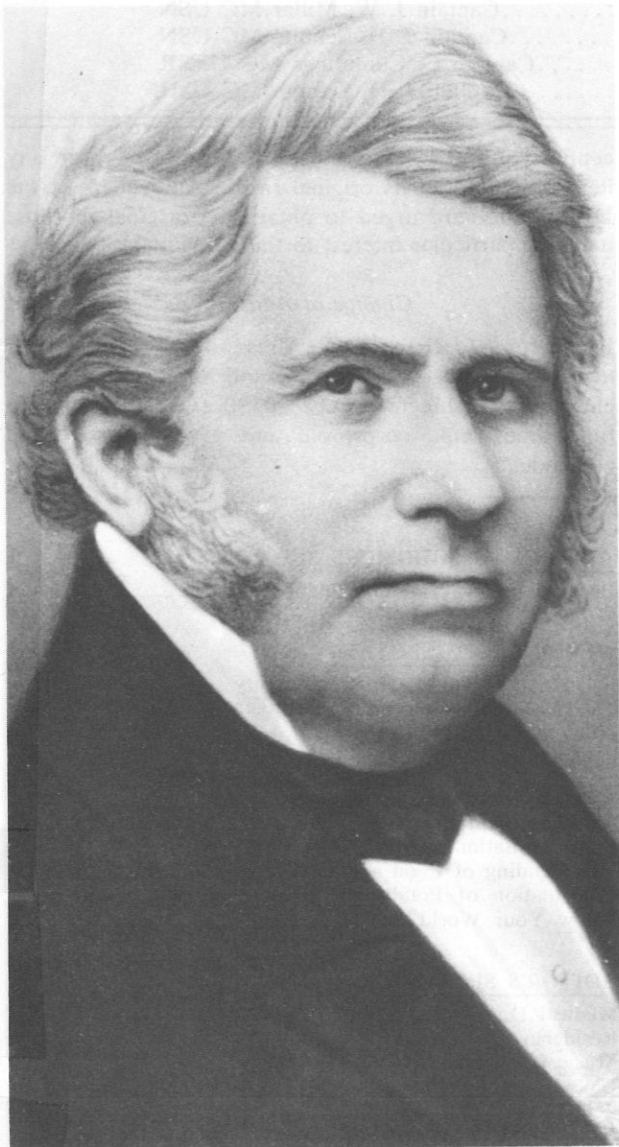


UNITED STATES NAVY *Medical News Letter*

Vol. 48

Friday, 2 December 1966

No. 11



Surgeons General of the Past

(The second in a series of brief biographies)

The second Chief of the Bureau of Medicine and Surgery was born of fine old colonial stock in East Whiteland, Pennsylvania on January 3, 1784. He was graduated from the Medical School of the University of Pennsylvania on April 19, 1809, and was appointed a surgeon in the United States Navy on July 6, 1812. Dr. Harris participated in the battle between the USS Wasp and HMS Frolic, a celebrated victory following which the Wasp was captured by the British battleship Poictiers. He was a surgeon with Stephen Decatur fighting the Barbary pirates in 1815. Later he supervised building of the naval hospital at Philadelphia, and was for years president of the board which examined surgeons for entrance and promotion in the Navy. He organized and conducted a medical postgraduate school in Philadelphia, the first American school to give instruction in naval medicine, and a forerunner of the present Naval Medical School. A distinguished surgeon, he once operated on Andrew Jackson to extract a bullet the President had received in a duel 20 years previously. He became Chief of the Bureau on April, 1844 and served until September 30, 1853. He encouraged high standards for physicians admitted to the Navy, and helped systematize the production and procurement of needed drugs and dressings for the Medical Department. Dr. Harris was retired from the Navy in 1857 and died on 4 March 1861.

United States Navy
MEDICAL NEWS LETTER

Vol. 48

Friday, 2 December 1966

No. 11

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CONTENTS

MEDICAL ARTICLES

Water and Electrolyte Disorders Associated With Renal Vascular Lesions	1
Factors in the Patient Contributing to Surgical Sepsis Transluminal T-Tube Drainage in Pancreatobiliary Surgery	3
Development of Lower Genital Carcinomas in Patients With Anal Carcinoma	8
Insect Control Through Sexual Sterilization	10
	13

MEDICAL ABSTRACTS

Scalene Node Biopsy: A Re-evaluation	16
Transdiaphragmatic Exploration of the Upper Abdomen During Surgery for Bronchogenic Carcinoma	16
Management of Surgical Hypoparathyroidism	17
Clinical Peritoneal Dialysis	17
Pulmonary Parenchymal Findings in Blunt Trauma to the Chest	17
Cryosurgery of the Pituitary in Acromegaly: Reduced Growth Hormone Levels Following Hypophysectomy in 13 Cases	18
Long-Term Effect of Probenecid on Diuretic-Induced Hyperuricemia	18
Recognition and Surgical Management of Visceral Ischemia Syndromes	18

DENTAL SECTION

Two Year Observations of Enamel Caries on Posterior Interproximal Surfaces	19
----------------------------------------------------------------------------------	----

AWARDS AND HONORS SECTION

Bronze Star, Navy Commendation Medal	21
--------------------------------------------	----

NURSE CORPS SECTION

Report of Nurse Corps Activity in One of Department of State's Surgical Teams, Vietnam	21
Nursing Radio Conferences	22

PREVENTIVE MEDICINE SECTION

Meningococcal Infection—1966	23
Food Sanitation Training Program	23
The Vending of Food and Beverages	24
Chlorination of Potable Water at Sea	24
Know Your World	24

EDITOR'S SECTION

Medical Department Officer Correspondence Course	26
Residency in Forensic Pathology	26
Music for Naval Hospital, Yokosuka	27
U. S. Navy and Marine Corps Team Dedicate Field Hospital	27
Medical Service Corps Officers Academic Achievement	27
Chemical, Biological and Radiological Weapons Orientation Course	28
News Letter Renewal Notice	29

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

WATER AND ELECTROLYTE DISORDERS ASSOCIATED WITH RENAL VASCULAR LESIONS

Clarence L. Gantt MD*, University of Illinois College of Medicine, Chicago,
Postgrad Med 40(3): 344-347, September 1966.

In order to determine the origin of primary aldosteronism, it is best to measure the concentration of renin or angiotensin in the plasma. Production of renin will be suppressed if an autonomous adrenal tumor is present; it will be increased if renal vascular disease is present.

The water and electrolyte disorders associated with renal vascular lesions can be divided into two types: (1) those related directly to partial occlusion of one or more major renal arteries and (2) entirely non-specific disorders occurring in hypertension or renal disease from any cause, including the renal lesions of collagen diseases, pyelonephritis and glomerulonephritis.

With partial occlusion of one or more major renal arteries, the decrease in pulse pressure or mean arterial pressure, or both, at the site of the juxtaglomerular apparatus on the afferent arteriole causes the release of the enzyme renin by the juxtaglomerular cells. Renin acts on its substrate, an alpha₂ globulin, to produce the decapeptide angiotensin-I. Converting enzyme (produced by the liver) splits two amino acids from angiotensin-I, yielding the octapeptide angiotensin-II. Angiotensin-II stimulates the release of aldosterone from the zona glomerulosa of the adrenal cortex by direct action on the gland. In association with the serum potassium, angiotensin-II appears to be a major regulator of aldosterone secretion. By this mechanism, patients with a partial occlusion of one or more major renal arteries may have a relatively high continuous production of aldosterone. They may present with the abnormalities of primary aldosteronism (Conn's syndrome): hypertension and hypokalemic alkalosis.

Slight elevation of the serum sodium concentration may occur in primary aldosteronism. Aldosterone stimulates the secretion of potassium in exchange for sodium in the distal renal tubule, and

by this mechanism hypokalemia is produced in the presence of excess aldosterone. The laboratory findings of the potassium depletion in aldosteronism secondary to renal artery disease include low serum potassium, high serum bicarbonate, vasopressin-resistant isosthenuria, urine which is relatively acid compared with the filtered bicarbonate load, abnormal results of the glucose tolerance test, and the classic electrocardiographic evidence of hypokalemia. While the patient is on a normal sodium intake, urinary excretion of potassium is essentially equivalent to intake of the ion in the presence of a rather low serum potassium concentration, which indicates renal loss of potassium.

Hypokalemic alkalosis was originally reported as a prominent part of the syndrome of primary aldosteronism due to adrenal tumor. Only a very small percentage of patients with hypertension due to constrictive renal artery disease have hypokalemic alkalosis. If angiotensin is a potent stimulus to release of aldosterone by the adrenal gland, why is it that most patients with renal hypertension do not have hypokalemic alkalosis? A partial answer to this perplexing question may lie in recent reports by Conn, who has demonstrated that some patients with hypertension due to an excess of aldosterone from an adrenal tumor do not have hypokalemic alkalosis. Conn has adduced that possibly 20 percent of patients now classified as having essential hypertension have primary aldosteronism without hypokalemia. The rarity of hypokalemic alkalosis in patients with unilateral renal artery disease lends some support to the thesis put forth by Conn concerning the frequency of primary aldosteronism and suggests that hypokalemic alkalosis may be unusual in patients with primary aldosteronism due to adrenal tumor. An alternative explanation is that the renin-angiotensin system has no significant role in the maintenance of hypertension in most patients with renal vascular lesions.

*Department of Medicine and Clinical Research Center, Research and Educational Hospitals, University of Illinois College of Medicine, Chicago.

In patients in whom hypokalemia does develop, an extracellular alkalosis is present. As potassium is lost by the kidney, it is transferred out of the body cells into the extracellular fluid. For each three or four molecules of potassium removed from the cells, two or three molecules of sodium and one molecule of hydrogen enter the cell. By this mechanism the cell becomes acidotic, and the extracellular fluid alkaline. The renal tubular cells also become acidotic, and the kidney retains excess bicarbonate and excretes excess hydrogen ion relative to the filtered bicarbonate load. However, the presence of the kidney does not appear to be necessary to produce and maintain the alkalosis.

The symptoms and findings of potassium depletion in the syndrome of primary aldosteronism, whether induced by tumor or by constriction of one of the renal arteries, are entirely nonspecific and associated with potassium depletion of any cause. One should recall that the most common cause of potassium depletion at present is administration of thiazide diuretics.

In the presence of severe potassium depletion, the renal concentrating mechanism is ineffective due to inability to maintain a countercurrent gradient in the medullary region. There is also a slight decrease in the ability of the concentrating mechanism to respond properly to vasopressin in the presence of alkalosis. Polyuria, polydipsia and nocturia frequently occur in potassium-depletion states.

Potassium depletion may be associated with intermittent episodes of paralysis apparently due to changes in the ratio of intracellular to extracellular potassium. However, since the muscle cells are also depleted of potassium, many patients with slowly developing hypokalemic alkalosis give no history of muscle paralysis even in the presence of a very low serum potassium concentration. The presence of alkalosis may give rise to episodic paresthesias of the extremities.

Pyelonephritis has been reported to be more common in the presence of prolonged potassium depletion. In experimental animals depleted of potassium, a higher incidence of pyelonephritis following injection of coliform bacteria has been reported.

Potassium depletion produces an abnormal glucose tolerance curve, and the patient may present a picture of diabetes mellitus. However, many patients have only an abnormal glucose tolerance curve without overt diabetes. The mechanism appears to be related to the effects of potassium on release of insulin by the pancreas. In the presence of uremia

without potassium depletion an abnormal glucose tolerance test is also frequently seen.

The role of aldosterone in the production and maintenance of hypertension in patients with this syndrome is not clear. In dogs the presence of the adrenal gland is necessary for the induction and maintenance of hypertension after partial constriction of the renal arteries. Ames and associates recently studied the interrelationships of aldosterone, angiotensin and blood pressure in man. In normal subjects, prolonged infusions of angiotensin-II at constant rates produced significantly higher blood pressures during the latter part of the study after the secretory rate of aldosterone had risen significantly. McCubbin and co-workers reported that prolonged infusions of angiotensin-II in animals had no effect on blood pressure initially but subsequently produced a rise in pressure. They interpreted this effect as being due to activation of the sympathetic nervous system, but the data are consistent with the concept of interaction of the aldosterone liberated by the angiotensin and the angiotensin itself. Masson, Corcoran and Page several years ago demonstrated that the response to renin is enhanced by the presence of excess mineralocorticoid. The effect may be indirect, however, since the blood pressure response to angiotensin-II infusions is greatly diminished during sodium depletion and restored with sodium repletion.

We have treated one patient with primary aldosteronism due to unilateral renal artery stenosis by giving 400 to 600 mg of spironolactone (ALDACTONE-A®) daily for six months. The electrolytic abnormality reverted to normal, but there was no significant effect on blood pressure. Friis reported on four patients in whom treatment with 275 mg spironolactone per day for two to four weeks had no effect on the blood pressure.

In order to determine the origin of the syndrome of primary aldosteronism, it is best to measure the concentration of renin or angiotensin in the plasma. If an autonomous adrenal tumor is present, the expanded extracellular fluid volume will suppress the production of renin by the kidney. If renal vascular disease is present, the production of renin will be increased. If facilities for measurement of renin or angiotensin are not available, a normal radiorenogram, a normal timed intravenous pyelogram, and a normal retrograde renal arteriogram will usually exclude a renal vascular origin. Split renal function studies are also extremely helpful.

Malignant hypertension is extremely uncommon in the syndrome of primary aldosteronism due to

adrenal tumor or hyperplasia in adults. Thus the ophthalmologic examination is quite helpful.

The nonspecific water and electrolyte abnormalities associated with renal vascular lesions are those that occur in malignant hypertension of any origin or chronic renal failure of various causes. The incidence of malignant hypertension is rather high among patients with renal vascular lesions. As the disease progresses to the malignant phase, the kidney that was not involved in the original renal vascular lesion is damaged by very high arterial pressure and demonstrates arteriolar necrosis, edema and multiple small hemorrhages. The kidney involved with renal vascular lesions may show similar changes or may be protected by the arterial stenosis from the very high arterial pressure.

In the presence of severe kidney damage from malignant hypertension of any cause, release of renin into the plasma increases and production of aldosterone subsequently increases. Hypokalemia is a rather common finding in malignant hypertension. If severe uremia is present, the serum bicarbonate level may be normal or only slightly

elevated but is still abnormally high considering the degree of acidosis that usually accompanies uremia of a significant degree. Successful treatment for the elevated blood pressure will usually result in a diminished secretion of aldosterone and ultimate correction of the hypokalemic alkalosis. Many of these patients have significant potassium depletion, and the ion should be replaced when urinary output is adequate. Thus in the presence of malignant hypertension it is usually not possible to interpret elevated values of aldosterone or renin (angiotensin) whether hypokalemic alkalosis is present or absent.

In severe long-standing hypertension secondary to renal vascular lesions, arteriolar nephrosclerosis and ultimate loss of renal parenchyma may lead to chronic renal failure. The characteristic nonspecific water and electrolyte abnormalities of isosthenuria, hyperkalemia, hyponatremia, acidosis, hypocalcemia and hyperphosphatemia are seen in the presence of elevated blood urea nitrogen and serum creatinine values.

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

FACTORS IN THE PATIENT CONTRIBUTING TO SURGICAL SEPSIS

*James May FRACS, J. P. Chalmers MB, John Loewenthal FRCS, FRACS, FACS,
and Phyllis M. Rountree DSc, Sydney, Australia. Surg Gynec Obstet 122(1):
28-32, January 1966.*

The influence of the patient's environment on the incidence of surgical wound infection has been extensively studied, but the difficult task of attempting to assess the relative and absolute significance of contributing factors in the patient has not been looked at carefully.

This study was undertaken to examine critically a group of patients with one common feature—avoidable wound infection. This examination was performed in three ways. Firstly, the group was scanned to see what common factors, if any, predisposed its members to infection. Secondly, a search was made for any correlation between pre-operative and operative factors, on the one hand, and the sequelae of infection on the other. Finally, a comparison was made between the results observed in an old and new suite of operating theaters and wards with respect to the quality of the infection.

The quantity, or rate, of infection had been dealt with previously by Rountree, and her associates. The present investigation concerned itself only with the quality, or severity, of infection.

Materials and Method

During the period, January 1961 to June 1964, there were 144 patients treated in the Surgical Professorial Unit at the Royal Prince Alfred Hospital, whose clean wounds became infected. The unit admits patients for general surgical care, but is particularly concerned with the treatment of advanced malignant tumors and of ischemic states of atherosclerotic origin. During the first part of this period, January 1961 to December 1962, all operations were carried out in a theater block belonging to the old part of the hospital, and all patients were treated in a ward which was built in 1885; in both areas some deplorably bad facilities and practices persisted. During the second part of this period,

From the Royal Prince Alfred Hospital and the Department of Surgery, The University of Sydney, Sydney, Australia.
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December 1962 to June 1964, 94 percent of the operations were performed in a new theater block, and all patients were treated in the 30 bed ward nursing unit in this block. Both theaters and wards had been designed to reduce avoidable infection as far as possible, according to Loewenthal.

From the time of admission to the unit, all clinical and bacteriologic details concerning the patient were recorded and coded in a manner suitable for analysis by an electronic computer. The information about each patient was classified under three general headings: the preoperative factors, intraoperation factors, and sequelae of infection. The detail comprised 96 separate categories.

The main preoperative criteria were sex, age, occupation, obesity, diabetes, peripheral ischemia, hypertension, and malignancy. Hypertension was said to be present when the systolic blood pressure was greater than 180 millimeters of mercury or the diastolic pressure was greater than 100 millimeters of mercury. Malignancy was only classified as present when an operation was performed for the specific purpose of treating an advanced and major malignant state; it was regarded as absent when a patient with a malignant state underwent surgical treatment for an unrelated condition.

The intraoperation factors included the site of operation, contamination at operation, hematoma formation, the use of cytotoxic agents, the duration of the operation, and the type of dressing used.

The results of infection were measured in terms of increased stay in the hospital, loss of tissue, further immediate surgery due to infection, septicemia, and death. Other factors considered were the formation of hernia, the occurrence of wound breakdown with healing by secondary intention, and the incidence of wound dehiscence. In this way, the relative morbidity associated with the individual preoperative and intraoperation factors was obtained. The increased period of hospitalization was obtained by calculating the average period spent in the hospital following any particular operation in the absence of complications, so that any patient who as a result of wound infection remained in the unit beyond this limit was grouped according to the number of extra days, up to a maximum of 28.

When the data were assembled, various questions were put to the computer. Some were simple, such as "What was the total number of patients coming into each category?" or "What correlation existed between the type of organism grown and the incidence of wound dehiscence?" In more complex

questions, the computer analyzed groups of patients who satisfied a series of conditions, e.g., those with a malignant condition undergoing abdominal surgery involving intestinal resection in whom a staphylococcal infection developed which caused an increased hospital stay. A vast number of answers to such questions has been obtained, but only the significant ones are discussed.

Results

The organisms responsible for the infections in the 144 patients: were *Staphylococcus aureus* in 122, streptococci in 26, *Escherichia coli* in 53, proteus species in 26, *Pseudomonas aeruginosa* in 10, clostridia in 16, and others in 6. Some patients were infected with more than one organism.

Factors predisposing to infection. Of the 144 patients 87 were male and 57 were female. Preoperative factors which were present in a large number of patients were: inactive or semisedentary occupation in 81; older age group, over 60 years old, in 68; peripheral ischemia in 47; malignancy in 39; obesity in 31; and hypertension in 31.

Other factors which are conventionally held to contribute to wound infection such as diabetes, irradiation, previous or current steroid therapy, and anemia were found only in small numbers. Ischemic and rheumatic heart diseases, congestive cardiac failure, and renal, hepatic, and respiratory diseases were also found to be of no importance numerically in this series.

Fifteen patients were infected with a staphylococcus of the same phage type as they had been carrying in their noses on admission, and were accordingly regarded as suffering from self-infection.

The site of operation was: the head and neck in 10 patients; thorax and breast in 6; abdomen, without intestinal resection, in 45; abdomen, with intestinal resection, in 27; upper limb in 3; and lower limb in 52.

Contamination at operation was considered possible in 54 patients. A large percentage of these underwent operations on the upper thigh in which it is difficult fully to exclude the perineum from the operation field. In a further 28 patients contamination at operation was considered inevitable because of the nature of the procedure. Some degree of ischemia was produced in the tissues in which the wound was made in 46 patients. A significant hematoma developed in the wounds of 25 patients. Cytotoxic agents were used either locally or systemically in 11 patients.

The duration of operation was less than 1 hour in 12 instances; 1 hour in 40; 1½ hours in 22; 2 hours in 35; 2½ hours in 17; and more than 3 hours in 15.

A spray dressing was used in 89 instances and a gauze pad dressing in 55. Spray dressing is the routine practice in the unit, and the high figure for pad dressings in this selected series of infected wounds is in keeping with the higher infection rate associated with this type of dressing found by Rountree and her associates. It indicates that many of the wounds had special dressing requirements such as compression of the operation area following a radical mastectomy or amputation.

Significant correlations. In this part of the investigation an attempt was made to correlate various preoperative and operation factors with the sequelae resulting from infection. The significant correlations are summarized in Table 1.

Hypertension, which was found to be present in a comparatively high number of patients in this series was associated with the highest morbidity as well as the highest mortality. It was associated with an average of 17.6 additional days' hospitalization per

patient, and almost half of these patients required further surgical treatment. Overweight patients and those with peripheral ischemia incurred a greater increase in morbidity than either the elderly or those that followed a sedentary occupation; however, more of the old and sedentary died. The average number of extra days spent in the hospital by those with malignant disease was lower than might have been expected.

The basic operation factors such as the site of operation, duration of the procedure, and type of infecting organism were correlated with the sequelae of infection. Table 2 shows the relationship of site of operation and the results of infection. Operations on the breast and lower limb entailed the highest morbidity as assessed by increased stay in the hospital. There was little to choose between the various sites, however, on the basis of loss of tissue and further surgery due to infection. Septicemia and death occurred more frequently in those undergoing abdominal surgery than in patients undergoing operations at other sites.

Table 3 shows that there is little correlation between the duration of operation and the subsequent morbidity except that all cases of septicemia oc-

Table 1
PREOPERATIVE FACTORS

	Sedentary occupation	Old age	Peripheral ischemia	Malignancy	Obesity	Hyper- tension
No. of patients -----	81	67	47	39	31	31
Increased stay in hospital						
Total No. of days -----	1,064	903	798	476	504	546
Average No. per patient --	13.1	13.5	17.0	12.2	16.3	17.6
Loss of tissue -----	11	9	8	6	3	3
Further surgery -----	20	12	15	7	11	14
Septicemia -----	3	1	1	1	1	1
Death -----	9	7	2	4	1	4

Table 2
CORRELATION BETWEEN OPERATION FACTORS AND SEQUELAE OF INFECTION

	Head and neck	Thorax and breast	Abdomen, no resection	Abdomen, resection	Upper limb	Lower limb
No. of patients -----	10	6	46	27	3	52
Increased stay in hospital						
Total No. of days -----	133	112	525	329	21	819
Average No. per patient --	13.3	18.7	11.4	12.2	7	15.8
Loss of tissue -----	3	2	2	1	2	8
Further surgery -----	3	1	8	9	2	14
Septicemia -----	0	0	2	2	0	1
Death -----	0	1	3	4	0	1

Table 3
CORRELATION BETWEEN DURATION OF OPERATION AND SUBSEQUENT MORBIDITY

Hours	0-1	1-1½	1½-2	2-2½	2½-3	3+
No. of patients -----	12	40	24	36	17	15
Increased stay in hospital						
Total No. of days -----	154	672	273	343	273	224
Average No. per patient --	12.8	16.8	11.4	9.5	16.1	14.9
Loss of tissue -----	3	5	1	2	5	2
Further surgery -----	2	12	6	7	5	5
Septicemia -----	0	0	0	2	2	1
Death -----	0	2	1	1	1	4

Table 4
RELATIONSHIP BETWEEN TYPE OF ORGANISM AND POSTOPERATIVE SEQUELAE

	Staph. aureus	Strepto-cocci	Escherichia coli	Pro-teus	Ps. aeruginosa	Clos-tridia	Others
No. of patients -----	122	26	53	26	10	16	6
Increased stay in hospital							
Total No. of days -----	1,659	434	749	441	119	231	77
Average No. per patient --	13.6	16.7	14.1	17.6	11.9	14.4	12.8
Loss of tissue -----	17	2	7	5	1	3	2
Further surgery -----	33	7	13	9	4	3	3
Septicemia -----	5	0	2	1	1	1	0
Death -----	8	3	1	1	1	2	0

Table 5
COMPARISON OF INFECTIONS IN OLD AND NEW BUILDINGS

	Old ward		New ward		Total No.	Old theaters		New theaters	
	No.	Percent	No.	Percent		No.	Percent	No.	Percent
No. of patients -----	86		58		144	90		54	
Staphylococcus aureus -----	75	87.2	47	81	122	78	86.7	44	81.3
Streptococci -----	10	11.6	16	27.6	26	11	12.2	15	27.8
Escherichia coli -----	28	32.6	25	43.1	53	29	32.2	24	41.5
Proteus -----	17	19.8	9	15.7	26	17	18.9	9	16.7
Pseudomonas aeruginosa -----	3	3.5	7	12.1	10	3	3.3	7	12.8
Clostridia -----	7	8.1	9	15.7	16	9	10	7	12.8
Others -----	3	3.5	3	5.2	6	3	3.3	3	5.6

curred in patients undergoing a procedure lasting at least 2 hours. Similarly, two-thirds of the deaths occurred in those whose operation lasted 2 hours or more. The number of extra days spent in the hospital by these 144 patients is obtained from Table 2 and 3; it totals 1,939 days. This wastage of bed space is equivalent to the entire 30 bed unit being closed for 9 weeks during the period of the survey.

Table 4 shows the relationship of type of organism and various postoperative sequelae. Streptococcal

and proteus infections had caused the greatest increased stay in the hospital. When the number of patients who suffered loss of tissue, further immediate surgical treatment, or septicemia is compared with the total number of patients infected with a particular organism, the proportion is approximately the same for each group.

Comparison of old and new wards and theaters. Since the staff and source of patients were similar in the old accommodation and in the new, an oppor-

tunity existed to study the change, if any, in the severity of infections. A comparison of the infecting organisms in the old and the new blocks is shown in Table 5. In the new ward there was a relative increase in the proportion of all nonstaphylococcal infections, except those due to proteus. These figures do not indicate the infection rate in the ward but do show the proportion of wounds infected by the various organisms.

Table 6 compares the main results of infection in the two wards. The infection in the new ward was of a far less disabling type than that which existed in the old ward. The total number of extra days spent by the 86 patients in the old ward was 1,281, a mean of 17.2, compared with an additional 658 days, a mean of 11.3, spent by 58 patients in the new ward. This decrease in morbidity occurred only in those with staphylococcal infections.

Table 6
COMPARISON OF RESULTS OF INFECTIONS

	Old ward	New ward
No. of patients -----	86	58
No. with increased stay in hospital -----	73(85)	38(66)
Loss of tissue -----	12	6
Further surgery -----	27	10
Septicemia -----	5	0
Death -----	5	4

Numbers in parenthesis are percentages.

Summary

A group of 144 patients suffering from avoidable surgical sepsis was analyzed with the aid of a computer. The computer made it possible to ask many complex questions involving multiple correlations. This is an undoubted advantage in series with large numbers, and in series in which it is necessary to ask complex questions. In the present study it was believed that, since the series consisted of only 144 patients and the majority of the questions were very simple, any saving of time obtained by avoiding tedious counting and calculating was more than off-

set by the lengthy processes of coding the material into a form suitable for analysis by the computer, and then of asking questions and obtaining answers in computer language requiring more work to arrange the material into a meaningful form.

Of the preoperative factors examined, hypertension had the highest association with morbidity and mortality. This finding may be due to impaired tissue perfusion and oxygenation secondary to changes in small blood vessels. Factors traditionally held to lead to increased infection, such as diabetes and systemic use of adrenocortical steroids, were conspicuously unimportant in the present study. The number of diabetics especially was unexpectedly small since the emphasis on vascular surgery in the unit led to a large number of operations on diabetic patients.

Operations on the lower limb and the breast caused the greatest morbidity. Many of the operations on the leg involved incisions in, or close to the groin so that contamination from the perineum during the operation might have been responsible for the large numbers of wounds in this area which became infected. The proximity of the breast to the axilla may have played a similar role with infection following operations on the breast. Abdominal operations were associated with the highest mortality due to infection, and this fact was attributed to the serious functional sequelae of intraperitoneal sepsis and of breakdown of wounds in the anterior abdominal wall.

A comparison of infections in the old and new theaters and wards showed a marked decline in the severity of infection in the new building. This decrease was most apparent in purely staphylococcal infections and less marked in mixed infection involving staphylococci and other organisms. The reason for the selective decline was that in the old ward, 60 percent of the staphylococcal infections were due to hospital strains displaying multiple antibiotic resistance. In the new ward only 30 percent of staphylococcal infections were of this kind and the majority of patients responded rapidly to appropriate antibiotic therapy.

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

TRANSLUMINAL T-TUBE DRAINAGE IN PANCREATOBILIARY SURGERY

A WAY OUT OF DIFFICULTY

Rodney Smith MS Lond, FRCS, Surgeon, St. George's Hospital, London, S.W.
Lancet pp 1063-1066, 20 November 1965.

There are many occasions in surgery when an operator who can cope readily enough with most technically difficult situations is faced unexpectedly with one of more formidable proportions, where any procedure he may select seems to carry a disproportionate risk to the patient of death or of major complications. When this happens it is of little use to the patient if the surgeon says to himself: "I know what Cattell would have done here" if the procedure is one which only Cattell could have carried out safely. The best possible operation is not always the best operation possible, and a willingness to improvise is no sign of weakness.

The principle described here is primarily applicable to the pancreatobiliary system because the particular type of technical difficulty is commoner in this system than in others. The principle, nevertheless, has obvious applications to other systems.

Let us state the problem in general terms:

- (1) There is an irremovable obstruction of the biliary tract or of the pancreatic duct system.
- (2) The patient's symptoms are such that decompression of the dilated, obstructed system is essential.
- (3) The local pathological changes, combined with such other complications as obesity of the patient or the results of previous surgery, have grossly limited surgical access to the area.

In these circumstances the surgeon is not uncommonly faced with a situation in which external drainage (easy enough to carry out) would provide effective decompression, but would then lead to a permanent external fistula; internal drainage by anastomosing the obstructed system to the stomach or small intestine, though ideal, is so impeded by difficulties of access that failure is likely, again with a permanent fistula as the likely outcome. If, moreover, the patient is old or ill or both, who can survive a simple procedure without major postoperative complications but is unlikely to survive a difficult operation and a stormy postoperative

course, it is easy to see that the selection of the proper procedure can be very difficult.

One solution lies in the realisation that external drainage of an obstructed system, with a T-tube, for example, will not produce an external fistula (as in fig. 1) so long as the long limb of the tube first traverses the lumen of another (but unobstructed) hollow viscus before being led through the abdominal wall (fig. 2).

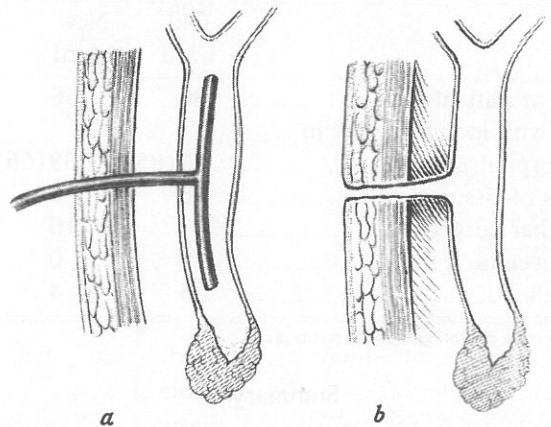


Fig. 1—(a) Drainage of obstructed hollow viscus (common bileduct); (b) external fistula after removal of tube.

Transluminal Drainage

The principle of transluminal drainage is simple. A T-tube is inserted into the obstructed system; this can be done even when access is very limited. The long limb of the T-tube is brought out through the abdominal wall in the usual way, but only after the interposition of another hollow viscus. Usually this will be a jejunal Roux-loop, but on occasion the stomach may be used. Postoperatively, suction of the fluid from the obstructed viscus is probably useful in aiding adhesion of the obstructed to the interposed viscus. Removal of the tube at a time determined by the requirements of each individual

case leaves an internal fistula, but the stoma from the interposed viscus through the abdominal wall closes at once with no leakage.

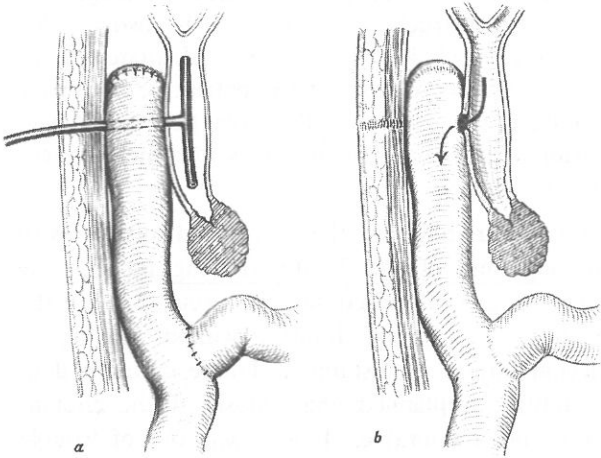


Fig. 2—External drainage.

The T-tube traverses an interposed unobstructed hollow viscus e.g., a jejunal Roux-loop (a); the result when the T-tube is removed will be an internal fistula (b).

Discussion

An obstructed biliary or pancreatic system requires decompression. If the obstruction itself cannot be removed, then internal drainage by means of some form of short-circuit procedure is clearly preferable to permanent external drainage. For an anastomosis by suture to succeed, there must be accurate apposition and no tension at all points of the linings of the two systems anastomosed. If these criteria are not met, the anastomosis will leak and may even lead to a permanent fistula. More likely, leakage allows the anastomosis and the area around it to be bathed in fluid (often irritant or infected or both); hence, though the fistula eventually closes, massive scarring around the stoma results in its compression by contracting fibrous tissue, with stenosis first, and, later, complete obliteration. Transluminal T-tube drainage is one way out of this dilemma. In the case of the biliary tract this form of drainage may in a sense be regarded as an extension of the method, regarded as useful by many surgeons, of splinting a biliary-intestinal anastomosis by an indwelling tube brought out through the abdominal wall. It is a considerable extension, however, for the main usefulness of transluminal drainage lies in its application to cases in which a

biliary-intestinal anastomosis of reasonable size by suture cannot be constructed.

Biliary Tract

The method, when applied to the biliary tract, is clearly less satisfactory than securing a large well-constructed anastomosis which does not leak. It is, however, much better than making do with a small inaccurate anastomosis, constructed under severe technical difficulty and doomed to failure from the start. It has the added advantage of simplicity and safety. Provided that enough of the biliary tree can be exposed merely to open a dilated duct with a knife and insert a T-tube, the rest of the operation presents no technical difficulty of any kind. It is thus a real way out of trouble when disease and obesity have grossly reduced access to the obstructed biliary tract.

Pancreas

The indications for operation in chronic pancreatitis should be limited to: pain; recurrent acute pancreatitis; complications, such as cyst and fistula; and suspected malignancy.

Of these indications, severe intractable pain is the commonest. When the diagnosis is confirmed at operation, the type of operation likely to help the patient is not always clear, but gross dilatation and obstruction of the duct system can be relieved by drainage. Sphincterotomy, in the view of many, provides ineffective drainage in this type of case of severe established chronic pancreatitis (though it has some place in the treatment of the milder cases of relapsing pancreatitis).

Retrograde drainage of the pancreatic duct is a different matter. A side-to-side anastomosis of the pancreatic duct to the stomach, or jejunum, with or without a short length of tubing left in the anastomosis, is difficult to construct accurately, is liable to leak, and has never given good results. Distal pancreatectomy, followed by anastomosis of the end of the transected pancreatic duct to the stomach or jejunum is a good deal better. Puestow's operation of slitting up the pancreatic duct throughout the length of the gland, which is then encased in a long Roux-loop of jejunum, gives good results in Puestow's hands, but can be technically difficult and has many possible complications. Distal pancreatectomy and Puestow's pancreato-jejunostomy demand reasonably good access to the pancreas and mobilisation of the gland with dissection from its bed must be possible. If drainage of the duct has to be achieved with a grossly limited exposure and

no mobility, transluminal (usually transgastric) drainage with a T-tube once again offers a simple way out of trouble, and, can even be satisfactorily secured when there is no direct access to the pancreas at all, the duct being entered through the lumen of the stomach and the adherent posterior gastric wall.

The infected pancreatic pseudocyst presents another surgical problem where this method may be applied with effect. Internal drainage is unsafe. External drainage is safe, but may leave a fistula. External transluminal drainage is safe and does not leave a fistula (case 4, not shown). The pancreatic duct, obstructed by an irremovable carcinoma of the head of the pancreas, is another possible indication for transgastric drainage with a T-tube.

Will the internal fistula resulting from the application of this method stay open? Only time will give the answer. It seems likely that in some cases it will. Even if in others the fistula later becomes stenosed, this does not destroy the value of the method. At worst, the relief may prove to be temporary, but time has been bought. At best, long-term relief is secured at slight risk to the patient.

Summary

Decompression of a permanently obstructed biliary system or pancreatic duct by external drainage leaves an external fistula. Internal drainage by a carefully constructed anastomosis is usually the procedure of choice, but requires adequate access. Gross disease or obesity of the patient or both may so reduce the access to the area that a planned anastomosis by suture becomes technically very difficult.

T-tube drainage of the obstructed system with the long limb of the T-tube running through the lumen of an interposed hollow viscus has all the advantage of external drainage without leaving an external fistula. Transluminal T-tube drainage does not replace a planned anastomosis, if the circumstances are favourable. It is a way out of trouble but it is a simple procedure which is effective in circumstances when an anastomosis by suture might prove technically very difficult or even impossible. In 4 patients this method proved valuable.

(The references, case reports, and figures not included, may be seen in the original article.)

DEVELOPMENT OF LOWER GENITAL CARCINOMAS IN PATIENTS WITH ANAL CARCINOMA

A MORE THAN CASUAL RELATIONSHIP

A. Cabrera, M.D., Y. Tsukada, MD, J. W. Pickren, MD, R. Moore, MS and I. D. J. Bross, PhD. Cancer 19(4): 470-480, April 1966.

One definition of "true multicentric cancers" states that the sites must have a common histology and the exposure must be to the same carcinogen(s). Since in man the carcinogen(s) is generally unknown, one must evaluate this portion of the criteria by the possibility that the 2 sites involved by cancer may have been so exposed. In many skin cancers the carcinogen is presumably solar radiation and the areas developing cancer are the areas where there has been maximum exposure. In dye workers the uroepithelial tract is exposed to the same carcinogen and multiple tumors are frequent. In other sites multicentric cancers occur more frequently than one would expect from chance alone. Some of these other sites are oral cavity, lips, larynx, pharynx,

esophagus, stomach, small intestine, colon and rectum, mammary glands, testes, ovaries, kidneys, thyroid, pancreas, liver, and central nervous system. Although most of the carcinogens are not known, it is probable that multicentric cancer occurring in one of the above sites is the result of the effects of the same carcinogen(s) and therefore meets the criteria of "true multicentric carcinomas."

A few reports indicate that in women anal carcinoma may be more than casually associated with cancer of the lower genital tract. Since the vulva, vagina, anus, peri-anal skin and portio vaginalis have a contiguous surface of squamous epithelium and since they are derived from closely related embryological anlagen, one can say they have a common histology. If one of these sites is exposed to a carcinogen, the other sites probably are too.

From the Departments of Pathology and Statistics, Roswell Park Memorial Institute, 666 Elm Street, Buffalo, N. Y. 14203.

When a woman has more than one primary cancer arising from these structures, she can be said to have a "true multicentric cancer." The purpose of this paper is to show that multicentric cancers occur more often in these sites than one would expect from chance alone.

Materials and Methods

In this hospital in the period from 1920 to 1962 a diagnosis of squamous cell carcinoma of the anus was made in 130 patients. Only 113 were accepted after elimination of those cases in which histological material was insufficient or unavailable. Of the 113 accepted cases 64 were females and 49 were males. The clinical records of all women were perused for information concerning the presence of a second cancer. Particular attention was given to those cases

where other primary cancers originated from the epithelium of the vulva, vagina, peri-anal skin or portio vaginalis of the cervix. A detailed study of the records and histological material of these cases was made.

Acceptable cases of multiple primary tumors had to meet the criteria proposed by Warren and Gates:

1. Each of the tumors must present a definite picture of malignancy;
2. Each must be distinct;
3. The probability of one being metastatic from the other must be excluded.

In our study we have adhered rigidly to histological proof of each malignancy. We accepted only those cases in which the diagnosis was established by tissue biopsies.

Table 1
SYNCHRONOUS AND METACHRONOUS TUMORS OF THE ANUS (14 CASES)

Age at dx. of 1st tumor	Case no.	Site of 1st prim.*	Interval (mo.)	2nd prim.	Interval (mo.)	3rd prim.
64	1	Anus	0	Sq. cell ca. cervix	15	Sq. cell ca. vagina
45	2	Anus	0	Sq. cell ca. cervix	—	—
66	3	Anus	0	Sq. cell ca. cervix	—	—
66	4	Anus	0	Sq. cell ca. cervix	—	—
54	5	Anus	0	Sq. cell ca. cervix	—	—
37	6	Anus	16	Sq. cell ca. cervix	72	Sq. cell ca. vulva
56	7	Cervix	34	Sq. cell ca. anus	108	Sq. cell ca. vagina
69	8	Cervix	67	Sq. cell ca. anus	—	—
62	9	Cervix	81	Sq. cell ca. anus	—	—
41	10	Cervix	180	Sq. cell ca. anus	—	—
36	11	Cervix	228	Sq. cell ca. anus	—	—
75	12	Anus	12	Gl. ca. breast	0	Sq. cell ca. sk. forehead
55	13	Anus	48	Gl. ca. breast	—	—
71	14	Anus	74	Gl. ca. endometrium	—	—

*All squamous cell ca.

Results

In this paper synchronous tumors are defined as those in which the interval of time between the establishment of both diagnoses is one year or less. When the interval is of more than one year, the tumors are said to be metachronous.

In our series the second or third primaries were synchronous in 6 cases and metachronous in 8 patients (Table 1).

Of the 3 cases in which the second primary occurred in breast or endometrium one case showed 3 synchronous tumors while in the other 2 cases the malignancies were metachronous (Table 1).

The age distribution of anal carcinoma in our series shows that the peak incidence occurred between 50 and 70 years of age, but a remarkable number of young patients were involved (Table 2). The incidence of synchronous tumors according to age is illustrated in Table 3. Most of them occurred in the decades in which anal carcinoma is most frequent in the female.

In the 6 cases of anal carcinoma in which metachronous tumors occurred (Table 1) squamous cell carcinoma of the cervix was the first primary in 5 cases while squamous cell carcinoma of the anus was the first in one case. In the 5 in which the first

Table 2
AGE DISTRIBUTION AT TIME OF DIAGNOSIS
OF THE ANAL CARCINOMA

Age in years	No. of cases
20-29	2
30-39	3
40-49	2
50-59	16
60-69	26
70-79	12
80-89	3
TOTAL	64

primary was in the cervix x-ray therapy was given for the first primary.

Discussion

Since Billroth's first report of the occurrence of 2 or more primary malignant tumors in a patient (cited by Warren and Gates), several studies dealing with the incidence of second primaries have appeared in the literature.

The concept of the susceptibility of a particular organ or tissue to carcinoma, i.e., of the multicentricity of origin of a malignancy, was well developed

by Lund. In a series of 1,548 cases of cancer of the mouth he found a 6% (94 cases) incidence of multiple cancer. Of these, 31 had multiple cancer of the buccal mucosa, about 15 times the number expected on the basis of chance alone. Practically all authors agree that multiple cancers of the same organ or paired organs occur far more frequently than would be expected from chance alone. This multicentricity has been well documented in the literature. The multicentricity of tumors in the contiguous structure around the anus is not so well known although Newman and Cromer and Moertel et al have reported findings which support this concept. We feel our series demonstrates that there is more than a casual relationship between anal carcinoma and carcinoma of the lower genital tract. (For statistical analysis see appendix). In some cases the possibility must be recognized that the changes induced by roentgenological or therapeutic treatments of carcinoma in one tissue may be carcinogenic to another tissue. The carcinogenic effects of ionizing radiation are well established and carcinogenic effects may well be suspected for the hormonal and tissue toxic agents used in oncological therapy or at least they might enhance the action of a carcinogen. In 5 patients with anal carcinoma the tumors were synchronous and no therapeutic agents can be incriminated since diagnoses of both tumors were made before any therapy was given. In 6 patients the tumors were metachronous. The time interval between the radiation treatment of the first tumor and the diagnosis of the second tumor in one of these cases (patient 7) is relatively short (Table 1). It is unlikely that the ionizing radiation caused the second cancer. In 4 cases the lag period was longer than 5 years (Table 1). In these cases ionizing radiation was used to treat the primary lesion and in one changes consistent with ionizing effect were seen in the tissues adjacent to the second carcinoma. Squamous cell carcinoma may develop in a chronic radiation dermatitis, the incidence, varying from 10 to 32.7% in the different series. Most cases of squamous cell carcinoma developing in radiation dermatitis occur from 25 to 30 years after treatment but the interval may be as short as

Table 3
INCIDENCE OF SYNCHRONOUS TUMORS
ACCORDING TO AGE

Age in years	No. of cases
40-49	1
50-59	2
60-69	3

6 years. An infant who received radiation to the thymus shortly after birth developed basal cell carcinoma of the radiated skin 5 years later. Therefore, it is probable that the ionizing radiation played a role in the development of the second carcinoma in those cases in which the lag period was longer than 5 years.

Conclusions

In a series of 64 anal carcinomas in the female 11 had multiple primaries in the anogenital tract, illustrating a more than casual association of these

tumors. In 5 cases the second or third primaries were synchronous. In 6 cases metachronous tumors occurred. Of these, 5 had previous x-ray therapy to the area and the enhancing or primary carcinogenic effect of the ionizing radiation cannot be ruled out.

It appears evident, however, that primary tumor in the anogenital tract in the female deserves special and careful examination and follow-up if cancer patients are to be kept completely free from disease.

(The reference and case reports may be seen in the original article.)

INSECT CONTROL THROUGH SEXUAL STERILIZATION

*LCDR E.M. Fussell MSC USN**

Until about two decades ago, man relied on such compounds as arsenicals, sulfur, petroleum oils, pyrethrum, and paris green for the control of harmful arthropods. The development and subsequent success of DDT in the control of disease vectors during the latter part of World War II gave rise to the discovery of many other chlorinated hydrocarbon insecticides. In recent years, numerous organic phosphate and carbamate compounds have made their appearance and, along with the chlorinated hydrocarbons, have been used widely for the control of both medical and economic pest problems.

The increased use of DDT is typical of the general trend of pesticide usage. The production of DDT, in the United States, has increased from about nine million pounds in 1943¹ to approximately 156 million pounds during the crop year 1958-59.² Prior to August, 1945, practically all the DDT produced in the United States was for military use.

While some pesticides such as pyrethrum, malathion, and DDT are only slightly toxic, others like TEPP, parathion, and endrin are extremely toxic. All pesticides can be harmful, if not used with proper care.

Recently, there has been a great deal of concern expressed about the widespread use of pesticides. Most of the criticism has been directed at the potentially injurious effects these poisonous compounds may have on the health of man, his domestic ani-

mals, and wildlife. On the other side of the coin, the effective use of pesticides has greatly enhanced the quality and quantity of agricultural production. We also must acknowledge the many benefits of these chemicals as weapons to control arthropod-borne diseases and protect man and animals against annoyance by pest species. Nevertheless, the time has come to employ other methods of pest control, whenever possible, so that unnecessary exposure to pesticides can be reduced to a minimum. The problem of insect resistance to insecticides is another important reason for developing new control methods.

There are many methods which may be used to effect the reduction or prevent the spread of an insect population. Some of these methods include the use of predators, various disease organisms, mechanical barriers, source reduction, chemical pesticides and sterilization. This discussion will be limited to the techniques which cause sexual sterility of insects.

Two basic principles have been employed to produce sexual sterility. The insect, usually in the pupal stage, may be exposed to a sterilizing dose of gamma radiation; or a chemical which causes sterility may be applied to a surface in which the insect comes in contact, applied to the insect, or mixed in a bait to be eaten by an insect species. In both methods, the idea is to cause the female insects to produce infertile eggs.

Knowledge that insects can be made to produce infertile eggs is not new. In 1916, Runner³ observed that the cigarette beetle, *Lasioderma sericorne*

*Medical Entomologist, graduate student at the Department of Epidemiology and Public Health, Yale University School of Medicine, New Haven, Conn.

The opinions or assertions contained herein are the private ones of the author and are not to be considered as official or as reflecting the views of the Bureau of Medicine and Surgery of the Navy Department or the naval service at large.

(Fabricius), would lay infertile eggs when exposed to roentgen rays. However, it was not until about 1938 that Knipling⁴ suggested the introduction of sterile males into a natural population of screw-worm flies, *Cochliomyia hominivorax* Coquerel, for the purpose of controlling the species. Knipling's suggestion was soon followed with research to study the biology of the screw-worm fly and the effects of X-ray and gamma radiation on the fly.⁵ One of the most significant accomplishments of insect control by sterilization occurred in 1954, when Baumhover et al⁶ successfully eradicated the screw-worm fly from the island of Curaçao. The success of the eradication program on the island of Curaçao provided the needed impetus for a large scale study. For such an experiment, an area was selected which covered about 70,000 square miles including Florida and parts of Georgia and Alabama. During a period of about 18 months, over two billion sterilized flies were released throughout the control area. Though they are more efficient than the females, the difficulty of separating the sexes generally make it impractical to release males only. The first release occurred in January, 1958, and by February, 1959, the screw-worm appeared to be eradicated from the area. To ensure complete eradication, the releases were continued until November, 1959. Sporadic cases of screw-worms have been caused by the importation of infested animals, but they were quickly eradicated.⁵ An even more extensive screw-worm eradication program is now underway in Texas and the Southwest, using the same method.

Another significant achievement, in insect control by gamma radiation sterilization, was the eradication of the melon fly, *Dacus cucurbitae* Coquillett, from the island of Rota, Mariana Islands.⁷ Melon flies commonly cause damage to such fruits as squash, tomato, cucumber, cantaloup, pumpkin, and watermelon. The island of Rota is located about 37 miles northeast of Guam and covers an area of approximately 33 square miles. The experiment involved the rearing of the melon flies, irradiating them in the pupal stage, and air shipping them from Hawaii to Guam, a distance of about 3,800 miles. Final processing and distribution were handled from a laboratory on Guam. Air and ground releases were made at weekly intervals, from September 24, 1962 to July 4, 1963. Approximately 257 million sterile flies were released during the period. No infested fruit was observed after December 26, 1962, about three months after the first release. The results of this experiment also proved that a monogamous

mating habit is not essential for successful species eradication.

Studies by Godwin et al⁸ demonstrated that males of the gypsy moth, *Porthetria dispar* (L.), could be successfully sterilized by gamma radiation without harmful effects to the insect. As yet, no attempt has been made to control the gypsy moth through the release of sterile moths.

While the technique of insect control through sterilization with gamma radiation has produced some remarkable results, there are problems of considerable magnitude associated with such a method. It is necessary to rear, irradiate and release an insect species in overwhelming numbers. The sterile insects must outnumber those in the natural population by many times. In the Rota experiment, the irradiated flies outnumbered those in the natural population by, at least, 14:1 and may have reached a 90:1 ratio.⁷ Flooding of the natural population with sterile insects is essential to ensure that a large proportion of the normal females will mate with the irradiated males. To rear insects in sufficient numbers often requires enormous and costly rearing facilities. The application of this method is somewhat limited, because not all insect species are adaptable to laboratory production. Furthermore, certain species of the released insects could themselves be harmful.

The latest approach to pest control, by sterilization, is the use of chemicals known as chemosterilants. Though still in the experimental stage, it appears that chemosterilants have certain advantages over irradiation for the control of insects. It is likely that chemosterilants will prove to be more economical than irradiation, since it will not be necessary to rear the insects to be sterilized.⁹ Although, if desirable, reared insects can be sterilized by these chemicals.

The primary aim of the chemosterilization technique is to induce sexual sterility in a large proportion of the natural insect population. This can be achieved in the field by applying the chemical to the surfaces on which the insects commonly rest, or by incorporating the compound in a bait to be eaten by the insect species.

The principal advantage of chemosterilants over insecticides has been aptly described by Smith.⁹ "Assume that we have a method of application that will reach 90 percent of the insects in a population. If we kill 90 males out of 100, and 90 females out of 100, the 10 females that escape the treatment will mate with the 10 males that escape, and there will be 10 fertile females to produce the next gen-

eration. However, if we reach the same 90 percent of the insects with a chemosterilant, 90 females out of 100 will be sterilized, and reproduce, and in addition the 10 females that escaped treatment will be subjected to mating competition by 90 sterile males as well as 10 normal males. From this ratio we would expect nine of the normal females to mate with sterile males, and therefore fail to reproduce, and only one normal female to mate with a normal male and thus be available to produce the next generation."

Although eradication of an insect species has not been accomplished by chemosterilization, much research is being carried out presently by workers of the United States Department of Agriculture and other agencies. Most of the research has been conducted on such insects as house flies, various mosquito species, stable flies, fruit flies, screw-worm flies and cockroaches. Among the numerous chemosterilants currently being tested, the alkylating agents, and particularly the aziridine derivatives, appear to be most promising.¹⁰ One of the primary advantages of the aziridines, as sexual sterilants for insects, is that both sexes are made sterile, especially the male. Tepa, metepa, and apholate are typical of the aziridines.

Because of the public health importance of the house fly, *Musca domestica* L., and since it lends itself well to laboratory studies, much of the work with chemosterilants has been conducted with this species.

The encouraging results of various laboratory experiments in the chemosterilization of house flies have led to several field tests.¹¹ Three such tests were conducted in Florida, using metepa,¹² apholate¹³ and tepa.¹⁴ Best results were obtained by mixing the sterilants with cornmeal. Although each of the test sites was fairly isolated, it was not possible to prevent some infiltration of flies from outside sources. Even so, the results of these tests are very promising and have opened the door to more extensive control experiments.

In an experiment in Louisiana, Davich et al¹⁵

were able to eradicate the boll weevil, *Anthonomus grandis* Boheman, from an one-acre plot of cotton by releasing 8,850 apholate-sterilized male weevils over an eight-week period. The plot had been purposely infested with 10 gravid females six days before initiating the releases. Eradication was accomplished within 17 weeks.

Conclusions. The sterilization of an insect species, as a method of control or eradication, provides a much needed alternative for dealing with the ever increasing problem of insect resistance to insecticides. There is little doubt that the use of sterilants will result in a significant reduction in the use of pesticides for the control of insects and other arthropods. The success of the irradiation method of insect control is now history, even though it was not seriously considered until a few short years ago. While the chemosterilants are still in the experimental stage, it appears that their potential for insect control is greater than any technique known today.

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MEDICAL ABSTRACTS

SCALENE NODE BIOPSY: A RE-EVALUATION

C. R. Blair MD and J. H. Hughes MD, (From the Surgical Service, St. Luke's Hospital Center, New York, N. Y.) *J Thorac Cardio Surg* 52: 595-598, October 1966.

This is a report of experiences with scalene node biopsy including 86 of the authors' cases, 1959 to 1963, and 102 previously reported by Dr. Blair, 1953 to 1959. After a review of the entire series, they have come to the following conclusions:

"1. Metastases to scalene nodes are a late phenomenon. They are accompanied by x-ray evidence of mediastinal enlargement and not infrequently are found in association with superior vena caval obstructive syndrome, phrenic or vocal paralysis, pleural reaction or pleural fluid, involvement of trachea or carina, bone, brain, and liver metastases. These are all contraindications to thoracotomy.

"2. It is a simple, fast, safe, convenient way of sometimes obtaining a diagnosis in *advanced* bronchogenic carcinoma.

"3. It gives a high diagnostic yield in the non-malignant diseases of tuberculosis, Boeck's sarcoid, and lymphoma, provided there is x-ray evidence of mediastinal or hilar involvement by these diseases.

"4. It is a poor diagnostic aid in lesions of the lung periphery without mediastinal enlargement.

"5. It is a poor diagnostic aid in disseminated lung disease without mediastinal enlargement.

"6. It is a very limited aid in determining resectability of lung cancer. Of 54 negative biopsies in 62 patients (recent series), 30 came to thoracotomy and only 6 of these had resections. Of these 6, only 2 had any chance of cure, and only 1 has been a 5 year survivor.

"7. Experienced and interested surgeons, proper choice of case, selection of optimal side or sides, and very thorough pathological examination will all help to increase the percentage of positive diagnoses.

"8. Anaplastic and undifferentiated tumors metastasize to scalene nodes more readily than do

squamous cell of epidermoid carcinomata. Adenocarcinoma infrequently metastasizes to scalene nodes.

"9. The procedure results in few complications and these are usually minor when it is performed by well-trained and well-supervised personnel.

"10. Scalene node biopsy should not be considered a routine procedure but, if patients are wisely selected and careful surgical technique is employed, this is and will remain a useful method of aiding the management of intrathoracic disease."

TRANSDIAPHRAGMATIC EXPLORATION OF THE UPPER ABDOMEN DURING SURGERY FOR BRONCHOGENIC CARCINOMA

John Yashar MD, (From the Thoracic Surgical Service of Pawtucket Memorial Hospital, Miriam, Roger Williams General, Our Lady of Fatima, and St. Joseph's Hospitals, Providence, Rhode Island.) *J Thorac Cardio Surg* 52: 599-603, Oct 1966.

The author prefaces his report by stating that in a review of 4,056 autopsy cases of bronchogenic carcinoma, the liver and upper abdominal lymph nodes are the most frequent sites of metastases after the hilar and regional nodes and that the purpose of his study is to evaluate the incidence of upper abdominal and liver metastases at the time of thoracotomy in cases of bronchogenic carcinoma technically resectable and to study the life expectancy of the patients with liver metastases.

He has reviewed 127 cases of carefully selected patients with bronchogenic carcinoma which were thought to be resectable, technically, and in whom the carcinomas were localized and there was no evidence of extra thoracic extension. The upper abdomen and liver were explored in all of these through the diaphragm at the time of thoracotomy. In 18 (14.9 percent), there were metastatic nodules in the liver. Life expectancy in these eighteen was extremely short; the majority were dead within four months; the main survival time was 2.7 months. The size and location of the primary tumor had no relation to presence, absence, or extent of liver metastases.

Metastatic nodules of the liver were seen more frequently with undifferentiated carcinoma and when hilar and mediastinal nodes were involved. He concludes that exploration of the liver and upper abdomen through a diaphragmatic incision at the time of thoracotomy is a definite aid in establishing the presence or absence of hepatic metastasis and may spare the patient unnecessary pulmonary resection.

MANAGEMENT OF SURGICAL HYPOPARATHYROIDISM

C. C. Harold MD and J. Wright, (*From the Head and Neck Service, Department of Surgery, Memorial Cancer Center, New York, N. Y.*) *Amer J Surg* 112: 482-487, October 1966.

The increasing number of total thyroidectomies, surgical, for cancer and of "irradiation thyroidectomies" effected by the use of I^{131} , say the authors, make it logical to expect increases in the number of cases of hypoparathyroidism. They report a study in the management of 73 patients whose surgery resulted in parathyroid deficiency during the period 1941 through 1964. None of these patients is known to have died of hypoparathyroidism although the status of two is unknown. Fifteen died of cancer, leaving 56 which are still being followed. Sixteen of these no longer require medication but three of them did for four, five, and ten years respectively. Of the forty previously on substitution therapy, 31 have been treated for over five years, the longest 22 years. Three patients received no treatment for calcium deficiency until over five years postoperatively (one ten years). In this series an early onset and initially severe degree of insufficiency were not incompatible with complete recovery. Treatment included the following modalities: dihydrotachysterol, calcium gluconate, (intravenous), calcium lactate (by mouth), Vitamin D_2 , thyroid extract, and low phosphorus—high calcium diet. All are discussed at considerable length.

As a result of their study, the authors feel that (1) if total thyroidectomy is indicated as the best treatment for the patient with cancer of the thyroid, operation should not be altered because of fear of postoperative hypoparathyroidism; (2) regardless of the time interval since operation, patients who have had total thyroidectomy should be regarded as potential candidates for hypoparathyroidism, (3) the condition can be controlled in virtually all patients using the modalities discussed.

CLINICAL PERITONEAL DIALYSIS

L. I. Niehuis MD, (*St. John's Hospital, Tulsa, Oklahoma.*) *Arch Surg* 93: 643-653, October 1966.

This is a review of more than 120 peritoneal dialyses done by the author. Indications for the procedure included acute renal failure, acute exacerbations of chronic renal failure, acute intoxications with diffusible chemicals such as barbiturates, salicylates, glutethimide, boric acid, meprobamate, bromides, calcium, and salt, refractory edema, acute viral hepatitis with coma, and renal failure of unknown etiology when there is insufficient time for a diagnosis to be made. Peritonitis or recent laparotomy, he states, do not contraindicate the procedure. He discusses the problems that occur but concludes that peritoneal dialysis is a readily available, safe, simple, and effective procedure—and points out that while deaths occur in spite of peritoneal dialysis, none in his series died because of it.

PULMONARY PARENCHYMAL FINDINGS IN BLUNT TRAUMA TO THE CHEST

Y. M. Ting MD, (*Department of Radiology, Wayne County General Hospital, Eloise, Michigan.*) *Amer J Roentgen* 98: 343-349, October 1966.

This is a report of a study of the x-rays of 200 patients who had sustained blunt injury to the chest. All were found to have parenchymal changes including pulmonary edema and congestion, atelectasis, patchy infiltrations, and formation of traumatic lung cavities and intrapulmonary hematomata. Often a combination of the changes occurred; usually one type predominated. The author stresses the importance of obtaining chest roentgenograms at the earliest possible moment after moderately severe trauma and that follow-up films, 24-48 hours later are pertinent in detecting late atelectatic changes or the clearing of edema, or the development of pneumothorax or hemothorax. Also, more follow-up films after one to two weeks are of value since most of the cases reviewed showed that the density caused by intra-alveolar, peribronchial hemorrhage cleared by that time. Repeat films should be taken at one month, three months, six months and one year when a hematoma has formed. Without serial roentgenograms and a history of trauma, the differential diagnosis of traumatic cavities with hematoma formation from abscess, granuloma, or neoplasm is difficult.

CRYOSURGERY OF THE PITUITARY IN ACROMEGALY: REDUCED GROWTH HORMONE LEVELS FOLLOWING HYPOPHYSECTOMY IN 13 CASES

R. W. Rand PhD MD, (From the Division of Neurosurgery, University of California School of Medicine, Los Angeles.) Ann Surg 164: 587-592, October 1966.

Cryohypophysectomy involves placement of a cryoprobe into the anterior lobe of the pituitary gland via the nasal vault and sphenoid sinus under x-ray control utilizing a stereotaxic guide system designed for this procedure. The operation is done under local anesthesia. Dr. Rand reports 13 patients with acromegaly and elevated plasma growth hormone levels for whom he has carried out the operation. Remission of signs and symptoms was accomplished in all. There was no mortality, no optic nerve or extraocular motor nerve palsies resulted. Meningitis due to cerebrospinal rhinorrhea occurred twice and was treated successfully with antibiotics. To prevent this complication, he now seals the twist holes with silicone dowels. The operation can be repeated if growth hormone levels are not decreased sufficiently to give the desired results.

(H. R. Tollefesen MD, T. R. Miller MD, and F. P. Gerald describe their technique of the transantral sphenoid hypophysectomy in the October number of The American Journal of Surgery 112: 566-576, 1966. And in the same issue, pp 576-581, J. M. Lore, Jr., MD, presents his procedure of septal transphenoidal hypophysectomy, both surgical and cryosurgical—Editor.)

LONG-TERM EFFECT OF PROBENECID ON DIURETIC-INDUCED HYPERURICEMIA

E. D. Freis MD and R. F. Sappington MD, JAMA 198: 127-129, Oct 10, 1966.

The hyperuricemic effect of thiazide derivatives appears to result from inhibition of renal tubular secretion of urate produced by therapeutic doses of these drugs. Serum uric acid levels above seven mg/100 ml in 40 to 50 percent of patients being treated with these agents have been reported. While the antihypertensive effectiveness of these oral diuretics usually outweighs the potential development of adverse side effects, the authors feel that it is desirable to take effective countermeasures when hyperuricemia appears during the course of diuretic treatment, and they describe their experience in adding probenecid for patients undergoing such treatment. They found an average reduction in serum uric acid levels from 8.14 ± 1.27 mg/100

ml when diuretics alone were administered to 5.86 ± 1.17 mg/100 ml when probenecid was added (initial dose 0.25 gm followed by an increase to 0.5 gm twice daily). No side effects or evidence of toxicity to probenecid developed and there was no diminution in the diuretic activity of the thiazide during the trial period.

RECOGNITION AND SURGICAL MANAGEMENT OF VISCERAL ISCHEMIA SYNDROMES

R. J. Stoney M.D., C. J. Wylie MD, FACS, (From the Department of Surgery, University of California School of Medicine, San Francisco, California.) Ann Surg 164: 714-722, October, 1966.

The author describes clinical, arteriographic, and operative findings in 14 patients with abdominal symptoms that were believed to be due to chronic visceral ischemia (abdominal angina). Revascularization operations were performed in thirteen. Six had arteriosclerotic occlusive lesions of the visceral arteries. Five of these had reconstructive procedures because of the typical symptoms of abdominal angina; one of these died. The surviving patients have been asymptomatic up to three and one-half years postoperatively and continuing patency of the arteries has been confirmed by aortographic examination.

Eight of the 14 patients had compression of the celiac axis by the diaphragm and had typical abdominal pain. Decompression was performed in four of these by division of the diaphragmatic fibers; two were relieved of symptoms; one was relieved partially and one remained unchanged. The persistence of residual defects after operation was confirmed by postoperative aortagrams.

In the other 4, operation in addition to division of the diaphragm, included a resection of the stenosed celiac segments and repair of the artery. All of these are well and arteriograms demonstrate patency.

(An Addendum is appended stating that three more patients have been operated upon with atypical abdominal pain and celiac stenosis since the above report was prepared. The stenosis in all was caused by diaphragmatic compression. Arterial reconstruction was done in all using the hypogastric artery in two and the saphenous vein in the third since the hypogastric artery was unsuitable. All have remained asymptomatic.)

DENTAL SECTION

TWO YEAR OBSERVATIONS OF ENAMEL CARIES ON POSTERIOR INTERPROXIMAL SURFACES

*CDR W. R. Shiller and CAPT F. P. Scola, U.S. Naval Submarine Medical Center,
U.S. Naval Submarine Base, New London, Groton, Conn.*

Introduction

When faced with providing dental care for a military population, the dental officer very soon realizes that there is more dental disease than he can treat. This basic fact forces an assignment of priorities to dental treatment. For this reason, the military dentist is keenly interested in matters of prognosis. Any facts contributing to an understanding of the speed of dental caries progression or of the expected outcome of untreated cases are of great help to the military dentist.

The small enamel caries lesions seen on roentgenograms of posterior interproximal surfaces have long been difficult to assess for treatment planning. The question of whether to restore these surfaces or to leave them unrestored while the patient is urged to improve his hygiene practices is often hard to answer.

Kesel has urged that all carious lesions be restored both as a recommended treatment procedure and in fulfillment of preventive dentistry principles. Arnim also has urged that all carious lesions be treated as soon as they may be detected. Paffenbarger compared the data of Waterman and Knutson from American children with that of Sebelius from Norwegian children, and found that while the total DMF indices are remarkably similar between the children from the two countries, the almost total restoration of children's teeth in Norway resulted in less than one tenth the number of extracted teeth in Norway when compared with the United States.

Most of the evidence in favor of restoring all caries in an individual's mouth has been derived indirectly. That is, caries activity tests rather than actual caries increment studies have supplied most of these data. Shklair and co-workers and Elliot have reported reduced lactobacillus counts after all caries lesions had been restored. Shklair's data indicated that the counts are more likely to be completely eliminated and more slow to become re-

lished when all lesions are restored than when some caries is allowed to remain.

Green and co-workers presented data from a limited number of children some of whom had all caries restored and some had varying percentages of their caries restored. The group which had all caries restored had about one-half the DMF increment in one year when compared with the other groups.

When considering possible reasons for not restoring small enamel caries lesions we are guided chiefly by some concepts but very few facts. Arnim presented case histories in which small caries lesions were controlled for several years with good patient cooperation. The current Navy stannous fluoride treatment procedure includes the concept of caries arrestment. This concept is necessary to explain the diagnostic reversals in clinical studies of stannous fluoride.

A recent evaluation of the roentgenograms of a two year clinical study of stannous fluoride caries in military personnel focused attention on the posterior interproximal caries lesions. It was, therefore, considered desirable to examine the fates of enamel caries on these surfaces.

Methods and Observations

The subjects in the stannous fluoride evaluation study were young Navy enlisted men, 18-23 years of age. They were examined initially and assigned at random to a control group and four treatment groups. For the purpose of this paper, only the control group will be considered. This group received placebo treatment corresponding to an operator applied stannous fluoride prophylaxis and aqueous topical treatment. They were given a placebo dentifrice with no special use instructions. This treatment was accomplished initially and at the end of one year. Examinations were conducted by

F.P.S. initially and at six month intervals for two years.

An instruction was placed in the subject's dental record to inform any dental officer that this man was a subject for this study. No treatment was to be accomplished for these subjects except that of an urgent nature, without approval of the principal investigator.

The special roentgenographic evaluation was conducted from the study records of 115 of these control subjects. The initial bite-wing roentgenograms, and those taken after two years, were evaluated. The enamel lesions of posterior interproximal surfaces were recorded separately and were defined as those translucent areas indicating carious involvement of the enamel up to the dentino-enamel junction but not visibly involving the dentin. Any lesion more advanced than this was classified as an unqualified caries lesion.

Ninety-five, or 83 percent, of the 115 control subjects had at least one enamel caries lesion of posterior interproximal surfaces. There was a total of 305 of these lesions available for study over the two year period. The fates of these lesions are summarized in Table 1.

Table 1
TWO YEAR OBSERVATIONS OF INCIPIENT INTERPROXIMAL CARIES (N=305)

Remained incipient	155	(51%)
Progressed to unqualified caries lesions	82	(27%)
Restored	23	(7%)
Missing	0	
Sound (diagnostic reversals)	45	(15%)

Discussion

When considering the data in Table 1, two main facts are apparent. Only about one third of the initial enamel caries lesions progressed in two years into the dentin. This is assuming that the seven percent restored had actually progressed into the dentin. None of these lesions resulted in the loss of a tooth during this two year study.

In order to correctly assess the meaning of these data one must recognize again the special condition of this study. These subjects were carefully examined every six months. No misgivings were associated with not restoring small lesions because the investigator was certain that he would see these men again in six months.

With these conditions in mind, certain applications of these findings to military dentistry are thought feasible. If a system of re-examination at six months intervals was instituted, these data would indicate the advisability of not restoring enamel caries lesions. The time thus saved could be spent on more urgent and more necessary types of treatment. It is possible that some special X-ray film holder suitable for serial mounting of bite-wing films could be placed in each man's dental record. This would enable easy following of the progressions of these enamel lesions.

It must be emphasized that these findings still leave some unanswered questions. In this study, no attempt was made to divide enamel caries into those just visible as an etch on the enamel surface and those at or near the dentino-enamel junction. It is quite possible that the latter were chiefly the ones that had progressed to unqualified lesions in the two year period.

Another important unanswered question concerns the overall caries activity as evidenced by new clinical lesions in men who have small enamel lesions remaining in their mouths. It is felt that bacteriological studies alone will not answer this question. A recent report by Shklair and co-workers showed that the lactobacillus counts are not appreciably effected by the small interproximal enamel carious lesions.

A study is being initiated at this activity to attempt to answer both of these questions.

Summary

1. In a two year period, only 34 percent of the posterior interproximal enamel caries lesions progressed to dentinal involvement or to restored status.
2. The presence of these enamel lesions resulted in the loss of no teeth during the two year study.
3. It is recommended that where regular re-examinations are possible, enamel caries may be left unrestored in circumstances where dental treatment capabilities do not meet the total population demands.
4. Attention should be given to instituting methods of X-ray film mounting in the dental records for easy follow-up of enamel caries.
5. Additional studies are required to answer the question of possible effect of enamel caries on overall caries activity.

Editor's comment—This study is directly applicable to naval dental practice. In 115 naval personnel, 305 posterior interproximal enamel caries

lesions diagnosed by bitewing roentgenograms were restudied after two years. Sixty-six percent of those diagnosed lesions had not progressed to the dentin, after two years. Only 27 percent had progressed to dentinal involvement, seven percent had been restored, none were extracted, and 15 percent were scored as "reversals" because they were not visible in the two year roentgenograms. To take advantage of this knowledge, the authors discuss the usefulness of serial mounting of bitewing roentgenograms, for systematic reassessment relative to arrestment and/or advancement of minimal caries lesions. With annual three-agent SnF₂ treatment to all hands and

with arrestment of existing caries lesions as a key value of SnF₂ cariostasis, it will become increasingly important to make periodic decisions on whether certain radiolucencies depict active or arrested lesions. Thus in annual examination, it becomes increasingly important to treatment planning to compare two, three and four year serial films of arrested lesions. For efficiency, it would be desirable to have the serial films mounted in a single holder. The Rinn Eezeemount stock #19-543 will hold five pairs of regular bitewing films. The Greene Products Co. stock #5P23T will hold five sets of four periapical films used as bitewing exposures.

AWARDS AND HONORS SECTION

BRONZE STAR

Markillie, John Roy, 772 62 46, HM3, USN
Meyer, Jack (n), 688 28 25, HM3, USN
Moore, Maxie Laverne, Jr., 699 63 05, HM3,
USN
Payerchin, Richard James, 770 44 72, HM3,
USN
Reece, William Sullivan, 519 50 52, HM3, USN
Saint, Ernest Emory, 571 74 40, HM3, USN
Scearse, Roger Dale, 290 45 49, HM3, USN
Stanford, Elmo Gail, 490 04 63, HM2, USN
Van Peenen, Peter F. D., LCDR, MC, USN
Williams, Gary Lee, 695 57 41, HM3, USN

NAVY COMMENDATION MEDAL

Albertus, Merrill Clark 774 85 74, HN, USN
Allen, Lee Roy, Jr., 661 65 83, HM3, USN
Condon, Earl N., LCDR, MSC, USN
Creager, Thomas D., LT, DC, USN

Darden, "L" "C" Richard, Jr., 797 38 11, HM3,
USN
Dewey, W. A., LT, MSC, USN
Doyle, Thomas Vernon, 536 58 61, HM1, USN
Edes, James Franklin, 487 73 55, HM2, USN
Howard, John E., LCDR, MSC, USN
Knowles, John Manley, 528 24 68, HM2, USN
Lewis, Thomas, LCDR, MSC, USN
McCarthy, Patrick Ray, 542 39 13, HN, USNR
Miller, Lucille, CDR, NC, USN
Morin, Aline E., CDR, NC, USN
Nanna, Larry Ross, 695 95 87, HM3, USN
Palmer, Donn Milton, Jr., 544 48 96, HM3, USN
Piatetsky, Louis Isadore, 777 68 92, HM3, USN
Sage, James Michael, 684 26 49, HM3, USN
Scott, Richard B., LT, DC, USN
Simmons, Harold Steven, 683 47 76, HM3, USN
Simon, Jeffrey Nicholas, 661 24 80, HM3, USN
Wozniak, Frank S., CAPT, DC, USN

NURSE CORPS SECTION

REPORT OF NURSE CORPS ACTIVITY IN ONE OF DEPARTMENT OF STATE'S SURGICAL TEAMS, VIETNAM

Since 1965 Nurse Corps officers have been assigned to the Department of State's surgical team program in Vietnam under the auspices of the Agency for International Development (AID). These nurses function as hospital nursing service advisors. Their duties include consultations, teaching nursing courses, and administrative responsibilities; they also make field trips to provincial hospitals to provide any assistance required by the program. The following is a letter

written by LCDR Robina Beveridge NC USN, a member of Advisory Team No. 54, to CAPT Veronica Bulshefski NC USN, Director, Navy Nurse Corps.

Dear Captain Bulshefski

Our work at Rach Gia has changed slightly, and this I will enlarge upon. The 27th of June saw the

arrival of Miss Kathleen Corniea who is a 28-year-old civilian nurse employed by USAID (United States Agency for International Development). Her arrival prompted CDR LeBouvier to assign all three of us to special areas. Miss Corniea works in the Female surgical ward and the Military ward, LT Wilhelmy works in the Male surgical ward and in surgical Pediatrics. My duties call for me to work in the Operating room, Recovery room, Emergency room and Postoperative ward.

We continue our weekly visits to the ARVN (Army Republic Vietnam) dependents' clinic, which accomplishes three things; it gives the ARVN nurse two more opinions about his patients; enables us to write referral notes to our surgeons regarding potential patients i.e. cleft lip repairs, thyroid nodules; and also establishes the fact that American Navy Nurses are interested in the health of the Vietnamese outside of the Provincial Hospital, and are willing to wade through mud to get to their clinic.

We have enlarged our experience in, and knowledge of nursing by having to care for patients with conditions which up until now, for us, have been textbook cases only. These have included tetanus with opisthotonus in one adult who died, and one newborn infant who had an infected umbilical cord, and one nine year old girl whose mother had made numerous scarifications over the child's body in the practise of Chinese medicine, the basic principles of which consist of counterirritation or "the letting out of the sickness". Fortunately these latter two patients recovered.

We have seen a fatal case of puerperal sepsis in a patient who was delivered by a rural midwife. Having seen the appalling lack of facilities, instruments and sanitary conditions which constitute the rural midwife's clinic, it is surprising that puerperal sepsis is not rampant.

We have seen cases of what we think is Pemphigus (no diagnosis by Vietnamese doctors); and these show numerous bullae approximately six centimeters in diameter which contain pus and on microscopic examination saturation with staphylococcus aureus. These cases clear up with Phisohex washes and Penicillin and Streptomycin.

We have had many patients with acute surgical abdomens, which have been diagnosed as probable appendicitis and turn out to be either typhoid perforations with other Peyer's patches obviously about

to rupture or ideopathic multiple perforations of the bowel. All of these patients have a very stormy, progressively downhill, postoperative course.

we have seen cases of leprosy, and of very advanced longstanding fungating malignancies, the like of which one rarely sees in an urban or city hospital.

Due to our proximity to water we also see quite a few young children and adolescents who have drowned. Unfortunately, we are sure, their lives might have been saved had immediate artificial respiration been established.

We have continued to show educational films, and we are pleased to say that the Chief Nurse, Mr. Cao, is having his nurses present some classes. I have managed to get two more nurses for the Operating Room and their training is in progress.

The senior USAID nurse in Vietnam, Miss Perney, came down to Rach Gia to visit the hospital and the nursing staff. She expressed the wish that Miss Corniea complete and submit the monthly report, which she did commencing this month.

I am enclosing copies of the two last reports submitted to Saigon.

Very respectfully,
s/R. W. Beveridge
LCDR, NC, USN

(Partially reproduced.)

NURSING RADIO CONFERENCES

The nurses at the U.S. Naval Hospital, Oakland, California are participating, with nurses of thirty hospitals in the Oakland Bay Area, in a series of Nursing Radio Conferences.

Topics of immediate concern to the staff nurse are presented each week by the staff of the University of California Medical Center. Twelve one-hour programs enable nurses throughout Northern and Central California to keep up with the latest developments in professional nursing practice. Dynamic question and answer sessions, by the participating members, during each broadcast stimulate intercommunication among nurses in a variety of clinical settings. The theme of the series is "Nursing—Today and Tomorrow."

Certificates of attendance (twelve hours of university instruction) are limited to those meeting with participating groups, although all nurses who are able to receive stations KPFA and KXQR are cordially invited to listen to the broadcasts.

PREVENTIVE MEDICINE SECTION

MENINGOCOCCAL INFECTION—1966

USDHEW PHS CDC, Morb & Mort Wk Rpt 15(32): 274 & 280, Aug 13, 1966.

Through the 32nd week of 1966 a total of 2,569 cases of meningococcal infection has been reported to the Communicable Disease Center, Atlanta, Georgia, an increase of 17.2% over the 2,192 cases notified during the comparable period in 1965.

The weekly totals for meningococcal infections during the months March through June 1966 were substantially above the 1965 level. Table 1 indicates that all regions of the country except the New England, Middle Atlantic and South Atlantic Divisions contributed to this spring increase. Of the

total number of cases reported thus far in 1966, 10.3% have occurred among military personnel compared to 8.2% during the similar period in 1965.

The trend toward increasing sulfonamide resistance is clearly evident. In 1964, 64% of strains were inhibited at that level during the first 6 months of 1966. Similarly, in 1964 only 8% of strains required 10.0% or more of sulfadiazine for inhibition, while during the first half of 1966 about 35% of strains were resistant to this high degree.

TABLE 1: MENINGOCOCCAL INFECTIONS—UNITED STATES TOTAL CASES REPORTED TO CDC 1ST THROUGH 32ND WEEK, 1965 AND 1966

	1966	1965	Percent Increase
United States	2,569	2,192	17.2
New England	113	111	1.8
Middle Atlantic	303	289	4.8
East North Central	398	299	33.1
West North Central	140	110	27.3
South Atlantic	433	423	2.4
East South Central	223	170	31.2
West South Central	363	301	20.6
Mountain	80	68	17.6
Pacific	516	421	22.6

FOOD SANITATION TRAINING PROGRAM

SECNAV Instruction 4061.1A, subject: "Food Sanitation Program" of 25 May 1966 has been distributed to the field. This instruction cancels and supersedes SECNAV Instruction 4061.1. The major change in the current instruction is a reduction in the number of hours required for initial food sanitation training and defines those who shall receive this training and those who may conduct the training program. This instruction also requires that NAVMED 4061/1 (formerly NAVMED 1348) food sanitation training certificates be issued to all civilian and military personnel upon completion of training programs. Refresher training can be recorded on

the reverse side of these certificates. These certificates shall be in the possession of food service personnel or in the custody of their supervisors and shall be verified at periodic intervals by supervisory personnel and by medical department representatives on routine sanitation inspections.

Outbreaks of food-borne illness in Navy and Marine Corps' general messes, both ashore and afloat, have increased during the past several years. Only through the administration of a vigorous and effective Food Service Training Program can these outbreaks be prevented. All commands are urged to give this instruction their utmost attention.
—Sanitation Section, PrevMed Div, BuMed.

THE VENDING OF FOOD AND BEVERAGES

Supplement 1 to Chapter 1 of the *Manual of Naval Preventive Medicine* entitled "The Vending of Food and Beverages," NAVMED P-5010-1, Supplement 1, has been distributed to the field. BUMED Instruction 6240.4 (Vending of foods and beverages; minimum sanitary requirements) is canceled. In view of the new technology and methodology which accompanied the recent growth in the vending industry, it was considered appropriate to issue this supplemental information.

Because of the public health significance of the problems involved, the Bureau of Medicine and Surgery participated in the establishment of a program for the identification of vending machines constructed in compliance with established standards. Medical officers or their representatives are reminded that they are responsible for establishing sanitary standards for the operation and maintenance of automatic food and beverage dispensing at naval stations and ships. This Supplement provides guidance on this subject.

The Supplement is stocked for issue through the Forms and Publications Segment of the Navy Supply System and any additional needed copies should be procured therefrom.—Sanitation Section, PrevMed Div, BuMed.

CHLORINATION OF POTABLE WATER AT SEA

Article 58-27 in the *BUSHIPS TECHNICAL MANUAL* has been misinterpreted by the Forces

afloat to mean that sea water distilled aboard ship is bacteriologically safe for human consumption when the chloride content is 0.065 equivalents per million or less. The chloride content does not indicate levels of bacteriological contamination or elimination of bacteria by the distillation process. In order to assure a safe potable water supply in the distribution system, a program of adequate chlorination and routine bacteriological analyses must be followed as prescribed in Chapter 6, "Water Supply Afloat" of the *MANUAL OF NAVAL PREVENTIVE MEDICINE NAVMED P-5010-6*.

The chloride tests aboard ship have an important role as indicators in determining the proper operation of the distillation apparatus. High chloride levels indicate a distillation system which is operated or functioning improperly. The probability of pathogenic organisms being carried over during the evaporation process due to an improperly operating distillation system increases greatly as the chloride content is raised above the specified limits. In addition, the chloride content in potable water should not be misinterpreted to mean free chlorine residual. The chloride content indicates the amount of salts remaining in the water after distillation; whereas, the free chlorine residual is the amount of available chlorine in the water after disinfection which provides protection for the potable water in the distribution system in case of sanitary defects or accidents which create a health hazard.—Sanitation Section, PrevMed Div, BuMed.

KNOW YOUR WORLD

DID YOU KNOW?

That the Chronic Respiratory Diseases Branch, Public Health Service and the National Tuberculosis Association are co-sponsoring a Task Force on Emphysema and Chronic Bronchitis?

Objectives are: to review what is known about chronic bronchitis and emphysema and evaluate the degree to which that knowledge is being applied in the prevention and treatment of these diseases; to identify the optimum types of facilities and services required for diagnosis treatment and rehabilitation; to determine the feasibility of prevention programs; and to compile and publish specific guidelines for comprehensive programs aimed at prevention and control. Twenty-five experts from clinical medicine, research, epidemiology, the behavioral sciences, public health and nursing comprise the Task Force.

Sponsoring agencies will each have 10 representatives attending meetings.¹

That only 109 cases of measles were reported in Paterson, New Jersey (population 147,400) in 1965?

This was the smallest total in recent years and far below the average of 1,084 cases per year reported for 1960 through 1964.²

That the World Health Organization declared Cambodia free of cholera on 16 September 1966?

The last case occurred on 26 August 1966. From 4 May to 26 August 1966, there were 62 cases with 5 deaths from the Provinces of Kandal; Kompong-speu; Takéo and Kompong-Cham.³

That of the 51,000 cases of cholera reported for the world in 1965, nearly 44,000 cases occurred from Afghanistan, Burma, India, Nepal and Thailand?

For Afghanistan and Nepal, this was the first time that cholera had been reported since 1960 and 1961.⁴

That the 19th Session of the WHO Regional Committee for South East Asia announced their Government's intentions for national campaigns for the eradication of smallpox?

The national campaigns in Southeast Asia will form part of a global 10-year smallpox eradication program to be launched in 1967 by WHO. In the first year, 220 million people are expected to be vaccinated. Additional international funds will be made available to assist smallpox endemic countries.⁵

That from 12 May through 26 May 1964, 507 cases of typhoid occurred in Aberdeen, Scotland, from 309 households in the city and 33 in the surrounding districts, with three deaths?

All but 4 were treated in hospital; the diagnosis was confirmed bacteriologically in 403 and clinically in 66 cases; 38 cases were unconfirmed. This outbreak occurred in one wave without secondary cases, and it was the largest epidemic in Britain since 1957.⁶

That the Government of Ethiopia has informed WHO that studies made since 1961 indicate the highlands are, above an altitude of 2,000 meters (approximately 6,600 feet), a "non-receptive" region for yellow fever, due to the absence of vectors above that altitude?

Based on this evidence and in accordance with the provisions of Article 70, para 2 (unamended) of the International Sanitary Regulations of the WHO, Addis Ababa and an area of 20 kilometers in radius from the center of the city (including the international airport of Addis Ababa) have ceased to form part of the yellow-fever endemic zone in Africa.⁷

That smallpox outbreaks occurred in 42 countries in 1965, with 50,557 cases and 9,735 deaths?

Asia had about 33,145 cases mainly in India, Indonesia, and Pakistan; Africa reported 15,882 cases; and South America 1,529, nearly all in Brazil.⁸

That new mass poliomyelitis vaccination programs are not justified epidemiologically and immunologically in Costa Rica?

A random sample of 136 children under 8 years of age residing in suburbs of San Jose, Costa Rica, was investigated as to the immunity status of pre- and post-vaccinal sera for all 3 types of poliomyelitis virus. Results showed that in the population sample examined there was a high degree of immunity (98%) to these agents before vaccination. About 14% of the children were sero-negative to 1 or more types of poliomyelitis virus, and 75% of them acquired complete immunity on vaccination.⁹

That President Johnson, on 27 July 1966, signed into law H.R. 14888, 89th Congress, which will allow the United States to join the Republic of Mexico in a program to eradicate the screw-worm from North America?

The screw-worm, a major livestock pest, maims and kills by infesting wounds on warm-blooded animals. While control of this pest is known, the intent is to break the reproductive cycle of the screw-worm fly. By a cooperative program of Federal and State governments and the livestock industry, the U.S. has been almost freed of established populations of the insect. However, nearly \$5 million a year are spent by U.S. to maintain an artificial barrier of 2,000 miles, from the Gulf of Mexico to the Pacific Ocean, and even this does not rid Mexico of the screw-worm problem.¹⁰

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EDITOR'S SECTION

MEDICAL DEPARTMENT OFFICER CORRESPONDENCE COURSE

The Medical Department Correspondence Course "Control of Communicable Diseases in Man," NavPers 10772-A1, is now ready for distribution to eligible regular and reserve officer and enlisted personnel of the Armed Forces. The course is based on the text, "Control of Communicable Diseases in Man," 10th edition, 1965, published by the American Public Health Association. Applications for the course should be submitted on Form 992 (with appropriate change in the "To" line), and forwarded via appropriate official channels to the Commanding Officer, U.S. Naval Medical School, National Naval Medical Center, Bethesda, Maryland 20014.

This objective-question course is designed to acquaint the enrollee with information relative to control of disease. Each disease is discussed in detail and information provided on clinical and laboratory findings, etiological agent, source of infection, mode of transmission, incubation period, the period of communicability, susceptibility and resistance, and prevalence of the disease. Through additional text material, information concerning the control of venereal disease is included as part of the course.

The course consists of seven (7) assignments, to be submitted on a schedule of at least one per month. For retirement purposes, Naval Reserve personnel will be credited with twelve (12) points subsequent to satisfactory completion of the course; these points are creditable only to personnel eligible to receive them under current directives governing retirement of Naval Reserve personnel. This is a minor revision and personnel who have completed NavPers 10772-A will NOT receive additional point credit for completing this course.—CO, NNMC, Bethesda, Md.

RESIDENCY IN FORENSIC PATHOLOGY

A one year residency in forensic pathology, approved by the American Board of Pathology and the Council on Medical Education of the American Medical Association, is available at the Armed Forces Institute of Pathology. There is a need for

qualified pathologists in this special field, not only in military hospitals, but also in histopathology centers, residency training centers, and other assignments related to military medicine.

The residency in forensic pathology is designed to provide the training and experience required for medicolegal evaluation of violent or unexpected deaths, identification of unknown human remains, investigation of aircraft accidents, supervision and interpretation of toxicologic analyses, participation in criminal investigations, and testimony in court. The residency is supervised by the Chief, Forensic Pathology Branch, Armed Forces Institute of Pathology, and it is affiliated with the Office of the Chief Medical Examiner, State of Maryland. Successful completion of the residency enables the pathologist to apply for the examination in the special field of forensic pathology conducted by the American Board of Pathology.

The residency is available to regular medical officers of the Army, Navy, or Air Force who are either diplomates of the American Board of Pathology in anatomic and clinical pathology, or eligible to take these examinations.

The program includes association with several organizations: (1) Affiliation with the Office of the Chief Medical Examiner, State of Maryland, for supervised training and experience in medicolegal autopsies and on the scene investigations. (2) Affiliation with the Division of Physical Anthropology, Smithsonian Institution, for training in the identification of human skeletal remains. (3) Affiliation with the Federal Bureau of Investigation Laboratory for familiarization with criminalistic techniques, including toxicology, serology, firearms examinations, hair and fiber identification, spectrography, document examination, and fingerprint identification. (4) Participation in the consultation, education, and research activities of the Forensic Pathology and Wound Ballistics Pathology Branches, AFIP, including familiarization with the investigative services of the Armed Forces, affiliation with the Registry of Tissue Reactions to Drugs, and review of cases in the Registry of Forensic Pathology. (5) Affiliation with the Toxicology Branch, AFIP, for training in toxicologic methods, experience with special instruments, and interpretation of analyses. (6) Affiliation with

the Aerospace Pathology Branch, AFIP, not only for participation in aircraft accident investigations and autopsies, but also in the research activities with the altitude chamber. (7) Affiliation with the Legal Medicine Section of the Forensic Pathology Branch for training in the legal aspects of medicine and the use of a law library. (8) Affiliation with the Accident Pathology Branch, AFIP, to study the affects of trauma on the human body and experimental animals. (9) Participation in the advanced course of instruction at the Federal Bureau of Narcotics Training School.

Military pathologists who desire further information concerning the residency in forensic pathology should address inquiries to The Director, AFIP, Washington, D. C. 20305.

MUSIC FOR NAVAL HOSPITAL, YOKOSUKA

Through the combined efforts of Mr. and Mrs. Charles Lyon, Tokyo, Japan; the Master Builders Company, Cleveland, Ohio; and Nisso Master Builders Company, Ltd., Tokyo, Japan, a complete tape recording system with amplifiers, AM-FM tuner, microphones and speakers was donated for use in all ward and clinic spaces in the Naval Hospital at Yokosuka, Japan.

Prior to the receipt of these items of equipment, there was already in existence on all wards a music system at the patients' bedside which permitted them to listen to either the Far East Network, AFRS station in Tokyo, or tape recorded music from the COM, Fleet Activities, Yokosuka. Since receiving this donation, it has been possible to provide background music for all clinics as well as the ward head sets, permitting patients on the wards a choice of the Far East Network, AFRS, or tape deck, as well as providing Sunday Worship Service from the Chapel and special entertainment from the temporary auditorium.—Public Affairs Office, BuMed, Washington, D.C.

U.S. NAVY AND MARINE CORPS TEAM DEDICATE FIELD HOSPITAL

A \$30,000 field hospital was recently dedicated "to the health and comfort of all for whom it is called upon to serve" at the Marine Aircraft Group (MAG)-12 area in Vietnam.

Designed and planned by a Navy hospital corpsman from Yuma, Ariz., the new hospital is already being tagged as the "finest field dispensary" in Vietnam.

For designer Petty Officer First Class Gerald D. Angelle, USN, it's "a dream turned into reality."

Marine Colonel Jay W. Hubbard, commanding officer of MAG-12, has already recommended the figure-eight shaped hospital be used as a model for other field hospitals in the future.

Construction of the dispensary was by SeaBees of Mobile Construction Battalion (MCB)-3, under supervision of Builder Second Class W. M. Hosking. The complex was dedicated with special appreciation to its enlisted designer and construction foreman.

The new hospital turns medical facilities of MAG-12 from a scattered ten, wooden-floored, poorly-lighted group of structures into a concrete-floored, air-conditioned, fluorescent-lighted building with indoor waiting rooms.

The new dispensary can handle 20 patients compared to the old hospital capacity of six.

In addition, it includes an improved facility for eye testing, and two state-side dental chairs in the new air-conditioned dental office.—NavNews, Navy Department, Washington, D.C.

Among those who died as a result of the fire in the Oriskany CVA-34 26 October 1966 were CDR Richard E. Donahue MC USNR and LT Lloyd P. Hyde MC USNR. CDR Donahue's wife, Nancy Jane resides at 511 South 12th Street, Centerville, Iowa and LT Hyde's wife, Patricia E., at 173 West Prima Vista, Point St. Lucie, Fort Pierce, Florida.

MEDICAL SERVICE CORPS OFFICERS ACADEMIC ACHIEVEMENT

The continuing efforts of MSC officers in pursuing their educational program is most encouraging.

The following named officers have recently received their degree as indicated:

<i>Name</i>	<i>Duty Station</i>	<i>Degree</i>	<i>Institution</i>
CDR Melba A. Grafius	NMRI	Ph.D. (Biochemistry)	The George Washington Univ. (GWU)
LCDR Samuel H. Barboo, Jr.	BUMED	Ph.D. (Public Health)	UCLA

<i>Name</i>	<i>Duty Station</i>	<i>Degree</i>	<i>Institution</i>
LCDR Joan M. Beckwith	NH, San Diego	MS (Education)	San Diego College for Women
LCDR Robert M. Gertz	NDS, NTC, San Diego	MS (Education)	Temple Univ.
LCDR James H. Herrin	HCS, San Diego	MS (Nav. Mgmt.)	PGS, Monterey
LCDR Russel H. Oleson	USNH, Camp Lejeune	MS (Nav. Mgmt.)	PGS, Monterey
LCDR Stanley C. Peake	CINCLANT	BA (Social Sc.)	GWU
LCDR R. L. White	BUMED	MS (Fin. Mgmt.)	GWU
LT William J. Auton	NTC, Great Lakes	MA (Education)	Roosevelt Univ.
LT Albion P. Chipman	NH, Quantico	BA, (Hotel, Rest. and Inst. Mgmt.)	Michigan State
LT Gerald G. Comfort	NDW (DUINS GWU)	BA (Social Sc.)	GWU
LT Adolph R. Dasler	NMRI	Ph.D. (Physiology)	Michigan State
LT David W. Fishel	PrevMed Unit 6, Pearl Harbor	BA (Env. Hlth.)	San Jose Univ.
LT Robert A. Johnson	BUMED	BA (Social Sc.)	GWU
LT Malcom K. Law	NDC, Wash. Navy Yard	BBA	GWU
LTJG Austin E. Piatt	Hdqtrs, 1st N.D.	BS, (Business Admin.)	Roosevelt Univ.

While some of the above officers were assigned to full-time duty under instruction during fiscal year 1966, the majority of these officers completed their degree programs on a part-time, off-duty basis. There are approximately 180 officers currently enrolled in part-time, off-duty courses. A large number of officers were required to interrupt their educational program this summer due to assignment to sea/overseas operating billets; thus proportionately reducing the participants in this type of training.

There are 84 MSC officers currently assigned to full-time duty under instruction in various in-service and out-service academic programs.—MSC, Div, BuMed.

CHEMICAL, BIOLOGICAL AND RADIOLOGICAL WEAPONS ORIENTATION COURSE

Fourteen classes of the Chemical, Biological, Radiological Weapons Orientation Course will be conducted at the U.S. Army Chemical Corps Proving Ground, Dugway Proving Ground, Dugway, Utah, by the Department of the Army during the remainder of fiscal year 1967. The duration of the course is three and one-half days.

Officers of the rank of Commander or above are

eligible to attend. Civilians in the grade of GS-13 or higher must be in a key position where need-to-know is mandatory. Persons who have received complete CBR briefings during the past year should consider delaying their attendance. TOP SECRET security clearance is required. Limited quotas will be provided the Bureau of Medicine and Surgery by the Chief of Naval Personnel on a "first come first served basis." Requests should be forwarded in accordance with BUMEDINST 1520.8.

The course provides a high level orientation on Chemical and Biological Warfare, and Radiological Implications of Nuclear Warfare, and is designed to acquaint senior military and civilian personnel of the Armed Forces with United States doctrine, policy techniques and capabilities in CBR Warfare.

Convening Dates of Courses

12 December	1966	17 April	1967
27 February	1967	24 April	1967
6 March	1967	8 May	1967
13 March	1967	15 May	1967
27 March	1967	22 May	1967
3 April	1967	5 June	1967
10 April	1967	12 June	1967

—Training Branch, BuMed.

IMPORTANT NOTICE

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—Editor

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