made to correlate the severity

of pneumococcal and Friedländer's pneumonias to the thickness of their polysaccharide capsules and subsequent relative insusceptibility to phagocytosis. Certainly all of these factors, the immune status, nutrition, and other disease processes in the susceptible host must be important in the successful production of pneumonias caused by Gram negative bacilli.

#### Summary

Thirty-eight cases of pneumonia caused by Gram negative bacilli admitted to the Detroit Receiving Hospital between July 1, 1963 and June 30, 1964 were reviewed. Most of the patients with infections due to *Klebsiella pneumoniae*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Proteus*, or *Bacteroides* were middle-aged men with either alcoholism, diabetes, heart disease, or chronic pulmonary disease. The mortality was 45%, about half of the fatalities apparently resulting from the pneumonia and the rest from extra pulmonary conditions.

*Klebsiella-Aerobacter* or *Proteus* most frequently caused upper lobe, lobar consolidations and may well have been the result of aspiration from the upper respiratory passages.

Pneumonias due to *E. coli*, *Ps. aeruginosa*, and *Bacteroides* were lower lobe bronchopneumonias, frequently with empyema. The latter cases frequently followed primary bacteremias from an extra pulmonary focus of infection, such as the kidney. Despite appropriate antibiotic therapy, these pneumonias due to Gram negative bacilli cause long serious illness with prolonged courses, residual pulmonary disease, and high fatality rate.

#### Acknowledgment

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(The references may be seen in the original article.)

# FROM THE NOTE BOOK

## INSTANT X-RAYS

CAPT Loy T. Brown MC USN, Chief of Radiology, U.S. Naval Hospital, Bethesda, Maryland addressed the graduating class of x-ray students at the U.S. Naval Medical School, Bethesda, Maryland. Doctor Brown spoke on recent advances in the field of x-ray technology and the importance of the x-ray technician to the radiology service.

Of particular interest was mention of automatic film processing units. Doctor Brown briefly traced the advancement of film processing from the hand method, which took about 35 minutes, to the present where a film can be completely processed in some 90 seconds. The units have become more streamlined, progressing from the large and cumbersome units to a compact unit about the size of two water coolers side by side. He envisioned the day when x-rays would be taken and automatically processed in the film holder. When the film is removed, there would be "instantly completed x-rays."

Doctor Brown charged the students with the responsibility of continuing their studies and to strive for recognition by achieving accreditation from a Registered Technician Society. CAPT John H. Stover Jr. MC USN, Commanding Officer of the U.S. Naval Medical School, then presented the honor students with letters of commendation, and completion certificates to all students.

The U.S. Naval Medical School Course for the training of x-ray technicians is approved by the Council on Medical Education of the American Medical Association. The first half of the two year program consists of didactic instruction and on-the-job training in Naval Hospitals. In the second year, each technician must serve under the supervision of a qualified Board Radiologist in order to establish eligibility for registration with the National X-Ray Societies. One thousand four hundred and eighty-three x-ray technicians have been trained in this program.—NavMedScol News Release.

## REGISTRY OF TISSUE REACTIONS TO DRUGS

The recently founded Registry of Tissue Reactions to Drugs is located at the Armed Forces Institute of Pathology, Washington, D. C., and has been functioning for five months. It is jointly sponsored by the American Medical Association, the Food and

Drug Administration, and the Pharmaceutical Manufacturers Association Foundation.

During this time it has accessioned 202 cases, involving 92 drugs and 18 organs, systems, or tissues. Some of these cases have been contributed by practicing pathologists, some have come from the AFIP files, some have been referred to the Registry through the reporting systems of the AMA Adverse Drug Registry and the FDA reporting system, and some have been seen in consultation with other AFIP Branches and Registries.

The success of the Registry hinges on the collection of statistically significant numbers of cases so that reaction patterns and their variations can be derived and causal relationships can be strengthened.

The submission to the Registry of cases having biopsy or autopsy material available is solicited. The Registry's interest as to the alleged drug includes not only the new and recent ones, but also the older and established medications.

The Registry will accept material directly from pathologists, and individual physicians may submit material through their pathologists. All case material should be packed in the same manner as other shipments to the AFIP and should include slides, blocks, biopsy and autopsy reports, clinical history, photographs, x-rays and other pertinent material and information. It is vitally important that all material submitted to the Registry be as complete and as detailed as possible. All material submitted will be reviewed by the Registry in consultation with other appropriate AFIP pathologists. Case material should be addressed to The Director, ATTN: Registry of Tissue Reactions to Drugs, Armed Forces Institute of Pathology, Washington, D. C. 20305. Detailed information for submitting material may be obtained by writing the AFIP.—AFIP, Technical Liaison Office, Washington, D. C.

## TROPICAL MEDICINE SPECIALIST RETURNS TO ACTIVE NAVAL SERVICE

In response to an urgent call for assistance by CAPT J. H. Stover, Jr. MC USN, Commanding Officer of the U.S. Naval Medical School, CAPT Julius M. Amberson MC USN (Ret) of Silver Spring, Maryland, volunteered to return to active naval service on 1 March 1966. CAPT Amberson will serve as Chief, Preventive Medicine Division, Laboratory Department, U.S. Naval Medical School,

National Naval Medical Center, Bethesda, Maryland. Among his responsibilities will be the organization and development of a program in Global Medicine, initiated by CAPT Stover in response to the urgent need for the training of medical department personnel in preparation for assignment overseas.

CAPT Amberson first entered the U.S. Navy in July, 1917, as an enlisted man where he worked in the communications field. After one year of service, he was commissioned as an Ensign in the line and he continued to serve in the Atlantic Fleet on cruisers and submarines. Returning to inactive naval service in 1919, from which he was later honorably discharged, he continued his schooling at the University of Montana School of Mines, receiving a degree in mining engineering in 1921. He entered postgraduate training in Business Administration at the University of Chicago following which he matriculated into medical school at that University.

The die was finally cast. He received his M. D. degree in 1927, and, following his internship, spent one year in a radiology residency. Doctor Amberson entered private medical practice in Chicago and continued in that practice until the commencement of World War II. At this time, he returned to active naval service as a Medical Officer, serving as such until his retirement on June 30, 1959.

CAPT Amberson's experiences include the investigation of cholera in India, typhus in Naples, Italy and Cairo, Egypt, trenchfoot in Northern Italy, dengue and filariasis in the Pacific, and scrub typhus and Japanese B Encephalitis in Okinawa and Japan.

During the Mediterranean campaign of World War II, CAPT Amberson served as Preventive Medicine Officer of the U.S. Eighth Fleet and was Officer in Charge of Epidemiology Unit #50, which was based principally at Cairo, Egypt, and which was associated with the American Typhus Commission. In 1946, he was Epidemiologist to the Headquarters Staff of the Coal Mines Administration, headed by ADM Ben Moreell USN. Doctor Amberson worked under RADM Joel T. Boone MC USN, who was Medical Advisor to the Coal Mines Administration, Department of the Interior, and Director, Medical Survey Group, which investigated the health, housing, welfare, and hospitalization conditions of coal miners throughout the United States.

In 1947, Doctor Amberson was a member of an International Commission for eradication of venereal disease in Southern Greenland, and in 1952, he was Task Force Medical Officer for Operation "Blue

Jay" in connection with the construction of Thule Air Force Base in Northwestern Greenland.

In 1948, he served as senior medical officer representing the U.S. Navy on the University of California African Expedition which trekked from Cairo, Egypt to Capetown, South Africa.

In 1950, Doctor Amberson served on loan to the Public Health Department of the Government of Venezuela. He assisted in the mapping of the extent of Bubonic Plague in wild rodents in that country in order to control that disease in the human population. He served as Preventive Medicine Officer, Third Marine Division, with the occupational forces in Japan during the Korean conflict. He supervised the medical aspects of the evacuation of 800,000 North Vietnamese repatriated to South Vietnam under the Geneva Agreement of 1954.

In 1955, CAPT Amberson was assigned to the U.S. Naval Mission in Colombia, South America, for the teaching of Naval Medicine to the medical officers of the Colombian Navy at the Naval Academy in Cartagena. He served as Division Surgeon, Third Marine Division from 1957 to 1958.

Following retirement from active naval service in 1959, CAPT Amberson participated in clinical trials of new drugs for the treatment of tropical diseases in Asian, Middle-Eastern, African, and South American countries. From January to July, 1962, at the request of the National Science Foundation, he served as civilian medical officer aboard the USNS ELTANIN in Antarctic waters. He is board certified in Public Health by the American Board of Preventive Medicine.

CAPT Amberson's background, experience, professional competence, and enthusiastic interest will provide the essential guidance and impetus for the development of a special group of urgently needed training programs. To CAPT Amberson, this urgent requirement is "just another job that needs to be done."—Technical Information Office, NNMC, Bethesda, Md.

## REPORT OF A WHO EXPERT COMMITTEE ON CANCER TREATMENT

WHO Technical Report Series, No. 322, published in 1966, presents planning of cancer treatment; types of cancer treatment; evaluation of cancer treatment; organization of cancer treatment; research in the treatment of cancer, with 3 annexes. This publication may be purchased from the Columbia University Press, International Documents Service, 2960 Broadway, New York, New York 10027, Cost: \$1.00.

—PrevMedDiv, BuMed.

## ACKNOWLEDGMENT

A letter from LCDR P. F. D. Van Peenen whose article "Plague in Danang," Vietnam, 1965 appeared in the 25 March issue of the U.S. Navy Medical News Letter requests credit for basic organization and implementation of the project go to HM2 Paul F. Ryan USN, senior mammalogy technician, G-18 Naval Support Activity, Danang. He also comments on the excellent cooperation existing between that unit and the U.S. Army Medical Research Team, Vietnam.—Editor.

## DENTAL SECTION

### DIRECT PATTERNS AND THE RUBBER DAM

P. W. Appel, *J Pros Den* 16(1): 150-153, Jan-Feb 1966.

The article describes a method of attaining proper occlusal form in direct wax patterns when using the rubber dam.

After the dam is placed, but before the inlay preparation is cut, a thin mix of acrylic resin is applied to the occlusal surface of the tooth to be prepared. Care is exercised to include the occlusal surfaces of the adjacent teeth. A paper clip is embedded in the acrylic to strengthen it and also to serve as a handle. When set, the acrylic matrix is removed and the cavity preparation completed.

Softened casting wax is placed in the cavity preparation. While the wax is still soft, the acrylic matrix, which has been lubricated, is firmly pressed to place in its original position. Upon removal of the matrix, a duplicate of the original occlusal surface will be left on the wax.

The carving is refined, the wax pattern removed and prepared for casting. The resultant is a casting that requires little, if any, adjustment.

### PREVENTION OF BACTERIAL ENDOCARDITIS

E. A. Mortimer Jr., *JAMA* 195(1): 53-54 Jan 3, 1966.

Recurrent rheumatic fever in adults is always preceded by a group A streptococcal infection, as in children. Adults are somewhat less likely to acquire streptococcal infections except when in the armed services. Therefore, the protective effect of prophylaxis with penicillin is less obvious.

The important question as to whether continuous prophylaxis prevents bacterial endocarditis cannot be answered with certainty. Circumstantial evidence would indicate that it is ineffectual, for the reason

that alpha-hemolytic streptococci residing in the oral cavity and pharynx in patients receiving penicillin daily are likely to be resistant to that drug (Penicillin-Resistant Bacteria in the Mouth and Throat of Children Receiving Continuous Prophylaxis Against Rheumatic Fever, Naiman, R. A. and Barrow, J. G.: *Ann Inter Med* 58(5): 768-722, May 1963). Indeed, instances of bacterial endocarditis due to penicillin-resistant alpha-hemolytic streptococci have been reported in such patients. For this reason it can be argued that patients receiving prophylaxis should be given therapy with a different antibiotic at the time of dental extractions (or any intraoral manipulation which might produce a bacteremia). However, it should be noted that it is very difficult to prove even in those patients who are not receiving continuous prophylaxis that antibiotics administered at the time of dental procedures reduce the likelihood of endocarditis. The use of antibiotics on these occasions is based on logical reasoning with which one must agree, but there are too many variables to permit its value being established as fact.

(Abstracted by LCDR W. K. Bottomley DC USN, USS NEWPORT NEWS (CA-148)).

### EFFECT OF DIETARY PHOSPHATE SUPPLEMENTS ON DENTAL CARIES INCIDENCE IN TROPICAL BRAZIL

H. M. Averill, P.S. Freire and B. G. Bibby. *Arch Oral Biol* 11(3): 315-322, March 1966.

Continuing the subject after reported failure to show any measurable cariostasis in institutionalized New York children with dietary dicalcium phosphate supplementation, this report presents a parallel study in two townships in the Amazon valley of Brazil. The two communities were selected on the basis of high caries activity, population homogeneity, isolation and controllable food supply. Neither has sig-

nificant water fluoride. In both, the low dietary mineral intake supplied less than one-fifth of the calcium recommended by the National Research Council for Latin America. The carbohydrate staple, mandioca, supplies 75 percent of the caloric intake. Two percent dicalcium phosphate, together with calcium lactate to provide a 2:1 calcium:phosphate source was added to the mandioca of one town. Clinical examination, including bitewing roentgenograms, were made by six standardized Brazilian public health dentists. After 30 months, 6-13 year old children on the phosphate diet showed 39.8 per-

cent of initially sound teeth carious and 17.4 surfaces, whereas the figures from the control diet were 45.4 and 20.7 respectively. This represents a reduction of 12 and 16 percent respectively. The greatest difference was found in first molar occlusal and buccal surfaces. In second molars and bicuspids which erupted during the study, there was significantly less caries increment among the phosphate supplemented children. In the children on dietary phosphate there was an increase in blood serum and saliva calcium. No difference was found in the salivary phosphate levels of the two groups.

### PERSONNEL AND PROFESSIONAL NOTES

**PROFESSIONAL MEETINGS.** The Dental Service, U.S. Naval Hospital, Oakland hosted the Alameda County Dental Society on 12 April 1966 at the Officers' Club. Table clinics were presented by the following dental officers:

CDR J. T. Anderson DC USN—IV Sedation for Dentistry.

LT J. W. Chandler DC USN—Management of Avulsed Incisors.

LT M. Z. Crigger DC USN and LT S. W. Oshinsky DC USN—Acrylic Dental Implant.

LT M. Z. Crigger DC USN and LT R. C. King DC USN—Closure of Oral-Antral Fistulae.

LT S. W. Oshinsky DC USN and LT C. E. Schutt DC USN—Amalgam Splints.

Miss Carol Zeck DH—Visual Education Aids.

LT N. R. Frei DC USN—Restoration of Damaged Partial Denture Abutment.

The dental officers of Naval Air Station, Atsugi, Japan, hosted a joint dental meeting with the Kanagawa-Ku Dental Society of Yokohama, Japan. The program included a showing of two professional films and a slide lecture entitled, "Radiographic Landmarks of the Maxilla and Mandible." The program and discussion periods were moderated by LCDR T. E. Stump DC USN. CAPT V. W. Van Damm DC USN is the Dental Officer at NAS, Atsugi.

On the same evening the Yokosuka Dental Society hosted the dental officers of the U.S. Naval Dental Clinic, Yokosuka, Japan. Eleven U.S. Navy dental officers were presented certificates of honorary membership in the Yokosuka Dental Society.

The District of Columbia Dental Society met at the U.S. Naval Dental School, National Naval Medical Center, Bethesda, Maryland, on 13 April 1966 to participate in a professional clinical program.

Presentations by the Dental School staff were as follows:

"Etiology of Periodontal Disease"—CAPT P. F. Fedi DC USN.

"Classification, Diagnosis and Treatment Planning"—CDR C. H. Holmes DC USN.

"Gingivoplasty and Gingivectomy"—CDR C. H. Holmes DC USN.

"Mucogingival Surgery"—CAPT P. F. Fedi DC USN.

"Assisting Advanced Periodontal Treatment with Operative Procedures"—CDR J. B. Enoch DC USN.

"Assisting Advanced Periodontal Treatment with Removal Partial Dentures"—CDR R. J. Leupold DC USN.

The day session was continuous from 1000 to 1700 in Building 122, and the evening dinner and lecture from 1730 to 2100, in the NNMC Officers' Club.

**DENTAL TECHNICIANS TO COLLEGE ON NESEP.** Congratulations are in order to two Naval Dental Technicians who have been selected for the Navy Enlisted Scientific Education Program, as announced in BUPERS NOTICE 1510 of 10 March 1966. Selected to attend a four-year college course were McCullough, Larry E., 585 98 79, DT3, USN, of 12th Force Dental Company, 2nd MAW, and Davidson, Dennis M., 237 78 36, DT2, USN, currently stationed at Naval Station, Newport, Rhode Island.

**DENTAL X-RAY EXPOSURE CHARTS.** The Dental Division, BuMed has a stock of Dental X-ray Exposure Charts, which are available to cognizant dental officers upon letter request. Available are charts containing data for the following X-ray units: General Electric 90 II, Weber 90, XRM (S. S.

White) and Ritter Model F. Also available are blank forms in which the user may enter the appropriate data for any X-ray machine. Requesters should specify the type of unit for which they desire data.

These charts were originated by Dr. Gordon M. Fitzgerald, Clinical Professor of Oral Roentgenology and Chairman of the Department of Oral Roentgenology, University of California. The charts have been reproduced for Navy use with his permission. The charts are in routine use at the Dental Department, Hunters Point Division, San Francisco Bay Naval Shipyard. The usefulness and accuracy of the system has been verified by the U.S. Naval Dental School, National Naval Medical Center, Bethesda, Maryland.

**DENTAL TECHNICIANS AUTHORIZED FOR ADVANCEMENT.** The following listed dental technicians have been authorized for advancement to Chief Dental Technician on 16 May 1966. Letters of congratulation have been sent to each individual by the Chief of the Dental Division.

Leo N. Dumphry, General, NDC Philadelphia.

Gerald D. Martin, Prosthetic, San Fran Bay, NAVSHIPYARD.

Jack E. McDaniel, Repair, 2nd MARDIV, FMF, LANT.

**HEALTH HAZARD.** BUMEDINST 6260.12 provided information concerning the hazardous properties of halogenated hydrocarbons and promulgated general precautions for the protection of personnel using these materials. Carbon tetrachloride is included on the list in the instruction.

The effects of short term, high exposure to carbon tetrachloride are dizziness and nausea. Significant liver damage is the result of long term, low exposure.

In view of the health hazards presented by these drugs, medical and dental department representatives are directed to take action necessary to insure compliance with the provisions of BUMEDINST 6260.12.

**DENTAL OFFICER PRESENTATIONS.** LCDR G. T. Ballard DC USN, U.S. Naval Training Center, Great Lakes, Illinois presented a table clinic entitled "Gold Foil, A Permanent Anterior Restoration" before the Kentucky Dental Association, Louisville, Kentucky, on 4 April 1966.

LT J. J. Brennan DC USN, dental intern, U.S. Naval Hospital, Great Lakes, Illinois, presented a table clinic "Powdered Gold in Class I Cavities" at the Midwinter Dental Convention in Chicago, Illinois, on 28 February 1966.

groups of people with particular handicaps or physical conditions.

Applicants with a history of a single episode of hospitalization for mental illness some years in the past who have a satisfactory employment record since that time are usually medically accepted solely on the basis of that record.

Any other applicant with a history of hospitalization for mental illness is sent a letter over the signature of the medical officer requesting his own account of his illness and his own evaluation of his present condition. He is also asked to authorize the release of medical information from the hospital in case further clinical information is desired. Not infrequently, the responses to this letter create such a favorable impression of the writers and their present stability that they are cleared without our obtaining information from the hospital. More frequently, however, the information from the hospital is obtained. In no case is an applicant with a history of hospitalization for mental illness medically rejected without our having obtained his own account of the illness and the hospital history. The latter is frequently supplemented by information from social service workers, supervisors who may have interviewed the applicant, previous employers, or others.

A change in the medical classification of applicants was made in 1962 which has resulted in the provisional certification of applicants with a health problem, either physical or mental. Thus many have been employed who would have been rejected under the previous standards, which were limited to "accept" or "reject." This previous "pass-fail" choice was appropriate when physical standards were set for the class of employees as a whole, and no allowance was made for particular positions with less arduous or physically exacting duties.

To assist in placing in employment handicapped applicants, we introduced the code "Subject to Proper Placement." Applicants so coded have a mental or physical problem which prevents them from qualifying for all positions in the class, but would be medically eligible for some particular positions; they are to be referred for interview when their names are reached for vacancies in the class. If, after interview, the agency believes that the applicant is capable of carrying out the duties of the position, the appointment is authorized.

We use some home-grown criteria in our evaluation of the employability of ex-mental patients. The following factors are considered to be favorable:

1. The breakdown was a long time ago.

2. It was of short duration.

3. It was a single episode.

4. It was a "situational" rather than a "deep" neurosis.

5. The applicant appears to have insight.

6. Stability has been maintained without supportive therapy.

7. The applicant had been a manic, now stabilized, rather than a schizophrenic; in turn, a schizophrenic, rather than a "paranoid," other conditions being equal.

8. The hospital commitment was voluntary rather than forced.

9. There are close relatives who had committed the applicant, rather than relatives with whom rapport has been severed.

10. The employment history since the hospitalization has been good.

11. The employment history prior to the hospitalization was good.

If there is a recurrence of emotional problems when the applicant is employed, the one who has previously committed himself is likely to do so again, or the relatives who did so before will likely be available for the same type of assistance. The "loner," as typified by many paranoid, may cause endless trouble and greatly disturb the working environment. We have come to the conclusion that usually when the patient stabilizes, his future work pattern will prove to be the same as that evidenced before his breakdown.

We cannot testify as to the validity of each of these 11 criteria. We do believe, however, that the following statistics indicate that they can be looked on as reasonably reliable in their entirety.

Table 1 shows the number of histories reviewed, the number of former mental patients unconditionally accepted medically, and those accepted "Subject to Proper Placement." We consider it significant that 50% more of those "Subject to Proper Placement" (STPP) had separated from California State employment than those unconditionally approved.

We believe the success of a program for the handicapped can be better measured by the job successes of those handicapped people hired than by their number. Each person with a health problem, be it physical or emotional, who is employed and who compares favorably with his fellow employees in productivity and safety, and in lack absenteeism and turnover, will increase employer acceptance of applicants with similar histories.

## OCCUPATIONAL MEDICINE SECTION

### STANDARDS FOR THE EMPLOYMENT OF FORMER MENTAL HOSPITAL PATIENTS

Christopher Leggo MD, Sacramento, California. *Abstracted from JOM 8(3): 135-137, March 1966.*

On occasion the California State Personnel Board receives inquiries as to its procedures and practices in respect to the employment of former mental hospital patients. Since the requirements of this state board are not dissimilar to those of numerous medical directors, publication of these officially adopted requirements and practices may be useful.

It has been our objective to evaluate all handicaps or illnesses, mental or physical, by the same criteria. Medically we accept an applicant for employment when the following conditions are met:

1. He is capable mentally and physically to carry out the duties of the position.

2. His health is such that he is likely to continue to render useful service for a reasonable length of time.

It is our aim to evaluate the medical eligibility for employment of all handicapped persons, whether the handicap be physical or mental, according to the same philosophy. We wish to avoid special concessions to or separate standards for each of the many

Table 1. Disposition of Former Mental Patients Who Passed California State Civil Service Examinations, Jan. 1, 1962—Sept. 30, 1964

|                 | Hired      |             | Separated |             | Total      |
|-----------------|------------|-------------|-----------|-------------|------------|
|                 | No.        | %           | No.       | %           |            |
| <b>Accepted</b> |            |             |           |             |            |
| Unconditionally | 150        | 77.0        | 45        | 30.0        | 195        |
| STPP            | 15         | 45.5        | 7         | 46.6        | 33         |
| Rejected        | —          | —           | —         | —           | 66         |
| <b>TOTAL</b>    | <b>165</b> | <b>72.5</b> | <b>52</b> | <b>31.6</b> | <b>228</b> |

Conversely, an unfavorable experience will tend to condition the employer to resist employment of those with similar histories. It is for this reason that we are continuing in our search for criteria that will assist in identifying those applicants who will perform successfully if employed.

#### CADMIUM POISONING

*U. S. Department of Health, Education, and Welfare, Public Health Service.*

The Division of Occupational Health, U.S. Public Health Service, reporting on two recent poisoning deaths traced to improper use of silver solder containing cadmium, warned that this type of industrial material should be carefully used under safe working conditions.

The Division of Occupational Health emphasizes that all silver solders do not contain cadmium. However, when using any type of this material, the following precautions should be followed:

a. Warning labels, which should be on all packages, must be carefully read and followed.

b. The working area must be properly ventilated, preferably with specific exhaust systems.

c. Workers must avoid breathing emitted fumes.

The worker deaths occurred in California and Utah. A second non-fatal incident of cadmium poisoning was also discovered in California. In the Utah case, the worker told his physician that he had been working with ammonia and neglected to mention silver solder. His illness was consequently first diagnosed as "ammonia poisoning." It was not until after his death that tissue tests made at the suggestion of the State Health Department revealed cadmium poisoning.

Part of the problem, the Division of Occupational Health says, is that there are few requirements for

labeling of hazardous industrial materials. In the case of the silver solder used in Utah, there was only a 1 1/4 x 2" loose tag which said: "Contains cadmium, emits dangerous fumes if overheated."

The Division of Occupational Health also stresses that all workers should tell their physicians what their jobs are and what types of materials they handle. Occupationally-caused illnesses and diseases can be easily overlooked if physicians do not have this vital information.

#### GLAUCOMA: EXPERIENCE WITH TONOMETRY IN 909 CONSECUTIVE EMPLOYEE PATIENTS

*Norman C. Kiefer MD and Warren S. Braverman MD, New York, N. Y. Abstracted from JOM 8(3): 95-100, March 1966.*

The industrial medical department has an exceptional opportunity to carry on comprehensive services in preventive medicine and in early diagnosis. As a part of these activities, a well-conceived program of periodic health examinations for employees can not only yield useful and gratifying results but also offer an unusual setting for long-term studies of epidemiological importance.

#### Screening Procedures

The medical department offers, in our main office, comprehensive annual health examinations to active, salaried, company employees who are 40 years of age or older. Participation is voluntary. Tonometry was added to these examinations in December 1963. Prior to this time, we had obtained expert advice that in a brief period under competent instruction, a physician could learn to perform tonometry with skill and accuracy. Suitable arrangements were made at the New York Eye and Ear Infirmary. With the

capable and generous help of this institution, 3 of our physicians—none of them with previous ophthalmological training or experience—have received this training, including performance of the examinations under supervision. Initially, one of the authors learned the technique and performed all of our tonometric examinations. During the ensuing year, 2 more physicians were trained at the same infirmary.

At a convenient time during the physical examination, when the patient is in a supine position, tonometry is performed. Topical anesthesia is established by the insertion of 1-2 drops of benoxinate hydrochloride, U.S.P., in each eye. Within at most 30 sec., the physician applies the tonometer to the corneal surface and makes one reading for each eye. This requires 10-30 sec. The entire procedure thus requires a maximum of 60 sec.

A Schiotz-type of tonometer is used. One instrument per examiner is sufficient, with one "spare" instrument for temporary replacement as each of the instruments is returned to the manufacturer, annually, for recalibration to assure continuing precision. The tonometer is the only special equipment required and costs less than \$40.00 per instrument.

The duration of the topical anesthesia's effects is at most 20-30 min., a period shorter than that required for completion of the general physical examination, for the patient to dress, and for the physician to discuss the results of the entire examination with him. This is of some importance in any instance where the employee leaves the building immediately after examinations. A foreign body could fall into his eye—a rather common occurrence in a city—and go unnoticed for some time because of the anesthesia.

#### Undesirable Reactions

No significant, untoward reactions have been encountered. There has been one instance of a trivial corneal abrasion which occurred when a patient suddenly moved his head just as the tonometer plate was placed in contact with the corneal surface. The abrasion healed without further incident within a day.

There have been no cases of conjunctivitis. In 3 instances, or less than once in each 300 examinations, there was immediate, minor, transient conjunctival irritation, apparently caused by the topical anesthetic. In each case, symptoms disappeared within 20-30 min., with no treatment other than saline-solution irrigation followed by instillation of an eye ointment.

#### Standard Employed

Using a 5.5 mg weight in the tonometer, any scale reading of less than 4.0 required further evaluation. This reading is equivalent to an intraocular pressure of 20.6 mm Hg. Whenever a scalar reading of less than 4.0 was obtained, i.e., more than 20.6 mm Hg, the examination was repeated once or twice at 1-week intervals to confirm the initial high reading or to identify instances of transient increase of pressure.

#### Procedure in Cases of Suspicious Pressure

Before our program was initiated, an arrangement of great value had been made with the Glaucoma Research Laboratory of the Department of Ophthalmology of New York Hospital. Employees with abnormal tonometric readings are sent to this laboratory, where our findings are checked and a battery of additional tests is provided as indicated.

Such tests are performed in order to determine whether glaucoma is present and, if so, what type it is and whether visual damage has already occurred. The employee then is referred to his own ophthalmologist for therapy.

In instances of increased intraocular pressure, where other abnormality is not found during the Glaucoma Research Laboratory examination, our Employees' Health Center is to repeat the tonometric examination semiannually for an indefinite number of years.

#### Population Examined

All tonometric measurements and results reported in this study were made only as a part of periodic health examinations. All employees in the study were in the age group 40-64 (periodic health examinations are not normally made available to employees under the age of 40, and retirement normally is mandatory at the age of 65). Most of these people are engaged in clerical, administrative, or executive work, or closely related supporting business activities; a few of them are employed as carpenters, electricians, painters, plumbers, porters, guards, or maintenance men.

The 40-year minimum age applicable to this study justifiably permits an assumption that with few exceptions these were employees with many years of company service, many of them in key positions demanding extensive prior training and experience. A number of top company executives were included. Among the participants, 38% were females.

Many of the employees included were simply returning for another in a series of annual examinations. No announcement was made of the addition of tonometry to the routine and therefore few of the first few hundred examinees knew of it until the examination was in progress. This initial group had the highest prevalence of abnormal findings. There were 3 employees who knew they had glaucoma, but none of them knew that tonometric examinations had been added to the program.

There remains the question of whether these employees, because they participate voluntarily in a health program, are more prone than other employees to real or imagined physical or mental illness, perhaps including glaucoma. There is no evidence to support such a premise—in fact, there is stronger justification to suspect that the opposite is true.

#### Results

It has been estimated, from the results of a number of glaucoma screening programs, that about 2% of Americans over 40 years old have glaucoma. In the group of 909 employees we studied, 34 (3.7%) were considered to have abnormal tonometric findings, and 25 (2.8%) were found, on more extensive examination, to have definite glaucoma. Of the 25 cases of glaucoma, 24 were of the chronic, simple, open-angle type. One was of the acute, angle-closure type. Three cases—all chronic, simple glaucoma—had previously been diagnosed elsewhere.

With one exception, none of the 24 had experienced symptoms related to glaucoma. The one exception was the employee with acute, closed-angle glaucoma. He had had symptoms which, on retrospective analysis, probably were caused by an acute episode of increased intraocular pressure, although the correct diagnosis had not been made. This was the only case in which surgical treatment has been required. The other 23 cases are responding, thus far, to medical therapy.

In our judgment, the 3 previously diagnosed cases should not be deleted in calculating the prevalence of glaucoma among the 909 employees. Because of our conviction that these subjects' knowledge of their glaucoma had nothing to do with their participation in the study, the inclusion does not bias the random nature of the sample and the three should be counted in computing glaucoma prevalence in this group. They should be deleted only in appraising the value of the periodic health examina-

tion in uncovering previously unknown or unsuspected disease.

There are some interesting observations arising from consideration of the age and sex distribution in the study. It must be remembered, however, that the total numbers of cases are small and therefore are subject to statistical fluctuation that cannot be reliably appraised.

#### Distribution by Sex

In most surveys, glaucoma cases have been about equally distributed between males and females examined. It therefore is intriguing to note that in our series, the rate of abnormal tonometric findings was nearly three times as great among male employees as among female employees, and the rate of confirmed glaucoma cases was over four times as great among males. There were 566 males with 28 (4.9%) instances of abnormal tonometric findings and 22 (3.9%) cases of glaucoma. There were 343 females with 6 (1.7%) abnormal tonometric readings and 3 (0.9%) glaucoma cases. Such a difference cannot be attributed to a difference in the age groups for each sex: by an interesting coincidence, the percentages of males examined in the 40-49, 50-59, and 60-and-over age groups were almost precisely the same as for females.

The small number of cases involved, particularly among the females, does not permit any sweeping conclusions but, because of their variation from the usual pattern of sex distribution of the disease, certainly present an overall challenge to expand the numbers to determine whether there truly is so great a difference, between the sexes, in vulnerability to glaucoma.

#### Age Distribution

Glaucoma is not a fatal disease. Therefore, when in 10 years a cohort of people 40-49 years old, including some with glaucoma, reaches the age range of 50-59 years, new glaucoma cases would be added to those in existence a decade previously, minus those glaucoma patients who had died from other diseases. Some increase in cases in each succeeding age group therefore could reasonably be expected.

But if the total glaucoma rate of 2.8% is applied separately to the number of glaucoma cases in each of the three age groups reported, the resultant expected number of cases for each group is quite similar to the actual number found in the 50-59 and 60-64 age groups. If all cases with increased intraocular pressure are considered, the expected and

actual numbers are strikingly similar in all 3 age groups.

Interpretation based on only 3 glaucoma cases and 3 suspects, as in the 40-49 year group, is speculative and dangerous. There was, however, another interesting observation: among the total of these 6 with abnormal findings, 3 were 43 or younger.

The common belief that glaucoma is almost entirely a disease that occurs after the age of 40 years may be incorrect. We therefore plan to survey a sample group of employees aged 35-39 (and, perhaps, 30-34).

Other future studies will be directed at adding to the total of cases examined to determine whether increasing numbers will alter any of the current findings of prevalence and sex or age distribution, and also at providing follow-up studies of the cases with abnormal findings.

There will be no opportunity to observe what happens to untreated glaucoma because all such cases must be treated. The consequences of progression of the disease are too serious and too insidious to allow the risk involved in establishing a control group of untreated cases. It will be possible, however, to observe what happens over the years to those who had increased intraocular pressure but did not have glaucoma; and to those who have glaucoma and are under medical treatment.

It will be helpful if other industrial medical departments conduct similar studies. Among those already in progress, there seems to be substantial variation in results. Assuming that the screening and diagnostic methods used are identical or any differences can be adjusted and reconciled, it is desirable that comparisons be made to determine whether the prevalence of glaucoma is influenced by the type of work engaged in or by the kind of people who seek different types of work.

#### Value of the Program

There can be no question of the value of a program in which nearly 3 employees of each 100 examined were discovered to have a previously unsuspected, asymptomatic disease that, untreated, leads to visual defects and often blindness; but that with early diagnosis can usually be controlled, without damage to vision or other progression, and using only simple medical treatment.

The cost of the screening program is small at the outset and negligible over a period of years. For full diagnostic and therapeutic follow-up for employees with abnormal screening findings, the cost

increases, of course, but still is relatively small and would usually be shared by the employee within the company health care insurance benefits.

The potential benefits both in averted misery and disability and in dollars saved by both employee and employer exceed by many times the cost of the total program. The total cost of including tonometry in annual health examinations during 25 years of employment for the average older employee is distinctly less than that for 1 day of absenteeism in the same quarter-century period.

#### Summary

Glaucoma is a common disease in both males and females aged 40 and over, and perhaps at even younger ages. It is a serious nationwide health problem and is the second most common cause of blindness. It is readily amenable to detection by a screening procedure, tonometry, which can be quickly learned by a physician; it is an unusually simple and inexpensive test to carry out with accuracy; and it is attended by essentially no undesirable reactions, even of minor degree. With early detection, simple medical therapy is frequently effective but must be continued for life.

The results of such examinations in 909 consecutive periodic health examinations of as many employees aged 40 and over are reported. Abnormal intraocular pressure was found in 3.7% and a diagnosis of actual glaucoma subsequently was made in 2.8% of the total group. The prevalence of abnormal findings was essentially the same for employees in their forties, fifties, and sixties, until retirement.

The cost of tonometry is extremely low but the value to both employee and employer is unusually great.

#### INVERSE TEMPERATURES DURING HYPERTERMIA IN MAN

*Adolph R. Dasler (LT MSC USN), MA and David Minard MD PhD.*

Classically, evaporative cooling from the skin of man has been the primary explanation for decreases in skin temperatures during work. Our study indicates that in a situation where it is possible for man to sweat, but the sweat is not allowed to evaporate, there is a drop in skin temperatures and a rise in deep body temperatures during work. There is somewhat of a reversal of these temperatures during rest. Therefore, evaporative cooling is not the primary cause for cooling of the skin when man works. Detailed analysis of the data indicates

that changes in blood flow must be the reason for the drop in skin temperatures and rise in internal temperatures during work, and reversal during rest.

In a lengthy series of experiments, volunteer Navy men worked and rested in a variety of common environmental temperatures while wearing impermeable, unventilated clothing which prevented evaporative cooling. Although a number of physiological responses were monitored, the skin and internal body temperatures yielded the greatest quantity of valuable information.

Monitoring of the test subjects involved continuous measurements of three internal body temperatures, 10 individual skin temperatures (ranging from head to foot), the average skin temperature and heart rate; with periodic electrocardiogram, blood pressure, and metabolic rate determinations. Blood and urine samples were investigated for any unusual changes covering a number of components.

The major external environmental condition of concern in this paper deals with an air temperature of 75° F., relative humidity of approximately 60%, and air movement of less than 1/2 mile per hour. A nude or normally clothed man would generally be comfortable in this environment, but the impermeable suit alters the man's ability to lose heat in the usual amounts. Of the total heat produced by a test subject, 27% was lost by radiation, 12% lost by convection, and only 2% by evaporation; the remaining 59% which would be dissipated by the man normally clothed was not dissipated but remained within the body.

When the test subjects alternated work and rest periods, there were pronounced changes in the skin and internal body temperatures. During rest there was a sharp rise in skin temperatures and some leveling off of internal body temperatures. However, during work the skin temperatures decreased sharply while the internal body temperatures were rising. Even though similar changes have been observed previously by us and other researchers dealing with semi-nude or lightly clothed subjects, these responses were believed primarily to be due to changes in the rate of evaporation of sweat from the skin. In the present experiments, the inverse cycling of surface and deep body temperatures occurred despite the fact that evaporative cooling from the skin was prevented by the impermeable barrier worn by the subjects.

A detailed statistical analysis of the skin temperatures disclosed that for any given man, as well as for the test subjects together, the changes between work and rest (during any phase of the experiment)

were significantly different ( $P < .001$ ). The greatest changes corresponded with skin sites directly over the more active muscle locations, and the smallest changes in skin temperatures were directly over the least active tissue sites.

Because the benefit of evaporative cooling of sweat was not possible in these experiments, and in the past the inverse responses have been attributed primarily to evaporative cooling from the skin, it was important to attempt an answer regarding this phenomenon. Calculations based on known physical and physiological heat transfer principles indicated that the more likely answer would be associated with changes in blood flow through the skin. These computations and observations lead us to conclude that during work a considerable flow of blood is shunted from the skin to the working muscles beneath the skin sites. Thus, the heat generated during work has a greater tendency to remain within the deep body tissues than to be carried to the skin by the blood where it can be dissipated by the usual avenues of heat loss.

The results of this research have immediate application to numerous military and civilian situations alike. In addition, the findings add important information relative to basic physiological research on body temperature regulation. It was clearly shown that in man at work, compared with at rest, there is a smaller proportion of heat lost by the physical means of radiation and convection. From the standpoint of a man living in a warm or hot environment, he should wear loose permeable clothing that will permit evaporation of sweat. Furthermore, during work when heat is rapidly being generated and large quantities of blood are shifted from the skin to working muscles, there will be a rapid spiralling of internal body temperatures. Since the dissipation of body heat is essential to life in warm and hot environments, men working in a poor evaporative cooling situation should have rest periods of sufficient length to dissipate the heat build-up from even short work periods.

#### NOTE

The opinions or assertions expressed herein are the private ones of the authors and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large. This research was supported by the Navy Department, Bureau of Medicine and Surgery, Project MR 005.01.03.

LT Dasler, of the Navy Medical Service Corps, and Dr. Minard were the two principal investigators

of this research. Each had the responsibility of interrelated phases of the experimentation conducted at the Naval Medical Research Institute, National Naval Medical Center, Bethesda, Maryland. The analysis of the data was done by LT Dasler while on educational assignment by the Navy Bureau of Pittsburgh.

Medicine and Surgery to the Physiology Department of Michigan State University. Dr. Minard, who retired from the Navy Medical Corps in 1963, is the Chairman, Department of Occupational Health, Graduate School of Public Health, University of Pittsburgh.

## EDITORIAL DESK

### SPECIAL ARTICLE

#### PREVENTION OF STREPTOCOCCAL INFECTION IN THOSE WHO HAVE HAD RHEUMATIC FEVER

Rheumatic fever is one of the most serious sequelae of streptococcal infection. In view of our understanding of the epidemiology of the disease it should be also one of the easiest diseases to prevent. Inherent in every attack of rheumatic fever, however, is the threat of another and its associated carditis.

Theoretically, with our present knowledge of antibiotic prophylaxis for patients with a history of rheumatic fever, there should be no recurrent attacks of the disease. About one-half of the cases occurring in the military, however, are recurrences rather than initial attacks. This occurs only because prophylaxis is not universal.

The policy both of the Committee on Prophylaxis of Streptococcal Infections and of the Commission on Streptococcal Diseases is that all individuals in the military service who have a history of rheumatic fever or who have rheumatic heart disease be placed on continuous prophylaxis.

These facts are pointed out because some men with histories of rheumatic fever are not being placed on a prophylactic regime.

Oftentimes a patient gives a history that is compatible with rheumatic fever, but no clinical evidence can be found to substantiate the history, e.g. no murmurs present. In these situations every attempt should be made to contact the physician who attended the patient during the episode described as rheumatic fever. This is best accomplished by a telephone call or a personal letter.

For the sake of emphasis paragraph 7 of TB MED 259 (NAVMED P-5052-17; AFP 160-5-24), "Treatment and Prevention of Streptococcal Disease and Its Sequelae," is quoted in its entirety:

"Individuals who have had one attack of rheumatic fever are at great risk of developing a subsequent bout of rheumatic fever after a streptococcal infection. *Because of this increased risk, such individuals should have continuous protection against streptococcal infections.* The Commission on Streptococcal and Staphylococcal Diseases of the Armed Forces Epidemiological Board has recommended that individuals who have had rheumatic fever, as indicated by a valid history of rheumatic fever or the presence of rheumatic heart disease, receive antistreptococcal prophylaxis. Opinion varies on the length of time to continue prophylaxis after the last attack of rheumatic fever, but 5 years is probably a minimum. Evidence of heart damage, duty in high exposure environment, and age under 40 years may indicate extension of this time. The necessity for medical diligence in identifying personnel who have had rheumatic fever is obvious. The prophylactic methods, recorded in order of preference, are:

a. *Benzathine Penicillin.* Monthly injections of 1,200,000 units.

b. *Oral Penicillin.* 200,000 to 250,000 units once or twice a day; twice a day is probably more effective.

c. *Oral Sulfadiazine.* One gram daily. Often best given in the morning. (Children under 60 pounds, 0.5 gram once a day). This is the prophylactic method of choice in individuals sensitive to penicillin. Weekly total and differential leukocyte counts are advisable for the first 2 months of prophylaxis. While reactions are rare, it is important to remember that sore throat may herald agranulocytosis."

—PrevMedDiv, BuMed

## APPLICATIONS FOR RESIDENCY TRAINING

The Professional Advisory Board will meet during July or August 1966 to consider requests for residency training commencing in July 1967. Applications from medical officers desiring consideration should be submitted in accordance with BUMED INSTRUCTION 1520.10C, through proper channels, to arrive in the Bureau prior to 1 July 1966. Applicants for outservice training may contact the institution and obtain tentative acceptance pending final approval by the Professional Advisory Board; however, no firm commitment should be made. Applicants are normally notified of their selection or nonselection within 30 days after the selections have been made.—Training Branch, BuMed.

## AMERICAN BOARD OF OB-GYN

### Part I Examination

1:00 PM—Friday, July 1, 1966

The next Part I (written) examination, scheduled as above, will be held at various examining centers in the United States, Canada, and military bases outside of the continental United States.

Applications received for the next Part II examination to be given in Chicago, Illinois February 20-25, 1967, will be reviewed for eligibility in September. Notifications will be mailed to candidates on or about October first.

The 1966 Bulletin outlining current requirements should be available upon request about the first of July. Applications and Bulletins may be obtained by writing the office of the Secretary, Clyde L. Randall, M.D., 100 Meadow Road, Buffalo, New York 14216. Applicants are urged to familiarize themselves with the current rules and regulations and the application and examination schedules effective each year.

Diplomates of the Board are requested to keep the office of the Secretary informed of their current address.

## MSC IN-SERVICE CORPS PROCUREMENT PROGRAM FOR FISCAL YEAR 1967

Interested hospital corpsmen and dental technicians who intend to apply for appointment as Ensign, MSC, USN, for the fiscal year 1967 in-service program are reminded to review BuPers Instruction 1120.15G (revised 22 February 1966).

Significant changes in this instruction require candidates to make written applications to their com-

manding officers prior to 1 August vice 1 October as in previous years. The Officer Selection Battery tests (OSB) must be ordered between 1-15 August, and the next OSB test will be administered on 15 November 1966. The professional examination for the FY 1967 program will be administered in February 1967 vice May as in previous years.

Candidates are reminded to furnish the Chief of Naval Personnel (B-623) a copy of their requests for the OSB indicating the specialty of their choice.

—MSC Div, BuMed.

## VIETNAMESE MEDAL OF HONOR AWARDED TO NAVY DOCTOR

LCDR Harrison D. Willcutts MC USN, has received the Vietnamese Medal of Honor (First Class) for his medical advice and assistance to the Vietnamese in Hue. The medal was presented by General Ti, Vietnamese Commanding General of the I Corps area.

Doctor Willcutts is the Commanding Officer, Alpha Company, 3d Medical Battalion, 3d Marine Division. His small field hospital is within 100 yards of the Phu Bai airfield.

Harrison has a staff of two general medical officers, an anesthetist, three dentists, and 60 hospital corpsmen. They spend their off-duty hours giving lectures and instructions to Vietnamese medical students undergoing training at the Hue Medical School, Provincial Hospital, and Hue Vietnamese Army Hospital, 10 miles northwest of Phu Bai.

"We wanted to do more than just pass out pills and bandaids to villagers," said Willcutts. "And we're glad we did. It's been a two-way street between us and the medical students—we've been medically stimulated with a wealth of material."

LCDR Willcutts is the son of VADM M. D. Willcutts MC USN, retired.

## BRONZE STAR MEDAL AWARDED

In the name of the President of the United States, the Commanding General, Fleet Marine Force, Pacific takes pleasure in presenting the Bronze Star Medal to Hospitalman Paul Rocha Hinojos USN for service as set forth in the following citation:

"For heroic achievement in connection with operations against insurgent communist (Viet Cong) forces while serving as a Hospital Corpsman with Company C, First Reconnaissance Battalion at Chu Lai, Republic of Vietnam. During the afternoon of 16 October 1965, a seriously wounded Marine returned

to the Company area from a patrol. Hospitalman Hinojos expertly administered medical aid to the wounded man. Later in the afternoon, the Company base camp was subjected to intense enemy small arms fire. Disregarding his own safety, Hospitalman Hinojos shielded the wounded Marine from the fire with his own body, continuing to remain in his exposed position until the firing stopped. Observing that another Marine was seriously wounded during this encounter, he immediately went to his aid, and, working together with a fellow corpsman, expertly

treated the wounded Marine. Throughout the remainder of the day and night, Hospitalman Hinojos displayed exceptional devotion to duty and concern for his comrades as he tirelessly attended to the needs of the wounded. Hospitalman Hinojos' courageous actions and inspiring devotion to duty throughout were instrumental in saving the lives of two Marines and were in keeping with the highest traditions of the United States Naval Service."

Hospitalman Hinojos is authorized to wear the Combat "V".

## ACADEMIC ACHIEVEMENTS BY MSC OFFICERS

Sixteen Medical Service Corps officers received degrees as indicated below during the Winter Con-

### *Master of Business Administration (Financial Management)*

|                              |       |  |
|------------------------------|-------|--|
| *LT Francis G. Anderson, Jr. | BUMED | The George Washington University (GWU) |
|------------------------------|-------|--|

### *Master of Arts (Personnel Administration)*

|                           |       |     |
|---------------------------|-------|-----|
| *LCDR Paul E. Cook        | BUMED | GWU |
| *LT Eugene M. Bryant, Jr. | BUMED | GWU |

### *Master of Science (Navy Management)*

|                       |               |   |
|-----------------------|---------------|---|
| *LT Howard D. Madison | NH, San Diego | Postgraduate School, Monterey, California |
|-----------------------|---------------|---|

### *Bachelor of Arts (General Curriculum)*

|   |                           |                              |
|---|---------------------------|------------------------------|
| *LT Robert F. Coxe                      | NH, Philadelphia          | GWU                          |
| *LT James A. Faulkner                   | DUINS, Cornell University | GWU                          |
| *LT Norman L. Flower                    | DUINS, PGS, Monterey      | GWU                          |
| LT Jack T. Henderson (with distinction) | BUMED                     | GWU                          |
| CDR Claude T. Hopson                    | NH, Corpus Christi        | University of Corpus Christi |
| *LT Theodore A. Hussey                  | BUMED                     | GWU                          |
| LT Aubin H. Lovin                       | NNMC, Bethesda            | GWU                          |
| LT Douglas M. Martin                    | NH, Gt. Lakes             | GWU                          |
| *LT Robert F. McCullagh                 | BUMED                     | GWU                          |
| LT William C. Parrish                   | NNMC, Bethesda            | GWU                          |
| *CDR John D. Pruitt                     | NH, Newport               | GWU                          |
| LT James J. Steil                       | NH, Cp. Pendleton         | GWU                          |

\*Degree awarded in September 1965.

Approximately 160 MSC officers received BuMed sponsorship for part-time, off-duty courses of instruction in various institutions throughout the United States and overseas during the Fall Semester 1965-66. In addition to this number, it is estimated

that about 20 officers are pursuing courses of study at their own expense. Approximately the same number of MSC officers are currently enrolled in part-time study during the Spring Semester 1966.

—MSC Div, BuMed.

## SPECIAL NOTICE

Because of the large number of medical officers who will be released from active duty, it can be anticipated that during the coming June, July, and August we shall experience our usual summer hiatus in the active Medical Corps. Reliefs for officers who are detached from operational assignments at sea and overseas will be supplied first. Reliefs for officers who are detached from the shore establishment will be supplied as they become available after necessary indoctrination and travel have been completed.

Commanding officers and senior medical officers within the shore establishment are urged to consider the above information when they are planning work and leave schedules for their staffs during the period concerned.—Code 317, BuMed.

### CAPT GALE CLARK HONORED AT OAKLAND NAVAL HOSPITAL

CAPT Gale Clark MC USN, Chief of Neurosurgery at Oakland Naval Hospital, on 5 March was elected President of the San Francisco Neurological Society—a singular honor in that he is the first armed forces medical officer chosen to head the group of civilian specialists.

In 1962 Dr. Clark returned to Oak Knoll for his third tour of duty as Chief of the Neurosurgical Service after serving in the same capacity at USNH, Chelsea, for four years. He was Chief of Neuro-



surgery aboard the USS CONSOLATION in Korea from 1950-51.

CAPT Clark earned his BA degree at the University of Wisconsin in 1938 and his MD at the University of Cincinnati in 1942. He interned at Presbyterian Hospital of Chicago and had residency training in general surgery at USNH, Bethesda. He had his residency training in neurological surgery at Huntington Memorial Hospital, Pasadena, and the University of California.

He is a Diplomate of the American Board of Neurological Surgery (1956), a Fellow of the American College of Surgeons, and a member of the Harvey Cushing Society and the Western Neurosurgical Society.

In addition to heading neurosurgery at Oak Knoll from 1953 to 1958, Dr. Clark was a clinical assistant in neurological surgery at the University of California Medical School. He is now a lecturer in neuroanatomy at UC, as he was at Harvard Medical School during his tour of duty at USNH, Chelsea.—U.S. Naval Hospital, Oakland, California.

### JOINT MEETING HELD AT U.S. NAVAL HOSPITAL, ST. ALBANS, N.Y.

On 22 March 1966, the Medical Service at the U.S. Naval Hospital, St. Albans, New York co-hosted a dinner and scientific meeting with the Brooklyn Thoracic Society of Brooklyn, New York.

Papers were presented by four members of the St. Albans Medical Service Staff and were discussed freely by members of the Brooklyn Thoracic Society.

CAPT Donald C. Kent MC USN, Chief of Medicine at St. Albans presented a paper entitled "Atypical Mycobacteriosis".

A paper entitled "Hyperlucent Lung—Physiologic Observations" was presented by CDR Vernon Houk MC USN, Head of the Tuberculosis Service at St. Albans.

LCDR Donald Reid MC USN presented a paper entitled "Ventilation Perfusion Relationships and Hyperventilation".

"Unusual Forms of Tuberculosis" was the subject of a paper presented by LCDR Joseph Pellecchia MC USN.—U.S. Naval Hospital, St. Albans, N.Y.

### NAVAL INTELLIGENCE NEEDS MORE TRANSLATORS OF RUSSIAN OR GERMAN

Reservists with a good knowledge of Russian or

German can help the U.S. Navy by translating scientific and technical journals through the Naval Reserve Translation Program (See BuPers Manual, Article H-4207).

You may apply, regardless of designator, if you are well qualified to translate Russian or German scientific and technical material. Write to the Director of Naval Intelligence, Translation Section, Bldg. 52, Naval Observatory, Massachusetts Avenue at 34th Street, N.W., Washington, D.C. 20390 *via your commandant*, and include a summary of your linguistic education and experience, as well as your field of specialization and competence.

Applicants will be sent a test translation. If your translation meets the necessarily high quality standard, you will be credited with two retirement points for the test and accepted into the Naval Reserve Translation Program. Points commensurate with the length and difficulty of each assignment under the Program will be recommended by the Translation Section to the respective commandants and awarded by him to the participant upon completion.—ONI Translation Section Op-923M2.

### KOCHER MANEUVER REVIVAL MONTH

VADM R. B. Brown and CAPT D. P. Osborne advocate using the Kocher maneuver for palpation and exploration of the common bile duct in an article appearing in *Surgery* 59: 654, April 1966. This maneuver for mobilizing the duodenum was first described in 1903 by Kocher. It is their contention that if the Kocher maneuver is combined properly with the usual standard approach to cholecystectomy, the entire extrahepatic biliary duct system (including the retroduodenal portion of the common duct and the ampulla of Vater) can be carefully and meticulously palpated to ascertain the presence of common duct stones. Without this technique, palpation of the biliary ducts is often incomplete and is restricted to the supraduodenal portion of the ductal system. Detailed directions for complete palpation of the biliary ducts and the ampulla of Vater are enhanced by very clear illustrations. The authors feel that a T-tube or

some other adequate decompressing tube should always be left in place when the common duct has been opened. Their opinions are based on observations of 1,000 consecutive cases of biliary tract surgery and they have not encountered postoperative complications which might be specifically related to the manipulative procedures associated with kocherization of the duodenum and careful palpation of the extrahepatic duct system.

The Kocher maneuver to aid in exposure of the vena cava at the immediate infrarenal level during operations for caval control is recommended by Dewes in his discussion of an article on Prevention of Pulmonary Embolism by Bergan et al, *Archives of Surgery* 92: 605-610, April 1966.

CAPT Ben Eiseman MC USNR, recommends the Kocher maneuver for complete visualization of the posterior surface of the duodenum when exploring for possible visceral injury in bullet wounds of the abdomen in his report on wound treatment in Vietnam. (U.S. Navy Medical News Letter, this issue.)

### SURGEON GENERAL'S CONFERENCE

The Surgeon General's Conference was held at the National Naval Medical Center April 27, 28, and 29. Commanding Officers of all naval medical installations participated. In addition, retired senior medical officers in the Washington area were invited to attend.

### EDITOR'S NOTES

"Cancer" Vol. 19, March 1966 includes 10 articles presented at the Symposium on the Clinical Aspects of Hodgkins Disease, New York, N.Y., 22 November 1965.

Identification of the two officers officiating at the opening of the Station Hospital, Naval Support Activity, Danang, Vietnam was inadvertently omitted in the *U.S. Navy Medical News Letter* 47(8): 29, 22 April 1966. They are ADM Roy L. Johnson Commander in Chief U.S. Pacific Fleet and CAPT Bruce L. Canaga MC USN, commanding officer.

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