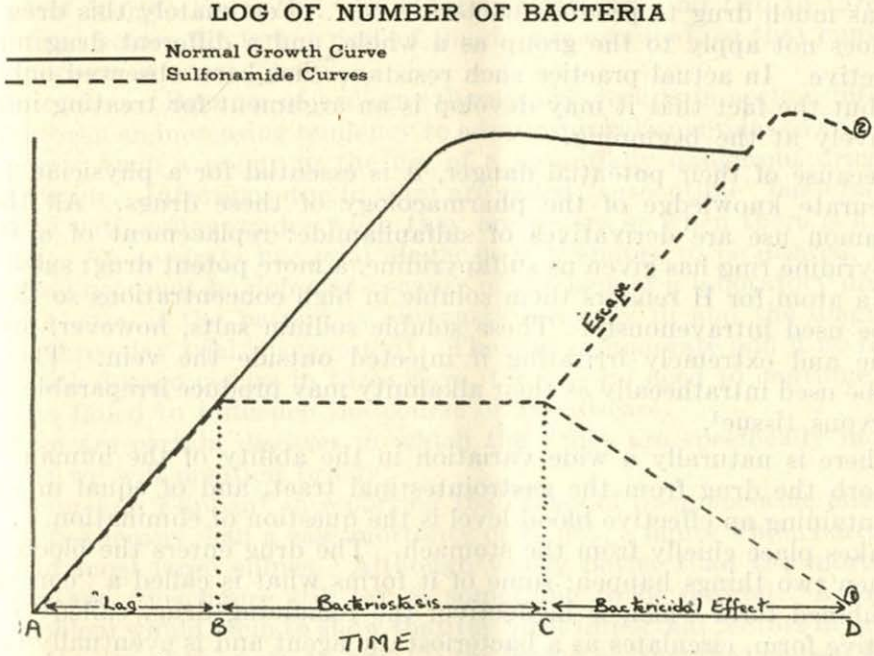
The Use of Sulfonamides in General Medicine

SURGEON LIEUTENANT-COMMANDER J. W. GRAHAM
Royal Canadian Naval Hospital, Halifax

ABOUT seven and a half years ago a new drug "Prontosil" was proved to be effective against haemolytic streptococcal infection in mice. In Canada few of us were aware of this discovery until a paper by Colebrook and Kenny in the *Lancet* of June 6, 1936, first aroused the interest of the English-speaking world in the subject of bacterial chemotherapy. The advent of sulfonamides marked the beginning of a new era in medicine, a story which is gradually unfolding as scientists keep adding to our ever increasing knowledge.

The widespread use of these drugs is well indicated by the fact that in 1941 there was produced in America 750,000 lbs. of sulfapyridine; 1,200,000 lbs. of sulfanilamide; and 1,500,000 lbs. of sulfathiazole, so that an estimated 10 to 15 million people received sulfonamide therapy in one year. In the treatment of these millions much has been learned about the usefulness and limitations of these drugs, and this paper is an attempt to summarize some of the recent literature and to add a few of our findings in the treatment of a varied group of patients in the Naval Service in Halifax.

The intelligent use of sulfonamide drugs requires an understanding of their mode of action. There is now evidence to show that they act on bacteria to delay or inhibit their multiplication. The drug apparently enters the germ, interferes with the essential enzyme system and the bacteria cease to grow.



Schematic Representation of Normal Growth Curve of a Micro-Organism and Its Growth Curve in the Same Medium Containing an Effective Concentration of a Sulfonamide Drug.

*Presented at the Annual Meeting of The Medical Society of Nova Scotia, Kentville, N. S., July 8, 1943.

Sulfonamides do not aid in the localization of infection or in the production of antibodies. The normal body defences must still localize and destroy the bacteria. This important basic principle has been well shown by Janeway[1] in a chart depicting the growth curves of bacteria in vitro.

At first, in the period A-B, growth takes place at the normal rate. This is known as the "Lag" phase and corresponds to the clinical observation that there is a period of several hours after chemotherapy is begun before a therapeutic effect is noticeable.

At B some change occurs and from B-C is the period of "Bacteriostasis." At this point the body defences should take over and in the period C-D the population of bacteria should fall as in Curve (1). Under other conditions the events depicted by Curve (2) may occur and there is a phase of "Escape." Two mechanisms may make the "Escape" possible. Enough organisms may autolyse to liberate sufficient inhibitor substance to overcome the sulfonamide effect or drug-resistant organisms may develop capable of growing in the presence of the drug.

These substances which are capable of inhibiting the bacteriostatic effect of sulfonamides are found in pus and other tissue break-down products. Their presence explains the marked difference in the therapeutic response between rapidly spreading infections such as pneumonia, and localized purulent conditions such as empyema, where the drug is of no value.

The drug resistance just mentioned as a possible cause of "Escape" is also important. Some bacteria have a natural resistance to sulfonamides; others acquire resistance if exposed to ineffective doses. Bacteria exposed to gradually increasing doses of sulfonamides may subsequently require ten times as much drug to produce bacteriostasis[2]. Fortunately this drug resistance does not apply to the group as a whole, and a different drug may still be effective. In actual practice such resistance has been observed only a few times but the fact that it may develop is an argument for treating infections intensively at the beginning.

Because of their potential danger, it is essential for a physician to have an accurate knowledge of the pharmacology of these drugs. All the ones in common use are derivatives of sulfanilamide: replacement of a H atom by a pyridine ring has given us sulfapyridine, a more potent drug; substitution of a Na atom for H renders them soluble in high concentrations so that they may be used intravenously. These soluble sodium salts, however, are quite alkaline and extremely irritating if injected outside the vein. They must never be used intrathecally as their alkalinity may produce irreparable damage to nervous tissue[1].

There is naturally a wide variation in the ability of the human subject to absorb the drug from the gastrointestinal tract, and of equal importance in maintaining an effective blood level is the question of elimination. Absorption takes place chiefly from the stomach. The drug enters the blood stream and then two things happen: some of it forms what is called a "conjugated" or combined form which is ineffective; the remaining drug, called "free" or the active form, circulates as a bacteriostatic agent and is eventually excreted by the kidney. The balance between absorption, conjugation and elimination will obviously give us the effective blood level.

TABLE I

Characteristics of Sulfonamide Drugs

Drug	Rate of Absorption	Degree of Conjugation	Rate of Free	Excretion Conjugated	Desired Blood Level Mg. per 100 cc.
Sulfanilamide..	Rapid	Usually about 1/3	Rapid	Fairly rapid (soluble)	8-15
Sulfapyridine...	Irregular	Usually high	Moderately rapid	Slow (moderately insoluble)	5-10
Sulfathiazole...	Rapid	Usually less than 1/3	Very rapid	Rapid (very soluble)	3- 7
Sulfadiazene...	Fairly slow	Usually less than 1/3	Slow	Moderately slow (soluble)	8-15

It will be noted that sulfanilamide and sulfathiazole are rapidly absorbed. A peak concentration is sometimes reached within an hour. Elimination is also rapid: in six to eight hours the level falls considerably, and in 24 hours is almost complete.

With pyridine and diazene, on the other hand, absorption goes on over a period of four to six hours. Elimination is slower, and two to three days are required before the larger part of the dose is excreted, so that cumulation to toxic levels is more likely.

Indications. Because of brilliant therapeutic results in certain infections, there has been an increasing tendency to administer sulfonamides to any patient with fever. Such a policy in the use of a potentially dangerous drug is not good medicine. Infections due to what are called "susceptible" bacteria should be treated with sulfonamides when they are severe or when there is a danger of spread. An accurate bacterial diagnosis is therefore to be desired, but use of the drug need not be deferred because of the lack of a laboratory diagnosis. In such a case, if the patient is obviously seriously ill and the diagnosis in doubt, a three day trial is suggested[3]. The risk is moderate and if no response to adequate dosage occurs in three days, there is no need to continue a drug which has failed to influence the course of the disease.

There are certain diseases in which the drugs are specifically indicated, and these we will mention briefly:

Pneumonia: Flippen[4], in reporting 1635 cases of pneumococcic pneumonia under sulfa-therapy, had a case mortality of 10.6%, a figure which corresponds to that of most large clinics. Although vastly better than the mortality of ten years ago, this figure still leaves something to be desired. An analysis of the problem would seem to show that the most important factors in prognosis are—(1) the age of the patient, and (2) the length of time that elapses between the onset of the infection and the beginning of sulfa-therapy. A definite increase in mortality and complications was found in those in which chemotherapy was started after 48 hours of illness. The best results with sulf-

onamide drugs are obtained when they are administered **early** in an infection while the number of bacteria is still limited and tissue involvement at a minimum.

In general, sulfathiazole and sulfadiazine are somewhat more potent than pyridine in the treatment of pneumonia, but as judged by mortality rates, duration of treatment and length of stay in hospital, there is little to choose between them except for toxic phenomena which will be considered later.

If the patient has had a previous toxic reaction, use a different drug, but not sulfanilamide as it is relatively ineffective in the treatment of pneumonia. In general, our policy has been to give:

First day—4 tablets every 4 hours for six doses; in a severe case an extra dose of 4 tablets is given two hours after the first dose.

Second day—2 or 3 tablets every 4 hours for six doses, depending on the severity.

Third day—2 tablets every 4 hours for six doses; remaining dosage depending on the course of the disease.

In 90% of cases the temperature, pulse and respiration drops to normal in 36 hours, and if the drug is continued for a further 48 hours, this will usually suffice to eradicate the infection.

Should pneumococcic serum be used in addition to the drug? There would appear to be no basis for the routine use of serum in addion to the drug in the treatment of pneumococcal pneumonia. In a proven case, however, the use of serum is indicated in cases of severe toxic reaction where the drug must be discontinued and if no response to the drug occurs in 36 to 48 hours.

Cerebrospinal fever, or meningococcal meningitis, responds even more dramatically, and in other types of meningitis due to susceptible organisms such as streptococcus and pneumococcus, the results of sulfa-therapy are amazingly good.

There seems to be some doubt concerning the use of sulfathiazole in any form of meningitis, because thiazole traverses membranes less readily and therefore gives rise to much lower concentration in the spinal fluid than the other drugs.' Sulfapyridine is very effective, but, because treatment must often be continued for ten days or more, sulfadiazine is probably best.

In general, the two essentials in the treatment of meningitis by chemotherapy are early administration of the drug and adequate dosage. Directly a clinical diagnosis is made sulfonamide therapy should be given without waiting for bacterial confirmation. In cases where there has been a delay in recognizing the condition, the first dose should be given by the intravenous or intramuscular route. If the patient is unconscious, this parenteral route should be continued. In fulminating cases an intravenous and intramuscular injection should be given simultaneously as the first dose, giving one gram by each route. Subsequent doses must be judged by the patient's condition and the blood levels obtained. The spinal fluid findings are the most reliable index of recovery, and if the polymorphs have gone, the infection has been overcome and the drug may be gradually discontinued.

During the past two years interest has developed in the possibility of sterilizing the bowel by the local action of sulfonamides. For this purpose it was necessary to secure a potent soluble sulfonamide, the action of which would be largely confined to the gastrointestinal tract. Up to the present time complete sterilization of the bowel has not been achieved, but interesting advances have taken place. The drugs used are sulfaguanidine and succinyl. sulfathiazole, better known as sulfa-suxidine.

Lieut. J. C. Scott, U. S. Navy, reporting in the J.A.M.A. recently[5], describes the prophylactic use of sulfaguanidine in bacillary dysentery. A rapidly progressing epidemic of bacillary dysentery was stopped abruptly by the prophylactic use of sulfaguanidine in all "well" personnel in the building. The dosage was only one tablet t.i.d. Used therapeutically with a slightly higher dosage the drug was dramatically successful also in the active cases. The same author points out the danger of using the drug in intestinal lesions with ulceration, where absorption can easily take place. All serious reactions which have been reported in the literature have occurred in patients with intestinal ulceration.

It is perhaps a little too early as yet to rightly evaluate these findings, but limited experience suggests that these drugs may prove of some importance in intestinal surgery and in the treatment of intestinal infections.

And now we come to a group of infections in which the use of sulfonamides is somewhat questionable, a group in which as yet it is difficult to be dogmatic.

Scarlet fever. Wesselhoeft's report on the use of sulfonamides in scarlatinal infections of the upper respiratory tract is frankly disappointing.[6] In 1239 cases compared with 1220 controls, the drug failed to benefit in any way the eruptive stage. The fever was not lowered, nor shortened; there was no improvement noted in the rash or sore throat, and no reduction in complications. In 54 cases of otitis media following scarlet fever, he found that the duration of the discharge and the incidence of mastoid infection requiring surgery was not reduced below the average. Benn[7], on the other hand, showed a moderate reduction, and Sako[8] of Minneapolis showed a marked reduction in the incidence of complications.

In our own series of 157 cases of scarlet fever, given routine doses of sulfathiazole, the incidence of otitis media and suppurative adenitis was reported by Surgeon Lieutenant R. A. Smith as less than the average number.

The use of sulfonamides in reducing the incidence of complications from scarlet fever istherefore in doubt—**but** following the **onset** of serious complications their value is not questioned. In scarlet fever the majority of deaths to-day are due to the end results of pyogenic infection, particularly in the mastoid cells, from which the blood stream and meninges may become involved. In these two serious complications, bacteraemia and meningitis, the death rate has been markedly reduced.

Acute follicular tonsillitis. Surgeon Lieutenant J. D. Fitzgerald has recently studied162 cases of relatively uncomplicated acute follicular tonsillitis admitted to R.C.N.H. during the past winter. This series of patients was divided into three groups.

The drug was never withheld if it was felt that the patient might benefit, so obviously Group I contains the majority of the serious cases. In spite of this preponderance of serious cases in Group I, we note that the period of

TABLE II

Acute Follicular Tonsillitis in R.C.N.H.

	Days in Hospital	Days of Fever
Group I. Received sulfathiazole on admission, plus irrigations, A.P.C.'s, etc.	6.2	2.1
Group II. Received sulfathiazole after no improvement with conservative treatment.	8.8	3.6
Group III. No sulfonamides. Irrigations, A.P.C.'s, etc.	6.7	2.8

hospitalization was almost exactly the same as Group III, which contains the majority of those not severely ill. In Group II the hospitalization was 8.8 days, which might reasonably be attributed to the fact that treatment with the drug was begun too late. This figure might have been lower if the drug had been started on admission rather than waiting to see which direction the clinical course of the patient would take with conservative therapy.

A similar situation is found in regard to the days of fever. We have been impressed by the precipitous drop in temperature on receiving the drug.

After reviewing these 162 cases, therefore, certain points seem to be clear. Sulfa-therapy can advisedly be withheld in **mild** cases of tonsillitis. Sulfonamides have little effect against organisms like the haemolytic streptococcus when the inflammatory process is indolent. In severe follicular tonsillitis, on the other hand, the days of hospitalization and duration of fever are definitely reduced by sulfonamide therapy.

Nephritis. It is now generally recognized that infections by haemolytic streptococci precede with great frequency the onset of acute glomerular nephritis, and predispose to a progression of the disease.

Williams, Longcope and Janeway report an interesting series treated by sulfanilamide with controls[9]. The patients received from 6 to 8 tablets daily for an average of 17 days. There were no serious complications.

TABLE III

NEPHRITIS

Clinical Outcome of Patients Followed for Two Years or Longer

	Patients Receiving Sulfanilamide	108 Controls
Well	74.4%	52.0%
Latent	18.0%	10.1%
Progressive	5.0%	22.2%
Dead	2.6%	15.7%

(After Williams et al)

Patients receiving the drug on the whole showed more rapid improvement than 108 almost identical controls. There was a reduction of haemolytic streptococci in the throat and albumin cells and casts disappeared more quickly from the urine. Most important, however,—the incidence of recovery was greater and the number of patients pursuing a progressive course distinctly less. There was no evidence that the drug caused renal damage. Janeway[3], on the other hand, is a little more conservative, and feels that the main virtue of sulfanilamide in nephritis is to reduce the number of bacteria and to make possible the early extirpation of a focus without producing a flare-up.

Subacute bacterial endocarditis. When sulfonamides first appeared great hope was held that the mortality from this almost invariably fatal disease might be reduced. Evaluation of drug treatment, however, is difficult.

Doctor George F. Dick[10] reports a cure after giving 40 gms. of sodium sulfadiazine intravenously in one dose. Another case[11], however, received 1242 tablets over a period of six months and went on to die. In general the results are not encouraging and the effect temporary. The temperature falls, the blood becomes sterile, but death eventually ensues. It has been shown that the drug cannot penetrate a blood clot, and we must presume a difficulty in penetrating the fibrin network on the valves in subacute bacterial endocarditis.[2] At best all we can expect is that an occasional patient will survive.

Rheumatic fever. It is generally accepted that the use of sulfonamides is contra-indicated in the treatment of **active** cases of rheumatic fever.[12] Toxic symptoms of increased fever, tachycardia and rash, are almost universal. The tendency of the rheumatic process to recur, however, is a characteristic recognized by all students of the disease. These recurrences appear to result from streptococcal infections in the upper respiratory tract, so it seemed reasonable that the prevention of such infections might prevent rheumatic recrudescences.

Coburn and Moore[13] studied this problem, examining rheumatic patients twice a month for three years. The patients were given six tablets of sulfanilamide a day, and blood levels were maintained at 4 or 5 mgms. Only one in 184 subjects developed a fresh attack of rheumatic fever, the incidence being less than 1%. In 129 controls the incidence was 20%.

Thomas and France[12] reported a similar series and had no attacks in those receiving the drug, and 15 major attacks with four deaths in the controls. They noted, however, that sulfonamides administered **after** the onset of streptococcal throat did not prevent rheumatic recrudescences. Stowell and Button[14], on the other hand, following the death of one patient from the drug, felt that it should not be used in ambulatory rheumatic patients. Unfortunately Coburn and Moore, in a follow-up of their patients whom they felt escaped streptococcal infection and rheumatic activity while receiving the drug from 1936 to 1939, found they were still susceptible when the drug was discontinued in 1940. They were forced to conclude that the absence of attacks was due to the drug and not to a change in susceptibility. There was no beneficial effect beyond the period of treatment.

Contra-indications. The use of sulfonamides in many and varied diseases has brought to light several conditions in which their use appears to be contra-indicated.

During the past few months the literature has b.en crowded with reports on a disease known under many titles—virus pneumonia, atypical pneumonia, pneumonitis, and so on. During the past winter we saw 112 clear-cut cases of this condition at R.C.N.H., and these were analysed by Surgeon Lieutenant Frank Elliott. On admission there were usually few physical findings—perhaps diminished breath sounds and a few rales at one lung base. The pulse was usually slow; there was seldom dyspnoea or increased respiratory rate or cyanosis. The X-ray usually showed a pulmonary infiltration, most often at one base and the patients were ill quite out of proportion to the physical signs The sputum varied, mucoid, muco-purulent and occasionally blood-streaked. Culture demonstrated a normal flora. The white blood count was almost invariably normal but the sedimentation rate elevated. The fever in some cases was high—104 or 105, and it fell by lysis usually in one to seven days.

These clinical findings are mentioned as the disease may closely resemble pneumococcic pneumonia except for the normal white blood count, absence of rapid respirations, and the fact that these patients appear ill out of proportion to the physical findings. The natural reaction, therefore, is to give sulfonamides in pneumonia dosage, and this was done in 63 of our cases before the diagnosis was established, **but the drug had no effect upon the disease.**

Fortunately complications are few, and I have seen no deaths reported from this strange malady which is probably of virus origin.

The widespread use of small doses of sulfonamides in cases of minor infection such as colds and pharyngitis no longer has any scientific support. No satisfactory proof of value exists, and the danger of cultivating carriers of sulfonamide-resistant bacteria has already been mentioned.

Lieutenant-Colonel Rusk, U. S. Army, has recently reported three comparable and controlled series of patients with respiratory ract infections, one of which was treated with sulfadiazine[15]. In his study of 670 cases with fever and malaise sufficient to warrant hospitalization, there was no significant difference either in the length of the febrile period or in the days in hospital among the group receiving sulfadiazine as compared with the control group receiving symptomatic treatment. There was also no difference in the number that developed pneumonia.

Prior to Colonel Rusk's report we had undertaken a similar study in the R.C.N. Hospital at Halifax. So far 210 cases of upper respiratory infection, pharyngitis and nasopharyngitis or common cold have been studied by Surgeon Lieut. J. Watt. The results are shown in the following table.

TABLE IV

Sulfathiazole in 210 Cases of Upper Respiratory Infection or Common Cold—R.C.N.H.

	Average Days of Fever	Average Days in Hospital	% with Fever over 48 hrs.
A. Received adequate sulfathiazole.....	2.5	8.4	56%
B. Received symptomatic treatment....	2.4	6.8	45%

Although the cases are not strictly comparable, we can find no evidence that sulfathiazole has any effect on the common cold.

In ulcerative colitis the sulfonamides do not significantly alter the course of the disease and attention has already been drawn to the danger of toxic reactions in ulcerative lesions of the intestine.

Haerem[16] in the *Military Surgeon* reports 500 cases of **mumps** receiving sulfonamide therapy. The drug did not shorten the illness, the febrile period or the amount of testicular inflammation present. Orchitis occurred irrespective of the drug in 24% of the series.

Similarly, in 400 cases of **measles**, the sulfonamides did not shorten the illness or the febrile period or clear up the eruption as compared with controls receiving symptomatic treatment.

The incidence of broncho-pneumonia and otitis media, however, is said to be reduced.

Sulfonamides are also of no value in typhoid fever, poliomyelitis, encephalitis, infectious mononucleosis or asthma.

Dosage. The effective dosages and the plans of administration of the sulfonamides in common use for their systemic effects are essentially identical for sulfanilamide, sulfapyridine, sulfathiazole and sulfadiazine. The goal should be a maximum concentration in the blood for a few days rather than a prolonged course of smaller doses. A dosage level which does not produce a marked effect in a few days is not likely to prove more successful over a long period of time.

Apart from sulanilamide, the rate of excretion of these drugs is little influenced by the urinary output. Therefore, in the case of pyridine, thiazole and diazine, fluids may be forced in order to prevent concentration of urine and precipitation of free or conjugated drug in the kidney.

The drug should always be given orally if possible. This insures a slow, steady absorption and a constant level. If the patient cannot swallow tablets, they can be powdered and given in water, milk or fruit juice. If the patient is comatose, the powder in fluid can be given by nasal tube into the stomach. If patients with severe infection the initiall dose should be given intravenously. or intramuscularly to insure an immediate blood level. This route should also be used in patients unable to take the drug orally because of vomiting, and in patients in whom it is difficult to establish a blood level.

If a patient responds promptly to treatment and has no abnormality of renal function, there is no need to determine a blood level. This measure should be carried out if possible, however, (1) If a patient does not respond to therapy in 24 to 36 hours.

(2) When a patient has diminished renal function or incontinence.

(3) When the drug is given parenterally.

In general, therapy should be continued until all evidence of infection has disappeared for at least 48 hours, and in pyogenic infections until localization has occurred and adequate drainage has been established.

On the other hand, haemolytic streptococci are much harder to destroy, and therapy must be continued longer after the temperature has become normal. If there is no response to therapy in 36 hours, one must consider: first, an incorrect diagnosis, as for example, atypical pneumonia; secondly, an inadequate blood level, and thirdly, the presence of pus[3].

Toxic effects. All sulfonamides are potentially dangerous drugs, so far with no exceptions. The toxic effects follow a general pattern for the whole group with some differences between individual compounds.

TABLE V*

Incidence of Common Toxic Symptoms

Drug	Subjective Discomfort	Nausea and Vomiting	Acute Hemolytic Anemia	Mild Anemia	Granulocytopenia %
Sulfanilamide.....	Very frequent	Frequent	Fairly frequent 2-3%	Almost constant	Less than 1
Sulfapyridine.....	Frequent	Very frequent	Rare	Frequent	Less than 1
Sulfathiazole.....	Rare	Frequent	Very rare	Rare	Less than 2
Sulfadiazene.....	Very rare	Rare	Rare	Moderately rare	Less than 1

*(After Janeway)

A change in the blood picture is a fairly common finding. In the case of acute haemolytic anaemia the drug, of course, must be discontinued. Leukopenia or granulocytopenia is not a contra-indication if it exists before drug therapy is begun. In overwhelming infections of streptococci, pneumococci or staphylococci the white blood count may be depressed to levels less than 1000 with almost complete absence of polymorphs, due to depression of the bone marrow. Such a finding is a grave prognostic sign. Therefore intensive therapy is indicated. When a granulocytosis takes place **after** therapy, treatment is very unsatisfactory. Fluids should be forced and large doses of pentnucleotide and crude liver given, but their value is very questionable.

The question of hypersensitivity brings up the problem of repeated courses of sulfonamides. The drugs are now being used so extensively that a physician can always enquire in regard to tolerance. If a patient has had a previous reaction, use a different sulfonamide, and proceed with some caution. If desperately ill, full dosage may be given. Otherwise give a test dose of one or two tablets and if there is no effect in 12 hours, it is probably safe to proceed. Even if a patient has had no reaction during one course, one must be on the alert during the second course. A patient has been known to show severe sensitization six months after a previous short course.

Drug fever. There is no way to be certain when the fever is due to the drug. If accompanied by a rash, swollen glands, joint pains or slow pulse and a normal white blood count, the diagnosis is certain. Unfortunately tachycardia and leucocytosis may occur, suggesting an infective cause. The fever may be low-grade, septic, or high and sustained. It usually begins between the fifth and twelfth day but if the patient has had a previous course, he may develop drug fever a few hours after receiving it for the second time[3].

TABLE VI

Sulfonamides

Drug	Incidence of Hypersensitivity		Tendency to Sensitize	Incidence of Renal Complication	Comment
	Rash	Fever			
Sulfanilamide..	2%	Frequent 10%	Moderate	Very rare	Seldom used because of subjective discomfort; low potency and anemia.
Sulfapyridine...	2%	Fairly frequent 4%	Slight	Hematuria frequent; oliguria occasional	Potent but seldom used because of vomiting and irregular absorption.
Sulfathiazole...	5%	Very frequent 10% or more	Marked	Hematuria occasional oliguria frequent	Potent and well tolerated; apt to cause renal complications and to sensitize causing rash and fever on subsequent administration. Difficult to maintain desired blood level because of rapid excretion.
Sulfadiazene...	2%	Moderately rare 2%	Slight	Hematuria occasional; oliguria rare	Not quite so potent but best tolerated and high blood levels easily achieved because of slow excretion. Treacherous since toxic reactions may occur after cessation of therapy owing to slow excretion.

(After Janeway)

Renal complications. These present the most pressing problems. Oliguria occurs chiefly with intensive treatment. These insoluble drugs precipitate out in the tubules and renal pelvis where the crystals irritate the kidney, giving rise to bleeding and obstructing the production and flow of urine. The presence of gross hematuria or red cells in urine constitute a warning, and the drug is best discontinued. Actually the best precaution against renal complications is to measure the 12-hour output of urine. If it is below 800 cc., fluids should be forced intensively. If the output of fluids in relation to the intake falls off, injury to the kidneys has taken place and may result in anuria.

Crystals of the drug in a routine specimen are of no significance, as these drugs crystallize out at room temperature, but the presence of large numbers of crystals in a freshly voided specimen means that more fluids should be given or less drug[3].

Sodium bicarbonate has been recommended to make the urine alkaline and thus prevent crystal deposition. It is doubtful whether the urine can be rendered sufficiently alkaline to markedly alter the solubility of these compounds[1]. Soda may be given when oliguria or hematuria occurs, but routine administration would not appear to be justified.

BIBLIOGRAPHY

(1) The Sulfonamides—Their Mode of Action and Pharmacology. Janeway, C. A. New England J. Med. 227:989-995, December 24, 1942.

(2) Some recent advances in therapeutics including the Newer Drugs of the Sulfonamide Group. Gold, H. Bull. New York Acad. Med. 19:132-150, February, 1943.

(3) The Sulfonamides—Their Clinical Use. Janeway, C. A. New England J. Med. 227:1029-1044, December 31, 1942.

(4) Modern Treatment of Pneumococcic Pneumonia. Flippen, H. F., Schwartz, L., Domm, A. H. J.A.M.A. 121:230-237, January 23, 1943.

(5) Prophylactic Use of Sulfaquanidine. Scott, Lt. J. C., (M.C.), U.S.N.R. J.A.M.A. 122:588-591, June 26, 1943.

(6) Sulfanilamide in the management of Acute Streptococcal particularly scarlatinal infections of the Upper Respiratory Tract. Wesselhoeft, C. New England J. Med. 224:221-226, February 6, 1941.

(7) Sulphanilamide in the Treatment of Scarlet Fever. Benn, E. C. British Med. J. 2:644-646, 1939.

(8) Sulfanilamide and serum in the treatment and prophylaxis of scarlet fever. Sako, W., Dwan, P. F., Platou, E. S. J.A.M.A. 111:995-987, 1938.

(9) Use of Sulfanilamide in the Treatment of Acute Glomerulo Nephritis. Williams, R. H., Longcope, W. T., Janeway, C. A. American J. Med. Sc. 203:157-172, February, 1942.

(10) Subacute Bacterial Endocarditis—Recovery following Intravenous Sodium Sulfadiazine. Dick, G. F. J.A.M.A. 120:24-25, September 5, 1942.

(11) Subacute Bacterial Endocarditis—Prolonged Administration of Sulfapyridine. Wilburne, M., McGoldrick, T. A. Ann. Int. Med. 17:333-339, August, 1942.

(12) Prophylactic Use of Sulfanilamide in Patients Susceptible to Rheumatic Fever Thomas, B., France, R., Reichsman, F. J.A.M.A. 116:551-560, February 15, 1941.

(13) Prophylactic Use of Sulfanilamide in Rheumatic Subjects. Coburn, A. F., Moore, L. V. Med. Clin. of North America. 24:633-638, May, 1940.

(14) Observation on Prophylactic Use of Sulfanilamide in Rheumatic Patients. Stowell, D. D., Button, W. H. J.A.M.A. 117:2164-2166, December 20, 1941.

(15) Sulfadiazine in Respiratory Tract Infections. Rusk, Lt. Col. H. A., Van Ravensway, Capt. A. C., (M.C.), A.V.S. J.A.M.A. 122:495-496, June 09, 1943.

(16) Measles and Mumps—Treatment with three well known Sulfonamides. Haerem, A. T., Military Surgeon. 92:306, March, 1943.

Coronary Artery Disease

Norman S. Skinner Major, R.C.A.M.C.

THE only common form of coronary artery disease is that which is due to arteriosclerosis and its treatment forms an important part of medical practice. Over the past few decades the average span of life has lengthened and it may be said, with truth, that modern medical science is enabling people to live longer that they may die earlier of coronary arteriosclerosis. The rapid conquest of the scourge of communicable disease has increased the chance of living well into the fifth and sixth decades but there is good reason to believe that our chances of going further are not as good as they were twenty and thirty years ago. To express it differently, there is now a better chance of our reaching the age of degeneration but when we do reach it, we may expect to degenerate faster. The only reasonable explanation that has been put forward to explain this more rapid degeneration is the increased tempo of modern existence.

Coronary arteriosclerosis ranks as the greatest killer of man after the age of fifty. It is a disease of particular and very personal importance to the members of our profession because it is the outstanding reason why our life expectancy is about five years less than the average, a rather heavy price to pay for the privilege of practicing medicine. In spite of the growing importance of this disease not enough attention has been focused upon it. In common with the other degenerative diseases improvement with treatment comes slowly and there is the inevitable final progression ending in clinical defeat. Because the results of treatment are often so difficult to see, and, since defeat is inevitable, we tend to become casual in regard to both diagnosis and treatment. If patients with coronary arteriosclerosis are given the advantage of thorough investigation and treatment the progress of the disease can be definitely slowed and the length of life definitely increased.

The proper understanding of any disease process in an organ requires a clear understanding of the pathology and physiology of that organ and it is surprising how slowly we are gaining this knowledge as it concerns the heart. It is only thirty years since Herrick placed the diagnosis of coronary thrombosis on a firm clinical footing. Although there has been much progress there still remains a tremendous amount to learn. There is still too much emphasis laid on the changes which occur in the main coronary vessels. Arteriosclerosis of the large coronary vessels may, at times, be the only pathological basis for clinical symptoms but, as a rule, arteriosclerosis is a diffuse process involving all the arterial branches of the myocardium; it is a generalized change and not an isolated process in one small segment of an artery. The thickening and roughening of the main coronary vessels may cause the dramatic coronary occlusion, which frequently kills at a relatively early age, but this
cause of death in comparison with the diffuse arterial change throughout the heart as a whole which progresses slowly and steadily, gradually giving rise to the clinical picture which we term myocardial degeneration, or coronary insufficiency, and ultimately ending life.

The proper anatomical conception of the heart is arrived at when it is pictured as being formed by circular layers of muscle between which run the arteries giving off many fine branches to the adjacent muscle planes. With the

arterial thickening of advancing age the calibre of these vessels becomes narrowed or obliterated and this results in diminished blood flow and diminished nutrition of the muscle. This diminished nutrition slowly changes healthy muscle fibres to fibrous tissue, normal myocardium becomes gradually replaced by abnormal scar tissue, and the functional capacity of the heart is inevitably impaired. Lowe, by careful dissection, has shown that entire muscular layers may be replaced by narrow planes of fibrous tissue which may be easily overlooked on routine autopsy, narrow planes of fibrous tissue replacing what was originally an important part of the ventricular wall. The fact should be stressed that this process is a very gradual one, it is far advanced when we recognize it clinically but we can usually expect it to continue for a long time before the heart ceases to function.

Clinically we divide our coronary arteriosclerotic patients into three very broad groups according to the presenting symptoms, Angina Pectoris, Coronary Thrombosis and Coronary Insufficiency. Such a classification is much too arbitrary and leads to a much too rigid conception of prognosis and treatment. Many cases of angina are caused by an unrecognized coronary thrombosis. Likewise many cases of clinical thrombosis occur without actual occlusion of a coronary vessel. Because identical pathological changes may give rise to different symptoms in different patients every case must be given individual consideration. Severe angina in one patient may be very much less important than mild angina in another and the same thing applies to thrombosis. Every case, whether it be angina pectoris, coronary thrombosis or coronary insufficiency, must be considered individually and not as one of a group. Regardless of the clinical manifestations the one important thing is function, each individual heart must be studied to determine to what extent function is impaired and to what extent function may be improved. The impairment of function may not parallel the prominence of symptoms. The serious heart may come with few complaints and the heart not so serious may, for the time being, present an ominous picture.

In order to properly evaluate the condition of affairs in the individual patient investigation must be as complete as possible. It must start with a very thorough history. The art of medicine is the art of taking a history and it is of the utmost importance in these cases. Two types of patients are especially common, the cardiac neurotic who gives a perfect story of heart disease which he has not got and the second type, which is very common, the older person who is so afraid of having his own suspicions confirmed that he minimizes or denies symptoms actually present.

The fear of heart disease is universal. Very few people of middle age escape the more or less sudden loss of a friend from this cause and their attention becomes centered on their own heart. Symptoms are imagined, or exaggerated, and a medical examination undergone. The slightest suggestion from the physician that heart disease may exist in the neurotic patient crystallizes a cardiac neurosis solidly and permanently. This is often done unwittingly through more or less natural caution on the part of the physician.

In older patients it is always wise, if possible, to discuss the patient with an intelligent member of the family. Symptoms that have been minimized or concealed will often be brought out into the open. Deceit in these patients may be intentional or the result of wishful thinking that we remain just as young as we used to be.

The most important symptom of a failing heart is shortness of breath. This shortness of breath is often of very gradual onset and, because it comes on so gradually, it may not be fully appreciated by the patient himself. The next most important symptom is pain on exertion, usually situated in the sternal area but may occur in other areas of the chest, or in the arms, neck or abdomen. In the latter areas it either accompanies the sternal pain or may be present without it. The important diagnostic feature of this pain is its relation to exertion. It is frequently stated that cardiac pain is seldomly referred to the precordium but I am coming to doubt this. We name this pain angina of effort but there is a different pain of heart disease, the same in location but not having the clearly cut relation to exertion, usually of longer duration and frequently termed "rheumatism." This pain is, as a rule, a symptom of advanced myocardial damage and is frequently situated in the back of the chest below the left scapula.

Just as in the case of the history physical examination should also be complete. Not only is the arteriosclerotic process diffuse throughout the myocardium it is diffuse throughout the body as a whole and its ravages may be individually more important in the kidney or brain. Two points of physical diagnosis are often misconstrued in arteriosclerotic heart disease. Sclerotic heart murmurs are one, no matter how loud they may be, they are seldomly of prognostic significance. The second point is heart size. There is a deeply rooted belief that a heart must be enlarged to be dangerous, a true belief in practically all forms of heart disease except the one at present under consideration where enlargement very frequently can never be detected even roentgoenologically.

Angina pectoris may continue for years, practically without change, or it may rapidly progress to coronary thrombosis or heart failure. The prognosis is that of the individual case and often can only be made for that individual case after careful study over a prolonged period. The treatment is likewise an individual problem as it depends on the estimation of the cardiac reserve. As a general rule the aim of treatment is to limit the patient to activity that will not bring on pain. Many cases of angina, when they first come under observation, benefit from a period of rest in bed. There are several reasons for this, it allows time for careful clinical study, it allows time for education of the patient and the acquisition of a proper mental adjustment to a probable more or less changed existence, and also, in many cases, there will be improvement in cardiac reserve and the angina may disappear for a shorter or longer period. Little need be said in regard to the dramatic effect usually produced on the anginal attack by the use of nitroglycerin under the tongue except to draw attention to the common mistake of not using the readily soluble hypodermic tablet for this purpose.

An attack of coronary thrombosis is usually easy to recognize but many atypical attacks occur. What has been said in regard to prognosis of angina applies equally well to thrombosis, it is highly individual. The usual case of severe pain of sudden onset, accompanied by shock, cannot be missed. Many cases, however, may have this picture for a very short period of time and when seen by the doctor an hour or two later may appear perfectly well. This type of case faces the danger of not being kept at rest for a long enough period and activity may be resumed before healing has taken place. The danger of too early activity is not the danger of sudden death but the danger of a disabled

heart frequently preventable by adequate rest. The need of complete rest in the treatment of coronary thrombosis has been emphasized and re-emphasized but it is my feeling that we still do not appreciate its need to a sufficient extent. To say that all cases of coronary thrombosis should remain in bed a period of six weeks should be considered only a minimal rule, the period should be from six weeks to several months, depending on the individual case. The immediate treatment of the attack is rest and morphine, the amount of the latter being judged by the relief of pain, rather than by a consideration of the usual therapeutic dose.

It is frequently said that coronary thrombosis is overdiagnosed, that many patients have this label unjustly attached to them. This mistake is often made but more frequently cases are missed as there are many that give no adequate clinical signs by which they could possibly be recognized. It is in the atypical case of coronary thrombosis that the electrocardiograph probably finds its greatest use, with the possible exception of some of the arrythmias.

Although it is the purpose of this paper to present a short and very broad discussion of coronary artery disease it is impossible not to say a few words about the electrocardiograph. It is probably one of the greatest aids to clinical diagnosis that we possess but its advantages and limitations are not fully recognized. It is invaluable, in fact it may be said to be essential, for the proper evaluation of many of the class of patients we are discussing as it frequently gives information that can be found in no other way and it very rarely is normal in the presence of serious heart disease. However, it will not replace history and physical examination. If a patient is suspected of having a coronary thrombosis, and the electrocardiogram is normal, he must be treated according to the clinical suspicion. Repeated tracings may be required before the diagnosis is confirmed and too much reliance should never be placed on one electrocardiogram unless it is typical.

Our final group of arteriosclerotic heart patients, so-called coronary insufficiency, might also be termed "the ageing heart." The study of these hearts is a fascinating one and it is a sadly neglected part of medical practice. The mere fact that these are ageing hearts and giving rise to symptoms usually with advancing age results in a tendency to brush them aside with little study. We are apt to feel that the failing heart is the inevitable result of its years of work. However, if we study these patients carefully, and if we use wisdom in handling the individual patient and the individual heart we can add months or years of life. The importance of individualization has already been stressed in regard to both the organic and psychological factors, it is the most important factor in successful therapy.

Drugs play a small part in treatment and, because of the chronic nature of coronary arteriosclerosis, their true position is hard to evaluate. Digitalis is the most important one and its status has changed with the years. Originally it was used in all cases of actual, or even suspected, heart disease. The pendulum then swung to the opposite extreme and it was felt to be of use only in cases of congestive failure with irregular rhythm. At the present time it is generally conceded to be indispensable in all cases of congestive failure regardless of rate or rhythm. Its use, in small so-called tonic doses in coronary insufficiency, seems again to be gaining adherents and it does seem to be useful in some of these patients, probably a minority, who can only be discovered by trial and error. There are several minor points on digitalis therapy that are

worthy of mention and one is the not infrequent occurrence of mental confusion which it causes in older patients. This may easily be attributed to cerebral vascular changes rather than to a toxic drug effect and its recognition is important as these patients apparently do badly if the drug is continued. Apparently there is good reason for the widely-held belief that the worse the heart the less the margin of safety between the therapeutic and toxic dose and there is no definite rule which will cover the dosage for any one patient. When satisfactory improvement does not occur digitalis may be pushed to the point of doing real harm.

Digitalis other than by mouth is rarely indicated but there are several very reliable products for parenteral administration and a newer one, Lanatoside C, is particularly efficacious. I have used this, intravenously, in twenty-one cases of auricular fibrillation, with excellent results and no untoward effect.

The effectiveness of the more slowly acting vaso-dilator group of drugs is much disputed and practically all experimental work has little to say for their value. Certainly they are widely used in practice, almost routinely, but the mode of employment is probably wrong. We tend to use them in small dosage over an indefinite period. They should be tried in adequate amounts for a definite period and if beneficial to the patient continued and if of no benefit stopped. Two or three trials usually will prove the point.

In regard to sedatives, they form an important part of the medical treatment of these patients, and what has been said so often in this paper must again be repeated here, their use must be studied in the individual case. Occasional patients are benefitted by heavy sedation, a few are depressed by very mild sedation and others fit between the two extremes. Many very anxious older patients, unfortunately, seem to belong to the class whose tolerance is low.

The use of tobacco and alcohol in heart disease is becoming less clouded by personal views and wishful thinking. The effect of tobacco is apparently definitely detrimental although it must be admitted that in many cases its interdiction would probably upset the patient more than its moderate use. There is very strong support for the use of alcohol as a vaso-dilator and, in coronary arteriosclerosis, its moderate and continued use is frequently of real benefit. In many peripheral vascular disease clinics whiskey is prescribed in a dose of one ounce every four hours and is believed to be superior to any other oral medication as a vaso-dilator.

In this brief presentation on coronary arteriosclerosis the object has been to bring out and stress certain broad principles necessary to its clinical understanding, broad principles that are apt to be buried beneath a rubble of unimportant minutiae. There are two problems with every patient, that individual patient and that individual heart, and each must be thoroughly studied. The degree of function of the heart must be estimated and the patient reeducated to live at a speed that is within the capability of his myocardium; the former requiring the best possible knowledge of modern, scientific medicine, the latter the best possible knowledge of human nature. The combination of these two factors, and their continued application, will produce real results in improving the health, happiness and longevity of this large group of medical patients.

The Centennial Meeting of the Ameriean Psychiatric Association

The one hundredth anniversary of the founding of the American Psychiatric Association was observed in the course of the annual meeting in Philadelphia from May 14-18 of this year. It was very fitting that this year's meeting should be held in the city where representatives from thirteen State hospitals met together in 1884 for the purpose of forming a society, known as the Association of Medical Superintendents of American Institutions for the Insane, now renamed the American Psychiatric Association. It was particularily pleasant that representatives from eleven of these original thirteen hospitals could be present for this 100th birthday. One of the original group, the Pennsylvania Hospital, was represented by the son and daughters of Thomas Kirkbride, the secretary treasurer of the original society and one of the outstanding psychiatrists of his day. In the hundred years that have passed great changes have taken place. Purely in terms of numbers the original thirteen have now grown to a society containing over three thousand members and fellows. This year's meeting was noteworthy for the largest attendance on record, there being more than two thousand persons present. From the beginning the Association represented both the United States and Canada. The first meeting of the Original Thirteen all came from the United States, but the following year invitations were sent to Canada and as a result the superintendent of the Lunatic Hospital, Toronto, Dr. Walter Telfer, attended the second meeting. Since that time the number of Canadians in attendance has steadily grown and this year representatives were present from many parts of Canada. With military psychiatry being given such a prominent place in this year's program, Canadians present were gratified to see Canadian military psychiatry so ably represented by the Director General of Medical Services, Major General G. B. Chisolm, and a large number of R. C. A. M. C. psychiatrists. This was especially so at the Centennial Day exercises when General Chisolm was one of the three main speakers and delivered a masterly address on the problems of military psychiatry and of the rehabilitation period.

There has been a steady increase in membership in this society in this hundred year period, but this has been especially rapid in the past five years. The society did not number one thousand members until 77 years had passed, the second thousand members were added in the next seventeen years. In this last five years, despite increasingly rigid standards of training and qualification of members, the third thousand has been added and at the turn of the century the memberships figures are well over 3300. The type of work done by these new members well represents the diverse interests of modern psychiatry. Perhaps one of the most significent changes is reflected in the change of name of the association—the American Psychiatric rather than the Association of Medical Superintendents of Institutions for the Insane. This change in name marks the trend away from the specialized hospitals to an active part in the community and general medicine.

Apart from the historical interest of this meeting the subject matter presented was of the greatest interest and often of considerable importance to the practitioner of medicine. Bulking large on the program were various papers

dealing with psychiatric problems in military service, and striking a perhaps optimistic note, a detailed consideration of the many problems concerning which we must deal in the rehabilitation period. Already there are more rejections and discharges from the services for neuropsychiatric reasons than for any other single cause. With a few exceptions facilities and opportunities for the rehabilitation of these men are non-existent. Not a week goes by in our own Psychiatric Clinic that we are not confronted by such problems. In the United States the situation is evidently similar and a great deal of the work being done is by private agencies. Probably the best report on rehabilitation work was that presented by Dr. T. A. C. Rennie, of Cornell Department of Psychiatry, who described the organization set up in New York City for the rehabilitation of such cases for that area.

Brought to the fore by the findings of the military groups, as well as the generally increasing interest in those problems we call psychosomatic, were several discussions of the problems of gastric ulcer, asthma and hypertension. These discussions provided interesting insights into the liasion between the psychiatric and general medical departments of such hospitals as the Massachusetts General and the New York Hospital.

This program for the Centennary Day was especially noteworthy for the three special addresses given by Major General G. B. Chisolm, Prof. T. North Whitehead, and Allan Gregg, Director of Medical Sciences, Rockfeller Foundation. This last address was of special interest to those engaged in psychiatric education since the Foundation is especially interested in such teaching. A full morning was devoted to a discussion of electro shock treatment. The general conclusions arrived at were very similar to those already reached in our own clinic—namely that such treatment was extremely effective in the psychosis characterized by depression but of little value in other types. The discussion underlined the fact that there were certain real dangers in this treatment and that it was not to be embarked on lightly.

In conclusion one would not come away from this meeting without two ideas remaining—first, the important part which psychiatric concepts and techniques can play in many of the immediate problems we are facing, and secondly, the need for a drawing together and closer understanding between those who work in this specialized field and those in the general practice of medicine, since both have so much to contribute to each other.

ROBERT O. JONES, M. D.
Department of Psychiatry,
Dalhousie University.

Abstract of White Paper Tabled by British Government

Prepared by Dr. A. E. Archer

1. **Principles of General Practitioner Medical Service**

The family doctor is the first line of defence in the fight for good health—as a rule he will be consulted first and through him access will be had to others. Necessary services such as specialists, consultants, hospital care, are included.

It is of first importance that every one be free to choose his or her own doctor—while admitting this, if the State is to provide a universal service, there must of necessity be some intervention.

2. Developments Which may be anticipated:

A. *Group Practice*

Group practice is discussed. It must be in the forefront of the planning for National Health Services, but this "cannot represent the whole shape of the future". Any such development will take time—and for some time and in some districts there will be individual practice. It is necessary, therefore, to plan for a combination of group practice and separate practice.

B. *Health Centres*

It is planned to give full scope to the development not only of group practice but also to a full Health Centre System.

It is anticipated that in the development of the Health Centre many individual doctors, in joining the health centre, will bring in their whole practice with them. However "the wish of the local doctor to bring their work into the centres must obviously be a big factor in the decision to provide a centre, but in the last resort, the decision will rest on the public interest".

It is planned to have Health Centres set up under a plan which requires action by local authorities as to location, size of district, size of group premises, etc.

C. *Separate Practice*

A doctor in "separate practice" will engage himself to provide ordinary medical care and treatment to all persons and families accepted by him, under the new arrangements—but he will be backed by the new organized service of consultants, specialists, hospitals, laboratories and clinics of which he will be enabled and expected to make full use.

D. *Distribution.*

To secure a proper distribution of medical personnel, some regulations controlling new entrants into any practice will be necessary.

E. *Central Medical Board*

A Central Medical Board will be established and this Board will be the "employer".

The General Practitioner service will be centrally organized. "As the doctors will be remunerated from public funds the Minister himself must be

ultimately responsible for this central administration", but he will appoint for this purpose the Central Medical Board.

In the case of Health Centres, a third party enters the picture, the "local authority". This local authority "sets up" the Health Centre and must have a voice in its operation.

The Board will also watch over the general distribution of public medical practices. In "separate" practices the Board must consent before a vacant practice is filled or a new one established. In Health Centre practice, the centre will be the agency through which new doctors are introduced.

The Board is to be a small body with a few full time members and the rest part time. Since the Minister is responsible for the service, the Board will be appointed by him, but all appointments will be made in close consultation with the profession.

F. *Remuneration and Terms of Service*

These are matters for discussion with the medical profession. The Government, however, puts forth certain proposals. They say that it would be easiest to put all on salary, but admit that this is "highly controversial". They say that both the opinion of the doctors and of the laity is divided on this matter.

The Government approaches the problem "solely from the point of view of what is needed to make the new service efficient". In a Health Centre, these doctors "should not be in competition", therefore the capitation system is inappropriate and they propose that these men should be on salary, or some basis other than capitation, and they will be ready to discuss with the medical profession which method should be adopted and the appropriate salary scales. This would apply also, probably, to doctors in group practice. Normally in the case of the separate doctor, the capitation system would apply, with careful regulation of the size of the panel.

In any system, "the substantial issue will be to decide what is, on ordinary professional standards, a reasonable and proper remuneration for the whole time doctor engaged in a public service".

G. *Private Practice may be Retained*

They hope to get the majority of doctors to engage in the new service and therefore "it is not proposed to prohibit" any doctor who enters the service from also treating the private patients "who do not desire to take advantage of the new public arrangements". If he wishes to do this, he will have fewer public patients on his panel.

Also the doctor who is on salary will be allowed "to treat the few who will not want to take advantage of the new public service", privately.

"The essential point is, that no person must have reason to believe that he can obtain more skilled treatment by paying privately for it than he can in the public service."

H. *Entry into Public Service*

"There is a strong case for and the Government proposes" that young doctors go through a short period as assistants to more experienced men. Also Government must be able "to require the young doctor during the early years of his career, to give full time to the public service, if the needs of the ublic service require this."

As the new system is set up, there will be compensation for the sale value of practices in certain areas.

Superannuation rights will be arranged in Health Centres.

The matter of the sale and purchase of practices is to be left for further discussion.

I. *Drugs and Appliances*

These will be supplied, but with perhaps some fee to the patient.

J. *Hospitals*

"A fully organized system of Hospitals is the keystone of the National Health Service". This system must be complete and hospitals "ready of access". "The Government proposals are based upon the fullest co-operation between the two hospital systems in one common service". There should be a planned hospital service in each area. "To achieve this object and to remedy the present lack of coherence there is need for a single authority which "has the duty to secure for that area a complete hospital service".

Unit of Hospital Administration

A hospital area must fulfill three conditions:

(a) It must have sufficient population and sufficient financial resources to make possible an adequate efficient service.

(b) It should normally include both rural and urban areas.

(c) It should be such that most of the varied hospital and specialist services can be organized within its boundaries in a self-sufficient scheme, leaving only certain highly specialized services for inter-area arrangement.

Voluntary Hospitals

These should receive "certain payments from the authority" in accordance with centrally determined scales, and "being less in amount than the total cost of the service rendered". There is no question of these hospitals surrendering their autonomy.

Mental Hospitals

These create some difficulty but "despite the difficulties the mental hospital service should be taken over by the new joint authority".

Infectious disease Hospitals

Should be taken over as a part of the plan.

Routine inspection of hospitals "at not too frequent intervals" is provided for.

Local Tuberculosis Dispensaries will henceforth be regarded as out-patient centres of hospital consultant service.

K. *Dental Service*

Is highly desirable, and should be a full service, but there are not enough dentists at present.

L. *Administration*

Must be under the Minister of Health, but only the general practitioner service will be centrally controlled. For the rest "there will be local responsibility with control at the centre." "Though it is in the Minister of Health that the responsibility must rest, the government attaches great importance to

ensuring that the service is shaped and operated in close association with professional and expert opinion."

"Set up by statute, at the side of the Minister, is a special professional and expert body to be called the Central Health Services Council." This body is advisory, while the Central Medical Board is an "Executive body responsible to the Minister".

The Council will have the right to advise on "any matter within its province". The Minister will be obliged to submit a report annually to parliament of the work of this Council.

M. *Consultants*

It is desirable that provisions should be made for "every one to obtain whenever he needs it and without charge" skilled specialist advice. "The government considers that a service of consultants can be best and most naturally based upon the Hospital services."

"The Hospital will itself enter into arrangements with the Consultants and specialists concerned". There is need for more consultants and for better distribution. (Apparently Hospital payments will include enough to provide for the services of consultants and specialists.)

Consultants might perhaps be associated with more than one hospital. They should be employed either on a full time or part time basis and there will be need for central control "to avoid competition".

N. *Child Welfare*

Child Welfare is to be cared for by another department related to Education.

O. *Maternity*

Maternity benefits must include arrangements for home nursing midwifery and health visitors.

P. *Financial Arrangements*

"The cost will fall mainly upon central and local public funds. It will be met partly by the ordinary process of central and local taxation and partly by an insurance contribution under whatever social insurance scheme may be in operation."

(Supplement to B. M. J., February 26, 1944)

Principles Relating to Health Insurance

Approved by the General Council

of the

Canadian Medical Association

May, 1944

1. The Canadian Medical Association approves the adoption of the principle of contributory Health Insurance, and favours a plan which will secure the development and provision of the highest standards of health services, preventive and curative, provided the plan be fair both to the insured and to all those rendering the services.

2. Inasmuch as the health of the people depends to a great extent upon environmental conditions under which they live and work, upon security against fear and want, upon adequate nutrition, upon educational facilities, and upon the opportunities for exercise and leisure, the improvement and extension of measures to satisfy these needs should precede or accompany any future organization of medical service. Failure to provide these measures will seriously jeopardize the success of any Health Insurance plan.

3. It is not in the national interest that the State convert the whole medical profession into a salaried service.

4. It is not in the patient's interest that the State invade the professional aspects of the patient-doctor relationship. Subject to geographical and ethical restrictions this relationship includes free choice of doctor by patient and free choice of patient by doctor; it implies also maintenance of the confidential nature of medical practice.

5. While leaving to each province the decision as to persons to be included, the plan must be compulsory for persons having an annual income insufficient to meet the costs of adequate medical care.

6. The dependents of insured persons should be included in the health benefits.

7. Medical care for resident and transient indigents should be provided under the plan, the Government to pay the premiums.

8. Health benefits should be organized as follows:

   (*a*) Every regularly qualified, duly licensed medical practitioner, in good standing in the province, should be eligible to practise under the plan.

   (*b*) The benefits conferred should be such as to provide for the prevention of disease and for the application of all necessary and adequate diagnostic and curative procedures and treatment. Specialist and consultant medical services should be available.

(*c*) The following additional services should be available through the medical practitioner:
1. Nursing service;
2. Hospital care;
3. Auxiliary services, usually in hospital;
4. Pharmaceutical service, subject to regulation.

(*d*) Dental service.

9. Cash benefits, if provided, should not be taken from the Health Insurance fund.

10. Health Insurance should be administered by an independent non-political Commission representative of those giving and those receiving the services. Matters of professional detail should be administered by committees representative of the professional groups concerned.

11. Under Health Insurance the Chief Executive Officer to the Commission and the Regional Executive Officers should be physicians appointed by the Commission from a list submitted by organized medicine in the province.

12. Each province should be served by an adequate Department of Public Health, organized on the basis of the practising physician taking an active part in the prevention of disease.

13. The granting of a license to practise medicine was designed primarily to protect the public. Therefore it is in the interests of the patient that all who desire licensure to practise a healing art should be required to conform to a uniformly high standard of preliminary education and of training in the recognized basic sciences as well as to furnish proof of adequate preparation in the clinical and technical subjects.

14. The method, or methods, of remuneration of the medical practitioners and the rate thereof, should be as agreed upon by the medical profession and the Commission of the province.

15. Every effort should be made to maintain health services at the highest possible level. This requires:
(*a*) Adequate facilities for clinical teaching in the medical colleges and hospitals;
(*b*) Post-graduate training of all medical practitioners at frequent intervals;
(*c*) Necessary facilities for and support of research.

16. The principle of insured persons being required to contribute to the insurance fund is strongly endorsed.

17. Any Health Insurance plan should be studied and approved actuarially before adoption and thereafter at periodic intervals.

18. In the provision of health services, cognizance should be taken of the fact that well over a third of Canadian doctors are now in the Armed Forces. If Health Insurance should be implemented in any province before demobilization, the interests of the medical officers in the Services should be fully protected.

Personal Interest Notes

THE marriage took place in Middleton in June of Miss Jessie Bowlby Morley and Captain James Bruce Crowe, R.C.A.M.C., only son of Dr. A. Boyd Crowe and the late Mrs. Nell (McDormand) Crowe of Annapolis Royal. Captain Crowe graduated from Dalhousie Medical School in September, 1943.

The marriage took place in Halifax on June 17th of Miss Betty Caroline Bird, daughter of Mr. and Mrs. W. R. Bird, Halifax, and Lieutenant Irwin MacKay Murray, R.C.A.M.C., son of Mr. and Mrs. F. I. Murray, Stellarton. Lieutenant Murray graduated from the Dalhousie Medical School in May, 1944.

Dr. J. Earl Hiltz, native of Truro and graduate of Dalhousie Medical School, for the past six years Assistant Medical Superintendent of the Nova Scotia Sanatorium at Kentville, has been appointed Acting Superintendent of the Victoria General Hospital, Halifax. Dr. G. A. MacIntosh, Superintendent of the Victoria General Hospital for a number of years, is on sick leave for an indefinite period.

The marriage took place at the home of Dr. W. M. Roy, Halifax, on June 17th, of Miss Miriam Jean Gross, daughter of Lieutenant Colonel H. K. Gross, R.C.A.M.C., and Mrs. Gross, Regina, Saskatchewan, and Dr. Alexander Kerr Roy, R.C.N., son of Mrs. Lillian Roy and the late Dr. A. K. Roy, North Sydney. Dr. Roy graduated in May, 1944, from the Dalhousie Medical School.

Dr. B. C. LePage, resident doctor at the Victoria General Hospital, Halifax, for the past two years, left during June to join the Royal Canadian Air Force, and at present is posted to Charlottetown where he is serving as medical officer there.

The contract for the new fifteen story Victoria General Hospital has been awarded to the Brookfield Construction Company and work was started July 11th. The new hospital will stand on Tower Road in front of the present hospital building.

A contract for an addition to the City Tuberculosis Hospital has been awarded to the Foundation Maritime, Limited, and work is expected to start shortly.

Mrs. Shirley Beck, graduate of the Victoria General Hospital, and charge nurse in the surgical female post-operative ward, was one of the first nurses to join the Canadian Navy when that branch of the service was being formed. She served for a short time in Halifax and was then sent overseas to H.M.C.S. Niobe. So well had she endeared herself to her patients that one of the many wrote the following verses to her, and has told of her many fine acts of service.

EAST WARD—H.M.C.S. NIOBE

Who cheers us with a sunny smile
Or when she stops to chat awhile?
That's Sister Beck.
Who is it when her work is done
Plays cribbage with the boys for fun,
And when the game is over finds she's won?
That's Sister Beck.

Who comes around at night
Who to us is a pleasant sight?
That's Sister Beck.
Who fixes up our hands and knees,
Who is it that we like to tease,
Who rides a bicycle in the breeze?
That's Sister Beck.

Who seems the same both day and night
Who's outlook always seems so bright?
That's Sister Beck.
Who always has a story to tell,
Who does her best to make us well
Who brought those bandages to do? Oh—
That's Sister Beck.

Who do we think is a "Cracker-Jack"
When she comes 'round to rub our backs?
That's Sister Beck.
Who seems to smooth our cares away
As she rubs and dubs at close of day
And who do we hope won't go to stay?
That's Sister Beck.

Who works away without much fuss
Who seems to be always thinking of us?
That's Sister Beck.
Who when stern is never feared
And from Duty's path has never veered
And who is it doesn't like a beard?
That's Sister Beck.

Who when we are far away
Will be remembered every day?
That's Sister Beck.
And before this poem we end
Who should receive this message we send
That we are proud to call her "friend"?
That's Sister Beck.

By Archer Banfield, R.C.N., Patient at H.M.C.S. Niobe

Since this was written Sister Beck has become a Matron, and is in full charge of the only Canadian Naval Hospital overseas, H.M.C.S. Niobe.

Obituary

THE death occurred at his home in Glace Bay on June 22nd of Doctor Thomas Francis Meahan. He was about his usual duties that day and after returning home in the late afternoon was seized with a heart attack and died within a few minutes. Doctor Meahan was born at Bathurst, N. B., on October 3, 1901, son of the late Doctor and Mrs. John C. Meahan. He was educated at Newcastle High School, St. Francis Xavier College and graduated from McGill in 1926, and interned after graduation at Saint John General Public Hospital. In 1927 he went to Glace Bay as assistant to the late Dr. M. T. Sullivan and when the latter died the following year, he took over the practice. He is survived by his wife, the former Mary Sullivan, two daughters and one son and four brothers and a sister.

Dr. James Ira Wallace, a native of West Gore, died at his home at Kamsack, Saskatchewan, in June, after an illness of several months. Dr. Wallace was born March 26, 1864, son of the late Margaret and Michael Wallace. He graduated from the Medical College at Baltimore, Maryland, in 1895, and practised his profession for a number of years in Central Economy, moving to Kamsack about thirty-five years ago. His wife, who died a number of years ago, was the former Ivy May, daughter of the late Mr. and Mrs. John T. Wallace of West Gore. He is survived by two daughters.

The death occurred at his home in Wolfville on June 29th of Doctor Alexander Locke Anderson. He had been in failing health for some time. He was born in 1873, graduated from the New York Medical College in 1898, and practised in Brooklyn, N. Y., for nearly forty years. Since his retirement he and Mrs. Anderson made their home in Wolfville. He is survived by his wife, the former Miss Lou Balcom.