

* Penicillin

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DESPITE the rapid growth of interest in this remarkable, new therapeutic agent, the supply has been so scanty that few practitioners have had actual experience in its use. With the expectation that this situation will soon improve the remarks that follow have been prepared with a three-fold purpose—that we may have a common understanding of (a) the principles underlying the use of penicillin, (b) what we may expect it to accomplish, and (c) what we must not call upon it to do.

Many of the statements and suggestions that follow have been drawn from a memorandum being prepared by the Joint Services Penicillin Committee for the guidance of medical officers of the three armed services and the medical representatives of the D. P. and N.H. It should be borne in mind that much of our knowledge of penicillin is in flux, particularly concerning dosage.

Penicillin is a weak, unstable organic acid produced in the growth of a kitchen mould called *Penicillium Notatum*. It has not yet been synthesized nor is its formula known. For clinical use it has been prepared as either the sodium or calcium salt. The latter form is more stable and is less irritating to tissues; however, most of our knowledge has been acquired with the sodium salt and at present it is the only form available. It comes to us as a powder, varying in colour from golden-yellow to dark brown, sealed in a glass ampoule. Only 10-20% of this is penicillin, the remainder being products of the culture which have escaped separation in the difficult process of refinement. It is to this incidental material that the occasional toxic reactions are attributed (fever, urticaria or phlebitis), and these are present only with certain batches.

On the label is printed the number of Oxford or Florey units of penicillin within the ampoule, e.g. 100,000, 20,000 etc. This is derived from a biological assay which is still inaccurate—not closer than plus or minus 15%.

Penicillin powder is vulnerable to heat and moisture and it is destroyed by various strong acids, alkalies, alcohol, heavy metal antiseptics and enzymes present in certain organisms, e.g. the colon bacillus. In solution, it is still less stable and up to the present the rule has been followed of making up only a twelve-hour supply which is kept carefully in the refrigerator until used. Recent reports suggest that some of the more highly purified preparations have remained potent in solution at room temperature for several days.¹ This awaits confirmation.

Penicillin arrests infection primarily by bacteriostasis, i.e. by interfering with bacterial reproduction. There is some suggestion, however, that the high concentrations attained in local application to tissues may exert a direct lytic effect on susceptible organisms². One of the most important biological properties of this agent is its efficacy in the presence of pus and break-down tissue products. This distinguishes it sharply from the sulphonamides which are inactivated by pus and thus have been relatively useless in the local treatment of empyema, abscesses, et cetera.

* Paper presented at 91st Annual Meeting of the Medical Society of Nova Scotia, White Point Beach, on July 5, 1944.

1. W. M. M. Kirby, J.A.M.A. 125: 628, July 1, 1944.

2. Karl Snyder, S.B.P.O., R.C.N.V.R. (To be published).

Penicillin is highly soluble and penetrates tissues having a good blood supply. For some unknown reason it passes in only scanty amounts into the spinal fluid, serous and synovial cavities, saliva and tears. Some of it is excreted into the bile. Most of an intravenous dose of penicillin disappears from the blood stream in an hour, about half of it being excreted in the urine. After intra-muscular injection there are detectable amounts in the blood for two to three hours. In general it may be said that a "detectable" amount represents a therapeutically effective concentration. Penicillin is destroyed by gastric juice. It has been too scarce, so far, for experimental trial in large oral doses in acid or enzyme-resisting capsules or pills. Locally, it may be used in the form of a cream, or as the calcium salt in solution or in powder form.

Organisms SENSITIVE to penicillin are as follows:

Gram-Positive Cocci

Hemolytic Streptococci
Other Streps except *S. Fecalis*
Pneumococcus
Staphylococcus

Gram-Negative Diplococci (Neisseria)

Meningococcus
Gonococcus

Gram-Positive Bacilli

Clostridium Welchii (and other organisms of gas gangrene.)
Cl. Tetani
C. Diptheriae
B. Anthracis

Spirochaetes

Syphilis
Relapsing Fever

The following organisms, however, are RESISTANT to penicillin:

Gram-Negative Bacilli

B. Typhosus
B. Para-typhosus { and other
B. Enteritidis { *Salmonella*
B. Dysenteriae (*Shiga* and other Dysenteries)
B. Tularensis
Vibrio Cholera and *B. Pestis*
B. Coli
B. Pyocyaneus and *B. Proteus*
Br. Abortus (*Melitensis*)

Acid Fast Organisms

B. Tuberculosis
B. Leprae (Leprosy)

Yeast Like Fungi

Blastomyces
Coccidioides (*Actinomyces*)

Viruses

Therefore, do NOT use penicillin in:

1. Virus infections, i.e. common colds, influenza, virus pneumonia, Acute anterior poliomyelitis infectious hepatitis.
2. Tuberculosis.
3. Rheumatic fever and rheumatoid arthritis.
4. Typhoid, dysentery and B. Coli infections.
4. Typhoid, dysentery and B. Coli infections.
5. Undulant fever.
6. Malaria.
7. Infectious Mononucleosis.
8. Ulcerative colitis.
9. Sub-acute bacterial endocarditis.
10. Leptospiral jaundice.

The diseases in which penicillin is more or less effective are listed below. Some of these will be discussed in greater detail later, because of their great clinical importance and because of special problems involved in their therapy.

1. Septicemia—Staphylococcus aureus; sulpha-resistant Streptococcus hemolyticus; Pneumococcus; Meningococcus.
2. Meningitis—Staphylococcus aureus; Pneumococcus or Streptococcus hemolyticus, severe or sulpha-resistant Meningococcus.
3. Pneumonia—Staphylococcus; Streptococcus; sulpharesistant Pneumococcus.
4. "Clinical" Gas-Gangrene ("clinical" implying that treatment should be started as soon as disease is recognized, i.e. without waiting for results of bacterial culture.)
5. "Serious" Infections due to penicillin-sensitive organisms:
 - Wound infections.
 - Acute osteo-myelitis (and chronic).
 - Cavernous and lateral sinus thrombosis.
 - Mastoiditis. Acute otitis media.
 - Cellulitis.
 - Empyema. Acute pulmonary abscess.
 - Suppurative arthritis.
 - Hand infections, carbuncle.
6. Gonorrhoeal Ophthalmia, arthritis, urethritis.
7. Infected burns.
8. Certain skin infections:
 - Impetigo, blepharitis and chronic ulcers.

Septicemia. It must always be remembered that the bacteremia is secondary to an infective focus in tissue, and unless the penicillin penetrates that tissue to make contact with the organisms in it, little can be expected from simple sterilization of the blood stream. The best example of this is bacterial endocar-

*In chronic ulcerative colitis penicillin may occasionally be valuable in treating an exacerbation due to a superimposed acute infection due to a penicillin-sensitive organism, e.g. haemolytic streptococcus.

ditis, whether due to *S. viridans* or to other Streptococci, the Gonococcus or Straphylococcus. We can all recall the disappointment during the sulphonamide boom when it was realized that some peculiarity in the anatomical lesion of vegetative bacterial endocarditis rendered it resistant to drugs which were otherwise specific for the organisms concerned. The same experience has arisen with penicillin. In one series, not yet published, (N.R.C. Can.) of 30 cases of staphylococcal septicemia there were 13 deaths and in 4 of these the autopsy revealed endocarditis which had not been recognized at the beginning of treatment. In 3 cases of hemolytic streptococcal and 3 cases of pneumococcal septicemia there were 2 deaths, one in each group, and both exhibited endocarditis. As in the case of sulphonamide therapy hope has been raised that the use of heparin concurrently with penicillin may lead to more effective control of the endocardial lesions. So far, only one report³ has been encouraging; otherwise, the results of penicillin treatment of the common sub-acute bacterial endocarditis due to *Strep. viridans* in major U.S. and British centres have been uniformly negative.

What are the rules then for the management of septicemia? First, endeavour to establish the origin of the infection and render any special treatment that may be called for, e.g. the drainage of any abscess, or the removal of dead tissue. Second, identify by blood culture the organism concerned and if possible obtain a determination of its penicillin sensitivity. A count of the colonies on a poured plate will tell one something of the severity of the disease and will provide also a measure of the efficacy of treatment if the blood culture is repeated. Third, watch constantly for the development of metastatic lesions, some of which may require immediate surgical attention. Some of the causes of death in the penicillin failures referred to above were multiple brain abscesses with meningitis, pulmonary embolism, pericarditis, pulmonary oedema and in 2 cases although blood cultures had become negative, even at autopsy, no localization of the infection could be found to explain death.

As for the mode of administration of penicillin it must be stressed that we are still in the "trial and error" stage. Probably few uncomplicated septiciemias require more than 120,000 units daily. This may be given as intramuscular injections of 15,000 units dissolved in 3 or 4 c.c. of normal saline every 3 hours day and night. In fulminating infections one may prefer a large dose, 20,000 units, every 2 hours intravenously. This may be injected at these intervals into the rubber tubing just below the graduate or flask of a continuous intravenous drip of normal saline or glucose solution. At the Mayo clinic a smaller total daily dosage of 40,000 to 60,000 is administered as a continuous intravenous drip over the entire 24 hours.⁴ (Half the daily dose is dissolved in 1000 c.c. of saline and given at a constant rate over the 12 hour period). In any case, treatment is continued daily until several days after temperature has become normal and the patient appears to be well. The average severe case requires about one million units and this may cost between \$40 and \$60.

Meningitis. It has been pointed out already that penicillin administered intravenously does not reach the spinal fluid (nor is it excreted in either saliva or tears). This apparent relative impermeability is not understood. Moreover, the injection of 10,000 units into the spinal fluid of a normal person results in the appearance of very little of it in blood or urine, whereas traces of penicillin

3. L. Loewe et al. J.A.M.A. 124: 144, Jan. 15, 1944.

4. W. E. Herrell. J.A.M.A. 124-622, March 4, 1944.

may be detected in the cerebro-spinal fluid as long as 30 hours after the injection. Such an amount, 10,000 units, may cause irritation—headache, vomiting, increased spinal fluid pressure and increase in cells. With 5000 units these symptoms are less marked or are absent.

When meningitis is present there is somewhat more absorption from the intrathecal space and penicillin appears in the urine in larger amounts. However, it is still detectable in the spinal fluid at 24 hours after injection. If it is present in detectable amounts one knows there is sufficient penicillin for bacteriostasis. This means then that one injection of 10,000 units in 24 or 48 hours is sufficient intrathecal therapy in meningitis. The present practice is to inject 5 to 10 c.c. of a penicillin solution of 1000 units per c.c. of normal saline. Because organisms sometimes lie deep in the meninges, and because there is often blood stream infection as well, it is desirable to administer penicillin by the intravenous or intramuscular route as well as intrathecally.

The treatment results, in other than meningococcal types of meningitis, have not been as dramatic as many would believe. Figures in two series are as follows:

1. Keefer et al (Boston)	cases	recovered	deaths
Pneumococcus	23	7	16
Staphylococcus	5	2	3
Streptococcus	3	1	2

(N.B. doses may have been too small.)

2. Canadian

(J.S.P.C. & N.R.C. to March 1944)

Pneumococcus	14	4	10
Staphylococcus	1	1	—
Streptococcus	4	2	2
	—	—	—
	19	7	12

I trust I have shown that these 3 organisms still cause serious meningitis. In some of the pneumococcal cases it appeared at autopsy that subarachnoid block prevented dissemination of the penicillin over the brain surface or into the ventricles. Possibly it should be introduced at an early stage of this infection directly into the lateral ventricles by burr holes in the skull. As regards *meningococcal* infections the results with sulphadiazine are so good that this should generally be used first.

The Pneumonias. Here we find that penicillin will do all that sulphadiazine does and, in addition, is effective against most strains of pneumococcus that prove to be resistant to sulphonamides. In pneumonia due to hamolytic streptococcus and staphylococcus success is reported in a majority of the cases treated with penicillin. The same rules apply as in the case of treatment of septicemia. However, when penicillin is available for the treatment of ordinary pneumococcal lobar pneumonia it may be that treatment over only 12 of the 24 hours of each day will suffice. In the Bellevue experimental series, from 40,000 to 70,000 units daily, given in 4 intramuscular injections each day for

3 or 4 days, appeared to be effective⁵. This will require verification but it suggests that intermittent treatment may have a place in other infections too.

Empyema. The intravenous or intramuscular administration of penicillin has little or no effect on infection of the pleura. However, when injected into the pleural cavity, after withdrawal of a suitable amount of fluid, 50,000 units of penicillin (dissolved in 10 to 50 c.c. of normal saline) given every 48 hours will result in sterilization of most empyemas due to pneumococcus, staphylococcus or hemolytic streptococcus in a period of 2 to 10 days. Rib resection can be avoided in perhaps a majority of cases, being carried out when the empyema fluid has become too thick to aspirate. There is some suggestion that even this may be obviated by more complete aspiration and by the irrigation of the cavity with normal saline⁵.

Important principles to remember during treatment are:

1. Any underlying pulmonary disease must be treated by the intravenous or intramuscular route.
2. The presence of a broncho-pleural fistula will cause continued re-infection of the pleural cavity.
3. Multiloculation calls for the separate injection of each collection of pus.
4. If thoracotomy has to be carried out, do not delay it until the fluid has become so thick that the lung cannot re-expand.

Osteomyelitis. Acute osteomyelitis responds satisfactorily to penicillin therapy, which is in keeping with the maxim that the more vascular the tissue concerned the more rapid and complete is the response. Even when considerable destruction is present in acute osteomyelitis new bone tends to grow readily, i.e. sequestration may not take place. In *Chronic* osteomyelitis the results are less dramatic. This is not due to any change in the organisms but is due to their being relatively locked out of the circulation by the sclerosed bone. Consequently, treatment must be prolonged and surgery must often be resorted to for the removal of dead bone and to establish drainage. Generally, the discharge decreases greatly in amount within a few days and organisms are reduced in number. In some cases the exudate in the sinus may become sterile within a week and complete healing may occur within 2 or 3 weeks. However, in the majority of "chronics" it is necessary to operate for the removal of sequestra or foreign bodies, or to open abscesses in either bone or soft tissue.

In this disease, then, penicillin is used chiefly as an adjunct to surgery, (a.) pre-operatively, to reduce infection in the field, and (b.) post-operatively, to permit more extensive closing and earlier healing of the defect. It may also be used locally at the time of operation in the form of a cream (this is not available at the time of writing).

Wounds. It is too early to indicate more than the broadest principles in this field. Florey and others, in an extensive experience in North Africa and Italy, have shown that an early infected compound fracture can be closed and converted into a simple fracture by a 5 to 7 day course of penicillin. Local treatment of chronic sepsis has not been adequate. Sometimes it is helpful to create a space within which penicillin solution may be retained, e.g. by suturing completely, then instilling penicillin solution twice daily through narrow rubber

tubes left in the wound and passing out through suture line or a stab incision.

In conclusion, it should be emphasized that enthusiasm over the efficacy of penicillin must not displace sound clinical judgment and the observation of firmly established principles of medicine and surgery. It is with these that the use of any new agent must be carefully integrated to secure the optimum results.

*Venereal Disease Control In Nova Scotia

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VENEREAL disease is probably the major communicable disease problem to-day. "As a danger to the public health, as a peril to the family, as a menace to the vitality and physical progress of the race, the venereal diseases are justly regarded as the greatest of modern plagues, and their prophylaxis the most stressing problem of preventive medicine." "They are a prime cause of physical and mental disability and reduced economic efficiency."¹

Unfortunately I cannot, to-day, give you a complete picture of the incidence of these diseases, syphilis and gonorrhoea, either in Canada or in particular, Nova Scotia. I can, however, give you a part of the picture. Although the law requires, in common with other communicable diseases, that venereal diseases be reported by physicians to health departments, it is very evident that physicians are not fulfilling these legal requirements. For this reason a true incidence of these diseases in the civilian population cannot be given. The Armed Forces Medical Services of Canada have, however given out information as to the incidence of venereal disease in the armed forces in Canada. This information has been widely published in the Press² and no doubt most of you are familiar with it. Certain of this information, however, will bear repeating here.

In the three and a half year period, January 1, 1940, to June 30, 1943, there were recorded 35,036 venereal infections in the armed forces. The treatment of these infections required nearly 700,000 hospital days and of course the loss of nearly 700,000 training days. The cost of medical care and lost training time amounted to nearly \$8,000,000. In graphic terms there were enough man-days lost in the Air Force to man an air squadron for a year, in the army to fight Canada's share of the Sicily battle, and in the Navy enough man-days were lost to escort eight convoys across the Atlantic. This is a small part of what venereal disease costs Canada. Please remember that you and I along with others pay these costs, directly or indirectly. There is no reason to believe that the Armed Forces rates for comparable age-groups are any worse than for the corresponding civilian population. The Armed Forces situation is simply a reflection of a similar situation existing in the civil population. The venereal disease problems for both are but parts of the inseparable whole.

The Armed Forces Medical Services have also shown that there is a variation in the extent of their venereal disease problem in the forces stationed in the different parts of Canada. There is no point in giving the statistics of venereal disease incidence in the various Training Commands and Military Districts across Canada. These, as I said before, have been widely published and are easily available for your reading. The point I wish to make is that we have a serious problem of venereal disease in Canada; and that problem is also present in Nova Scotia. For example, the infection rate for members of the Army stationed in Prince Edward Island and Nova Scotia (M.D. No. 6) is slightly below the average rate for all Canada. . . The infection rate for

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members of the R.C.A.F. stationed in the Eastern Air Command is well above the average rate for all of Canada.

I wish now to give you what information we have as to the incidence of venereal disease in the civilian population of Nova Scotia. For the year ending November 30, 1943, there were reported to the local medical health officers, 133 cases of syphilis and 241 cases of gonorrhoea, making a total of 374 cases reported by physicians in all of Nova Scotia. In a section of the province, records were kept of the number of positive blood examinations for syphilis and positive smear examinations for gonorrhoea, recorded for the first time. This section of the province comprises the mainland of Nova Scotia. In this area, there were reported to the local medical health officers by physicians, 176 venereal diseases during the year ending November 30, 1943. In this same area there were found to be 1103 new cases of syphilis and gonorrhoea estimated by means of positive laboratory reports. In other words only about 15% of the new cases estimated on positive laboratory reports were reported to the local medical health officers as new cases. In addition, when we consider that numerous cases of gonorrhoea are treated without having smears examined at the provincial laboratory, then I feel that the percentage of cases reported to the local medical health officers is even smaller than 15%.

In the Cape Breton Island Health Unit³ the results of the Kahn tests done on samples of blood, donated to the Red Cross Blood Donor's Clinic, showed 33 positive tests out of 3,456 first donations. These positives were checked and were regarded as due to syphilis. This gives an incidence rate of 0.95% or 9.5 per thousand for syphilis in this section of Nova Scotia's population. Very few of these individuals had previously suspected they had syphilis.

These separate pieces of information as to the incidence of venereal disease in Nova Scotia, each not entirely complete, do at least indicate that we have a problem of venereal disease here. A problem that is at least as great as the average problem throughout the Dominion. Certainly it is a problem that must be faced and reduced to the greatest possible minimum.

Now having given you something of what we know of the venereal disease incidence, I wish to speak of the control of these diseases. Because of the fact that we have no specific immunizing agent against these diseases, it appears that their control must depend on systematized social action. The particular factors which make it necessary for society, probably through its government to take this action, are somewhat as follows:

- (1) Venereal diseases are communicable from person to person.
- (2) They affect a large proportion of the population.
- (3) The cost of treatment, particularly of syphilis is greater than can be borne by most of the individuals who have these diseases.
- (4) Public education is essential to a successful venereal disease program. This education must be brought about by careful planning and continuing effort.
- (5) Successful results are not attained on the individual or in the mass when action is unsystematized. In other countries notably Sweden, systematized action has produced the most satisfactory results.

Now if a government is to lead, through its health department, a program against venereal disease, it cannot hope to develop an effective program, with-

out the active support and full participation of the medical and allied professions, and the lay organizations. Although the health department must determine the scope, define the content of the program and administer many of its details, the private practitioner, the local and provincial medical societies, the local health officers and boards of health will have specific duties to perform in the actual application of many of the control procedures.

I wish next to list what are considered certain essentials in a program against venereal disease, then on this basis to describe what has been done and is being planned by the Department of Public Health of Nova Scotia. I wish also to indicate to the medical profession in Nova Scotia, how they in particular can co-operate in this program against venereal disease.

The essentials of a successful program against venereal disease may be summarized briefly as follows:

1. It is a necessity that the public recognize the problem of venereal disease and the need for its early discovery and prompt and continuing treatment.
2. Adequate venereal disease laws.
3. Provision of treatment facilities, such as free drugs and clinics with co-operative clinicians.
4. Free diagnostic laboratory service.
5. Epidemiological investigation of venereal disease.
6. An informed and co-operative medical profession.

The first point mentioned, public education, is being undertaken on an increasing scale. It is being accomplished by radio addresses, lectures, moving pictures, the provision of up-to-date literature, articles in the press, and by means of posters placed in public places. The radio addresses have been broadcast on our national radio network. The press articles on venereal disease have been published in publications having a nationwide circulation. These forms of education on a national scale have been stimulated by the Dominion health authorities. The literature distributed in Nova Scotia is the same used across Canada. Our posters on venereal disease were designed and made in Nova Scotia. These posters are being distributed in public places throughout the province. Many addresses have been given and moving pictures shown to boards of health, service clubs, civic organizations and interested groups of citizens. What has been done along this line is a start and must be continued on an increased scale. One thing certainly must be considered at an early date, that is, the education of our children, particularly of the teen-age to sexual problems and the dangers of venereal disease.

The next essential, adequate venereal legislation, is well cared for in Nova Scotia. Recent amendments to the Public Health Act give health officials adequate power to control reservoirs of venereal disease infection in their communities. Recently the venereal disease regulations were revised. These are shortly to be distributed to the local medical health officers and physicians for their use and information. We believe that these regulations which are concise and clear are among the best in Canada. One of the most important changes in legislation, however, has been an amendment to the Public Health Act concerning the reporting of venereal disease. It was formerly required that venereal diseases be reported to the local medical health officer. It will now be required that these diseases be reported to the Minister of Health.

A standard report form coming into use all across Canada will be used. I do not wish to discuss this change in reporting of venereal disease further at this time. Within a short time each physician in the province will receive a supply of these forms, together with a description of how the information reported by the physician will be used to combat venereal disease in Nova Scotia.

The third essential is one which refers to treatment facilities. In Nova Scotia we have established free treatment clinics where it has been shown that need exists. These clinics, eight in number, are located at Halifax, Truro, Amherst, Pictou, New Glasgow, Yarmouth, Shelburne and Sydney. Another is in the process of formation in Kentville.

In the areas of the province not covered by these clinics, drugs are distributed free for the treatment of patients unable to pay full fees. The physician must apply to the Department of Health at Halifax requesting these free drugs.

I believe you all are familiar with the free diagnostic laboratory service available from the Public Health Laboratories under the able direction of Dr. D. J. MacKenzie. I do not need to enlarge on these facilities except to say that in addition to the diagnostic service, containers are available for the collection of blood samples, samples of material to be examined by the dark-field method and slides in special mailing cases for examinations of smears of pus. These containers may be obtained on application to Dr. D. J. MacKenzie at the Public Health Laboratory in Halifax.

At this point I wish to mention two procedures which, although I have not put them down as essentials, are nevertheless essential in the fight against venereal disease. These procedures are the examination of all prenatal cases before the fifth month of pregnancy; and pre-marital examinations for evidence of venereal disease. No matter what the effect of venereal disease on the individual it is the home that eventually receives the greatest damage from venereal disease. I recommend then, that we must have these two procedures if we are to wage our fight against venereal disease successfully.

The essential that I have arbitrarily numbered five, refers to epidemiological investigation of venereal disease. Epidemiological investigation attempts, in brief, to find the suspected source and contacts of any given case of venereal disease. These individuals must then be examined, and if found infected, treated. This may be an activity of the health department but any investigation conducted by them, must first be set in motion by a report of a case by the physician to the health department. Do not forget that every case of venereal disease has at least one and probably several sexual contacts, all of whom need examination and treatment, if infected, as much as the patient who presents himself with venereal disease to the physician. If you wish to conduct your own investigation of venereal disease contacts well and good. If you do not wish to do this, the Department of Public Health has trained investigators who will. These investigators whom we call social nurses are distributed throughout the various health units of the Province and in Halifax City. These social nurses working under the immediate supervision of the Divisional Medical Health Officers and in Halifax, under the Commissioner of Health, have already shown their worth. These nurses conduct efficient, confidential investigations. They visit venereal disease cases and their contacts explaining the dangers of venereal disease and the importance of examination and regular treatment. We have found

in practically every case visited that the reaction of the person interviewed has eventually been one of gratitude and co-operation.

I may add that the need of special social workers became evident to the Department of Public Health, when it began to receive in numbers from the Armed Forces Medical Authorities, reports of suspected sources of venereal disease who had had sexual contacts with members of the Forces, later discovered to have venereal disease. These social workers, as I have said, have now been procured. Up to the present they have been used mainly in the follow up of these individuals who have been named as probable sources of venereal disease in members of the armed forces. The reason for this is plain when I cite the example of such reports in my own health unit, the Fundy Division. This Division has a population of about 115,000. During the year ending November 30, 1943, 116 individuals were named as probable sources of venereal disease in the armed forces. In contrast we had two reports of similar cases named by practising physicians.

This brings me to the final essential, a co-operative medical profession. Probably by now, you have realized that we, in the Department of Public Health, want reports of your cases of venereal disease. We must have these reports so that we will know how much venereal disease there is and where it is. Without this information we can take little, if any action to prevent the spread of these diseases. Without this information we cannot take special action when special problems arise. Any program the Department of Health undertakes to control venereal disease is doomed to failure unless we get this co-operation.

Let me sum up, then, a number of ways in which you as the medical profession can aid in the control of venereal disease.

1. First and foremost, report your cases.
2. Educate your cases to the need of regular treatment and adequate follow-up examinations. Use the literature supplied by the Department of Health which may help you do so.
3. Examine all contacts of the case. If you wish these individuals investigated by the Department of Health, report this to us also.
4. Report all delinquent patients to the Department of Public Health.
5. Have serological tests for syphilis carried out on all prenatal cases before the fifth month of pregnancy.
6. If you are sending in specimens from an individual who is a contact of or a suspected source of a case of venereal disease, record this information on the accompanying laboratory form.
7. No patient should be discharged as not having venereal disease, when they have been named as a contact, until repeated negative smears for gonorrhoea and blood examinations have been obtained. Suggestions as to the proper follow-up examination of contacts are contained in a circular recently sent out to all members of the medical profession in Nova Scotia by our Deputy Minister of Health, Dr. P. S. Campbell. Certain other information is contained in this circular which contains suggestions as to the management and treatment of venereal disease. It is our wish that this information will be helpful to the physicians throughout the province.

These are some of the things you can do to help. You may feel that I have over-stressed the part the general medical profession must play in venereal disease control. Certainly we do need the co-operation of the general public and in particular, the local health authorities, the legal profession, teaching profession and certain lay organizations. I have stressed this part the general medical profession must play in venereal disease control because control begins with the practising physician. If a case presents itself for diagnosis and treatment, the physician has an opportunity to start an investigation which will lead to the hidden web of venereal disease which is the greatest of our modern plagues. A case of venereal disease not reported and not thoroughly investigated is a lost opportunity in the fight against a costly, disabling, killing but preventable disease.

REFERENCES

- (1) Preventive Medicine and Hygiene, 6th edition Roseneau—p.38.
- (2) MacLean's Magazine, March 1st, 1944.
- (3) Report of the Department of Public Health for the year ending November 30th, 1943, P.65.

The Sulphonamides and Acute Ear Infections*

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HOW does the middle ear become infected? Infection of the upper respiratory tract, which in one case may involve the accessory nasal sinuses more particularly, and in another the tonsils and associated lymphoid elements of Waldeyer's Ring or may be more or less general as in influenza, or strictly local as may follow "spluttering" in an infected swimming tank, all these involvements of the naso-pharynx mean a threat to and not infrequently definite invasion of the Eustachian tubes. Now, the Eustachian tube is the normal drainage and ventilating shaft of the middle ear and its air-filled extensions. If its ciliated mucous membrane has failed to prevent invasion then an infected middle ear results.

The astonishing performance of this defensive mechanism has been set vividly before us by Dr. Proetz¹. He takes the average measurements of a maxillary antrum and multiplies them by 100, thus a 3 cm. antrum becomes a 10 foot room with an 8" ventilator. The walls, ceiling, and floor are now lined with the thinnest imaginable velvet, for the cilia even after being multiplied by 100 are still only 1/42 of an inch long and 1/300 of an inch thick. And yet if one were to place the contents of a wash-tub of molasses and a bucket of sand into that room this remarkable mechanism would discharge it through the ventilator in the almost unbelievable time of ten minutes.

This illustration helps us to visualize the Eustachian tube, not as a passive elongated hole or tube connecting the naso-pharynx and middle ear but rather as a very active organ, and when the parts it serves are infected restoration of its functions becomes the object of treatment.

The important elements in treatment aimed at the attainment of this much to be desired end are; bed, the value of bodily rest cannot be over emphasized; low-pressure hot saline douches directed against the fauces and oropharynx, the patient bending well forward to avoid coughing; heat externally; when the nose is the primary site the use of ephedrine in normal saline administered in the head-low position, along with plain steam inhalations or the steam tent; a gentle laxative is always comforting both to the body and mind; the ear "drops" are traditional and bring as much comfort to the family as to the patient and that is saying a good deal in their favour. Avoid those containing carbolic or any substance that causes destruction of the epithelium of the drum, because the appearance of the drum is our guide as to the state of the middle ear. If in spite of medical measures the drum shows that the intra-tympanic pressure is rising, the inflammatory products must be given vent by opening the drum by a free myringotomy. Almost three times as many operations on the mastoid are necessary in cases in which the drum ruptures spontaneously as in those in which a myringotomy is performed before rupture.² This minor operation is probably the best example of prophylactic surgery. In fact, few operative procedures are so pregnant with promise. Time and again one has seen the most acute and tender mastoid subside in a matter of hours, and possibilities of intracranial extension, always inherent in purulent disease in this region, fade away as mist before the rising sun.

*Delivered before the Dalhousie Refresher Course, Oct. 25th, 1943 and published concurrently in the Canadian Medical Association Journal.

Under such or somewhat similar measures what percentage would be expected to go on to recovery without a mastoidectomy and what help is to be expected from the sulphonamides?

There are reports which like that of Fisher³ of Baltimore make one feel guilty if one has failed to use a sulpha drug in acute otitis media. He observed 183 patients, most of whom were treated in the out-patient department and "whose home care was inadequate." Of 95 patients who had a paracentesis but were not given sulphanilamide, 66 required a mastoid operation; of 88 who had a paracentesis and were given sulphanilamide only 7 required operation.

Now let us consider two other reports, those of Richardson⁴, and Page⁵.

At the Massachusetts Eye and Ear Infirmary for five consecutive December to March periods, beginning in 1937, Richardson and his associates set themselves to study otitis media and to determine its best treatment. Cultures were obtained in all cases at the time of myringotomy. This exhaustive work involved the complete study of 625 ears which had to have the ear drum incised, and who were cared for until recovery; 94.7% recovered without a mastoidectomy.

Those infected by the Strep. haemolyticus numbered 179 and of these 17 had to have a mastoidectomy, that is an incidence of 9.5%. Some 20 cases in this group received sulphanilamide (none of the other 600 received chemotherapy) and of these 20 no less than 6 had to have a mastoidectomy. The author refrains from stressing that this 1/9 contributed $\frac{1}{3}$ of those having to be operated on as he feels the numbers are too small to conclude that sulpha therapy is of no benefit in such an infection.

Page, Manhattan Eye, Ear and Throat Hospital, published in 1934, what might now be called a pre-sulphonamide report on 836 ears that had had a myringotomy performed and 94.9% recovered without a mastoidectomy having to be performed.

You will note that these two studies, carried on along almost identical lines, agree to within 1/5 of 1%; in round numbers only 5% came to operation in each group.

Assuming that the patients in each group had a similar economic background and that in the same proportion "home care was inadequate", there must be an amazing difference in opinion as to what the indications for operation are to explain operating on 2 out of 3 in one group and only 1 in 20 in two much larger groups.

Can these drugs do any harm? The answer is twice "yes." Yes, in a general way, by damaging the liver and kidneys, by sensitizing on the one hand or rendering drug fast on the other, or the development of resistant strains of bacteria and so eliminating these valuable drugs from our armamentarium when a real need arises. These drugs are very clannish: if you fall out with one you are apt to fall out with all. When they kill the patient by malignant neutropenia¹², it goes to emphasize that "the practice of giving chemotherapy without proper supervision of blood and urine cannot be too strongly condemned."⁸ Yes, in a very specific sense when the ear is concerned, to be summed up in the one word "masking." Now, masking is an odd phenomenon and so far as I know is peculiar to the middle ear and its air-filled extensions, the mastoid cells. Possibly the explanation may be anatomical, the drug being unable to reach the infection in a series of air cells in sufficient concentra-

tion to inhibit the growth of the offending organism, or possibly chemical and anti-sulphonamides play the part; one such substance, para-aminobenzoic acid is definitely known to inhibit the therapeutic action of sulphanilamide when given mice infected with *Streptococcus haemolyticus*.⁶ Be that as it may, the fact remains that in spite of apparent improvement as expressed in freedom from pain and tenderness, fall of temperature and lessening of discharge, and in some rare cases the drum healing,⁸ the disease steadily progresses.

The X-ray adds little to the clinical findings in acute mastoiditis, nor in chronic disease for that matter, and its value lies in determining the type of bone—whether cellular, diploic or sclerotic—in which infection has found lodgement. Even though the X-ray is a weak reed from a pathological standpoint, it may be thought that in the presence of the sulphonamides with clinical evidence masked that surely this laboratory aid can at least suggest when something has gone awry. Listen to Law,⁷ the distinguished roentgenologist: "The drug does something to the contents of the cells whereby they are made more translucent to the roentgen-rays so much so that in cases in which the severity indicates operative intervention one cannot tell from a single film which side is involved. The opacity is practically gone."

Several years ago, when these drugs were new and enthusiasm ran high, a colleague of mine was good enough to give me for textual purposes notes on a case admitted under his care at Camp Hill Military Hospital. This man, aged 23, was admitted with a temperature of 101°. He gave a history of having had a "cold" for about two weeks and that his left ear began to ache and throb four days previously and began to discharge a few hours before admission. On examination the following day both ears were found to be discharging and the temperature was 102°. Sulphanilamide was prescribed and in three weeks' time the right ear was dry and the left showed not much more than a little moisture.

His discharge from hospital was arranged for the 20th of the month. On the 19th at 5.00 p.m. he complained of some indefinite pain about the left mastoid area. Tenderness even on firm pressure was uncertain. Temperature, pulse and respiration were normal. An X-ray was ordered in a placebo-like spirit. Six hours later he vomited, became irritable and shortly afterwards lost consciousness. An operation was performed and a far advanced infected clot was found in his lateral sinus. A lumbar puncture was done at the same time and the cerebral spinal fluid was found to be under great pressure and very cloudy. Subsequent examination of clot and fluid showed a pure growth of *Streptococcus haemolyticus*. Here then we have two intracranial complications, infected sinus thrombosis and meningitis without any evidence suggestive of their existence.

Permit me to tell you about a man aged 27 who developed pneumococcal meningitis⁹ secondary to an acute infection of the middle ear. He had had a "cold in the head and chest" and a mild degree of earache developed on November 15th. Two days later it had become sufficiently severe to prevent sleep and five days later still the ear began to discharge and the pain was greatly modified. At this stage the family physician was called who referred the case to me. On examination there was tenderness over the area of the mastoid antrum and to a lesser degree over the tip of the mastoid process. Temperature 99.5°. The membranes of the nose and throat were highly

inflamed and I started him on the routine already mentioned. The following day he was better and a week later treatment was modified almost to the point of omission, sufficient being retained for psychological rather than curative reasons as he was not really bodily fit to return to work. The following day he developed a headache but little was thought of it as he was subject to severe bouts of headache and he had been reading a great deal to pass the time, and anyhow it was better towards evening. Early on the morning of December 4th his mother telephoned that the patient had had a bad night and could hardly stand the pain in and about the left eye. Admission to the hospital was secured without delay and on his arrival the temperature was $100^{\circ}.6$, with a suggestion of sagging of the superior and posterior wall of the external auditory meatus. There was no involvement of the 5th or 6th nerves. A simple mastoid operation was performed that afternoon. This elimination of the primary focus, the first and foremost of all measures, is the operation of common denominator to all the intracranial complications of purulent disease of the ear. The following morning neck rigidity was first noticed and a Kernig sign could be demonstrated. Intravenous suladagenan (sulphapyridine) was commenced immediately, 2 grams repeated in two hours and then one gram every four hours until the 11th when consciousness returned and convulsions ceased. The same amount of the drug was now given by mouth until the 18th when the cerebrospinal fluid was shown to be sterile. Fortunately, no change in the blood or urine compelled us to stop the drug. Had such occurred it would probably have proved disastrous. "Certainly" would be a better word than "probably" because prior to 1937 no cases of recovery were reported.

I have presented to you two extreme cases: one that might have lived but died, and one that should have died but lived, one illustrating the sulphonamide in one of their worst roles, the other in one of their best.

It must ever be remembered that the sulphonamides do nothing to increase the immunity of the blood and a difference of laboratory opinion exists as to whether or not the antibodies actually suffer or not. One side contends that they are unaffected,^{10,11} the other that they may not be destroyed as such but the same end is accomplished when the normal stimulus to their formation is modified. Clinical evidence would appear to support this latter view because disease reasserts itself if the administration of the drug is stopped too soon. These drugs are bacteriostatic not bacteriocidal, consequently it still remains for the normal body defenses to destroy the invader.

A perplexing situation is not made any the less confusing by reading the leading articles on chemotherapy with their writers' varying experiences and conclusions in the treatment of acute infections of the ear. They seem to be agreed that on the average the duration of discharge is lessened, that a new chapter has been written in the successful treatment of the complication meningitis, and that the use of the drug is associated with well recognized dangers, but here the agreement ends. Some controlled series show a definite decrease in the number of cases developing surgical mastoiditis, others an increase.

In view of the fact that suppurative otitis media is more or less a self-limiting disease in which upwards of 80% of unselected clinic cases get well in anywhere from a few days to four weeks, and a much higher percentage if given the benefit of the measures outlined, the question arises are we justified in exposing 95% of such cases to the ill effects of these drugs, in

the hope of rescuing one or possibly two per cent from a simple mastoidectomy, an operation whose death rate must be almost nil, if not rushed into before nature erects her defences and localizes the disease, and operative mishaps rare in the hands of those properly trained. To quote Richardson, "the 5% incidence of cases of acute otitis media requiring a mastoid operation must be materially reduced by chemotherapy in order to justify its routine administration to every case of otitis media."

Simply because a case recovers during the administration of a remedy it must not be taken as evidence that the medicine was the cause for rejoicing. I can recall a patient of one of my colleagues in this hospital who ran a continuous high temperature for which no explanation could be found, and even a laparotomy had been resorted to but in vain. After several weeks of this kind of thing and in sheer desperation the boy was referred to the nose and throat department. Examination even by us failed to throw any light on the puzzle! Sulphanilamide had just made its appearance and a prescription was attached to the chart with the recommendation that it be dispensed without delay. Next morning the surgeon in charge called me in and showed me the patient's chart; sure enough the temperature was normal for the first time in weeks. Placing the thumbs in the arm-holes of the vest and expanding the chest I enlarged upon the wisdom of calling in a real doctor when in difficulty. My friend listened with profound attention whilst I dilated with pride on what had been done, then he turned over a page and there was the prescription that had yet to reach the dispensary! The joke was on me,—but the incident illustrates the point.

True, a valuable aid has been found in these drugs but an aid that has so changed the clinical picture of mastoiditis and its complications that it produces a false sense of security. Whilst the otologists flounder around in doubt and uncertainty trying to find their way out by recognizing new criteria which may lead to the discovery of a safe guide to their use and to the diagnosis of impending trouble in their presence, I would suggest leaving them alone where acute otitis media is concerned.

I both teach and practise that an early and free myringotomy combined with medical measures constitute a safer course for all, but particularly for those in general practice, who must supervise cases of acute otitis media in the home. I consider these drugs so precious that their use should be retained for serious conditions and not squandered on every trivial illness. In short, not to use a 15" gun to do the work of an air-rifle.

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*Modern Trends in Obstetrics

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Montreal, Quebec

THIS paper chiefly concerned three points in the management of the obstetrical patient—

1. The blood count,
2. The serological examination.
3. The rhesus factor.

Forty-two per cent of all patients investigated in the Montreal Maternity had a slight or a severe anaemia during pregnancy. This anaemia can easily be treated if diagnosed by the use of proper diet, administration of iron, vitamins or liver extract as the case warrants.

Of the serological examinations in 18,000 consecutive cases, an incidence of 2.9% definite leucic patients, only two mothers died and less than three per cent of the babies. This was on account of persistent treatment throughout the pregnancy.

The rhesus factor, a newer development in obstetrics shows that fifteen per cent of women are rhesus negative. It frequently occurs that the mother is rhesus negative and the father is rhesus positive; many of the off spring are rhesus positive from the paternal side. Consequently these babies react against the mother's blood and cause an agglutinin in her serum which when passed back through the placenta causes destruction of the foetal red blood cells with a subsequent foetal hydrops developing. So far there is no adequate treatment for this condition. Vitamine C deficiency has been suggested.

*Address delivered at the Annual meeting of The Medical Society of Nova Scotia, White Point Beach, N. S., July 5th, 1944.

Personal Interest Notes

THE marriage took place in Halifax on July 15th of Miss Natalie Hazel, elder daughter of Commissioner of Works and Mrs. R. M. MacKinnon, Halifax, and Lieutenant Gordon MacGregor Murray, R.C.A.M.C., son of Rev. Dr. and Mrs. A. A. Murray, Auckland, New Zealand, now of Sydney, N. S. Doctor Murray graduated from Dalhousie Medical School in May of this year, and is at present stationed at the Victoria General Hospital.

Dr. Henry S. Dickson, Dal. 1921, arrived in Digby from Honolulu the end of July. Dr. Dickson flew from Honolulu to San Francisco, and thence to Montreal, and is en route to Sydney to visit his mother and plans to spend a few days in Halifax. Dr. Dickson played an important part in the defence organization in Honolulu and surrounding districts on the Island of Oahu, and following Pearl Harbour, was asked to take complete charge of the district, establishing first aid posts, emergency hospitals, etc. Dr. Dickson was met at Digby by Dr. A. B. Campbell of Bear River, a classmate at Dalhousie Medical College.

The marriage took place in Pictou on July 22nd of Miss Lillian Elaine, daughter of Mr. and Mrs. Henry MacArthur, Pictou, and Lieutenant Frank Vreaghan Hazen, R.C.A.M.C., son of D. King Hazen, M.P., of Saint John, and the late Mrs. Hazen, and grandson of Lady Hazen and the late Sir Douglas Hazen, formerly Lieutenant-Governor of New Brunswick. The bride graduated from the Children's Hospital, Halifax, and McGill University, Montreal, in Public Health Nursing, and the groom graduated from Dalhousie Medical School in May of this year.

The BULLETIN extends congratulations to Dr. and Mrs. R. E. Pugh of North Sydney on the birth of a son on July 31st.

Dr. E. I. Glenister of Dartmouth who has been taking post-graduate work in Toronto for the last two years has accepted a position as resident doctor in ophthalmology at the Toronto General Hospital and the Hospital for Sick Children.

The wedding took place August 30th of Miss Jennie Churchill Allen of Arcadia and Dr. O. R. Stone of Bridgetown.

His many friends will be pleased to know that Dr. G. Victor Burton, Yarmouth, is recovering following his operation.

Dr. A. B. Campbell, Bear River, recently underwent an operation at the Digby General Hospital. While Dr. Campbell is recuperating, Dr. Douglas Black will take over his duties.

Dr. E. A. Brassett, Glace Bay, and Dr. D. J. MacMaster, Antigonish, recently went to Montreal where they will attend hospital clinics for several weeks.

Dr. and Mrs. David Drury, of Amherst, were recent visitors to Halifax to meet their son, Lieutenant J. S. Drury, who has returned from duty overseas.

Dr. W. J. Lamond, of Sydney Mines, spent several days at Charlottetown, P.E.I. recently.

Dr. and Mrs. W. R. Dickie, of Digby, spent a few days at Halifax during the latter part of August.

Dr. and Mrs. Edgar Kelley and two daughters have returned home from a visit to Dr. Kelley's mother in Yarmouth.

Dr. Eliza Kilpatrick, New York City, has been spending a few weeks with her mother at North Sydney.

Dr. and Mrs. T. R. Ford, of Liverpool, recently visited Digby.

Dr. John Hall Smith, founder of Middlesex University at Waltham, Mass., has returned to his native place, Granville Ferry. Dr. Smith has presented his valuable collection of surgical instruments to the Annapolis General Hospital. Not only has he been successful as a physician and surgeon but has taken a deep interest in all matters pertaining to the continued advance of Middlesex University.

The marriage took place in Woodside in August of Miss Frances Ethel Hewey, daughter of Mr. and Mrs. C. S. Hewey, Bridgewater, and Captain Francis A. Dunsworth, R.C.A.M.C., son of Mr. and Mrs. E. T. Dunsworth, Halifax. Captain Dunsworth is a recent graduate of Dalhousie Medical School.

Dr. L. M. Morton, Yarmouth, has again been successful in capturing the Maritime senior golf title. This is the third successive year that Dr. Morton has done so. Congratulations!

ERRATUM

In the list of Nova Scotia physicians in the services which was published in the August edition the name of Robert William Begg, of Halifax, was given incorrectly.

Also the following names were omitted:

Wilfred Leith, Flight Lieutenant, R.C.A.F., Halifax

Donald Roderick Sutherland, Middle Musquodoboit.

James Alton Ross, Stellarton, N. S.

Leads in Canada's V. D. Fight

"The most spectacular improvement in elimination of venereal disease in Canada was made in Nova Scotia last year", declared Colonel D. H. Williams chief of the Federal Venereal Disease Control Division, before a representative group of provincial and civic officials, and delegates of service and welfare organizations in the Lord Nelson Hotel last night. Ralph A. Pepper, president of the Halifax Junior Board of Trade, under the auspices of which the meeting was held, was in the chair.

The drop in percentage in cases from 35 to 18 in Nova Scotia was a remarkable achievement, the speaker said. He also paid glowing tribute to those who had been responsible for the outstanding window display in the Nova Scotia Light and Power Company, Limited, building. It was, he said, the best he had seen in Canada; and added that the designers may be asked to place like displays in other parts of Canada.

Startling Facts

Startling facts given by the speaker included the grim announcement that, in the first three and a half years of the war, more than 35,000 men had been treated in the three armed services. This had cost millions of dollars, he said.

More than 300,000 in Canada today have syphilis; 200,000 have it and don't know it; and 30,000 will die of venereal disease, he stated. He also said that in the past ten years 5,000 middle-aged men had entered hospital suffering from syphilis-riddled brains.

It was possible for a person to have syphilis and be unaware of the fact, as it had the deadly knack of lying hidden, slowly eating into the organs.

Colonel Williams advocated five means of combating the disease. This he said, was by a system of tests (1) A test of every Canadian; (2) Pre-employment blood test; (3) Premarital test; (4) Prenatal test before the 5th month; (5) A blood test for all who expose themselves to venereal disease.

He discouraged the prevalent idea that syphilis may be carried from one to another by towels, dishes, and like means, declaring that venereal disease is contracted in only one way, except where it had been inherited by some unfortunate baby because of a diseased condition of mother or father, probably both.

Four Sector Front

Four sectors make up the battlefield against the dread scourge, he said. These were health, welfare, legal and moral fields. He urged a thorough and continuous program of enlightenment. Quacks, he said, must be discouraged.

The police were proving of immense assistance in rigorously hunting down the festering spots in cities. He scored certain hotels and transportation medium which have greatly aided the spread of vice. In nearly every case where these agencies had been eliminated there has been a drop in the numbers of new cases in those localities. Liquor has proved a useful ally to syphilis.

Colonel Williams said that one of the reasons venereal disease has been given a chance to spread is because young couples have been unable, due to the economic state of the world, to get sufficient money together to get married.

Consequently, they have had to wait, in many cases, sometimes for years. This has brought about a sad condition.

There is also a great laxity by medical men in reporting cases of gonorrhoea. He did not believe that more than ten percent of doctors were reporting the cases coming through their offices, although there is a law in every province requiring this to be done.

He believed that many escaped from examination because of social standing. A little girl of the street is picked up and forced to have an examination, while the fellow who lives in the "good" part of the town goes merrily on his way.

The speaker pulled no punches in the matter. In answer to a question he stated that he had heard many reports of venereal disease being prevalent among high school girls and boys, but that he had yet to see a single case where this had been proved.

Factors in the drop of syphilis in Nova Scotia had been due to several factors. One, he said, was the splendid cooperation between the three armed forces and the civilian health authorities. There also had been perfect cooperation between the various health departments. He also praised the manner in which the attorney general's department and the R.C.M.P. were throwing their strength into the battle.

One should never let down the bars of suspicion regarding syphilis, said the speaker, for it has been called the Great Imitator, as in the early stages it so often resembles common ordinary ills. It is only when it has a firm hold that it emerges in its true colors. Sometimes it appears as long as 30 years after contact; and often appears in middle life in the form of heart trouble and mental ills. Gonorrhoea is short lived and can be killed, but is likely to burst into flames when it has been long forgotten.

When it can be determined how many women have undergone pelvic operations due to venereal trouble in the past, it will make an astounding story, the speaker declared. Gonorrhoea has caused a dropping birthrate. Countless little children that might have been good citizens of Canada have been unborn owing to venereal disease.

Progress was being made against gonorrhoea and fifty percent of cases in the army had been cured within five days, whereas hospitalization used to be twenty-one days for cases of that sort.

Mayor J. E. Lloyd of Halifax gave a warm tribute to the Colonel's address and the masterly manner in which the topic had been presented. From Halifax Mail.