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Editorial

Thoughts On Hospital Insurance

THE pamphlet "Questions and Answers on the Hospital Insurance Plan of Nova Scotia" gives a straight forward statement of the benefits available to the public. We hope these instructions to the public will be widely read and understood. If the Hospital Insurance Plan is to work it will require acceptance by the profession of a new kind of responsibility, the protection of the resources and a respect for the regulations of government. This three-cornered compact between the public, the profession and Government, is a situation the profession has been awaiting with apprehension for many years. The plan will impose increased stress on the practicing physician. In the sections of the pamphlet that follow the physician is required to determine the patient's eligibility for admission, the amount and kinds of service and length of the patient's stay in hospital. In Q. 5 an in-patient is defined as "a person who has been admitted to—a hospital **upon the application of a duly qualified medical practitioner.**" In Q. 8 the in-patient is to have "diagnostic services that are **medically necessary**" and in Q. 12 a large number of out-patient services are available (**when ordered by the physician**). In Q. 22 (regarding the length of stay in hospital)—"benefits cease when **the patient's physician** indicates that hospital care is no longer necessary."

Physicians have not sought this increased emphasis on their role of admitting officers to the public hospital system and guardians of the provincial/federal purse. It poses many problems. For example, one of the subtle dangers of any third-party interposition might be the temptation on the physician's part to have two codes—a rigid inflexible ethic for his "private" dealings and an elastic "Robin Hood" morality to apply when dealing with insurance companies, corporations, and especially when dealing with government. However, despite our reluctance to become agents of government no other group is qualified to do it and the profession would not consider for a moment handing over this control to an alien body. We must insist, for example, on the same medical necessity for hospitalization as we did when admission was restricted because of its high cost to the patient. Some time ago when discussing hospital insurance with some confreres it was said "the public will control the ordering of X-rays and determine hospital admissions. If John Doe bothers enough doctors, someone will order an upper G.I. series or apply for admission for peptic ulcer in order to get rid of him, if for no better reason." The danger is certainly there—if you believe that it costs you and your patient nothing to depart from good medical practice then there is nothing to stop you streamlining your office routine. However, if you insist on "being the doctor" 100% of the time you can withstand this pressure as you have many others.

The advent of the Nova Scotia Hospital Insurance Plan offers an opportunity for the medical profession of Nova Scotia to play a vital part in a great social experiment. Fair play and high-minded service at this time will do much to conserve our professional freedom and enable us to guard the patient's health. Government will never find cause to regiment us as long as we can solve the nation's health problems in a competent and public spirited fashion.

Even those who have the darkest vision of the future of the profession under a government-sponsored health plan might agree that our best hope of survival in freedom lies in a renewed interest and loyalty toward our professional organizations, both local and national and the strict observance of our professional duties, both legal and traditional. It is common knowledge that the profession has fallen in toils elsewhere because it allowed itself to be taken piecemeal. Surely we need a complete unity and solidarity in Canadian medicine as never before.

J. O. G.

The Susceptible State To Viral Infections

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INTRODUCTION

What is the nature of the affinities which shape the pattern of viral disease before the antibody barrier appears in the blood stream? Since viral particles have no motion of their own, and are inert outside the cell, some force not resident within them must clearly determine the preferential cell selection which viruses exhibit as they project their effects in the patterns of the various viral diseases.

I have expressed the view in this paper that cell susceptibility is itself the positive force which determines this pattern and the movement of virus between contiguous susceptible cells. Susceptibility is at present conceived as the negation of resistance, and the post infection antibody barrier the means by which resistance is acquired and maintained. But this takes no account of the phenomenon of natural insusceptibility or of the highly specific nature of most cell-virus relationships, which give rise to these distinctive patterns. Those positive cell properties towards an infecting virus which have permitted entry and lend themselves to replication, and have thus determined this pattern, have been envisaged here collectively as constituting the susceptible state of the host to that particular virus. I think it necessary to extend one's views on susceptibility and formulate such a concept for three reasons. In some viral infections cells which show wide variations in the amplitude of their function may be susceptible at one state and insusceptible at another. I have suggested that such is the case in poliomyelitis (the motor neurone) and infective hepatitis (the hepatic cell). In the second place it is difficult to envisage natural insusceptibility except as the negation of such a state. Finally it gives to the host cell a positive place in the viral infective process as an autonomous unit.

The host cell is never a static unit. It is continually under the influence of the physiological pulse and the ebb and flow of the humoral tides in the constant response of the body to function. Early in life some cell systems such as the striped neuromuscular system (the motor neurone and its respondent striped muscle fibres) the metabolic system (the hepatic cell) and the reproductive system (testicular and ovarian cells) are much less exposed to stress effects (prolonged and sustained physiological activity) than during maturation and adulthood, so that the age at which viral exposure occurs may be—as it appears in the epidemiological field in poliomyelitis, infective hepatitis and mumps,—a vital factor in viral penetration of these systems. There are then good reasons for giving the host cell a status akin to that of the infecting virus, and embodied in the concept of the susceptible state as the third pillar of the viral infective process—virus, antibody, susceptible cell.

It appears to be generally agreed that the disease pattern emerges as a result of the disturbance of cell physiology and function occasioned by viral replication within it, coupled with the general features of response of the corporate host which accompany any infective process. Unlike bacterial infections, toxic manifestations of viral infections have not so far been established as powerful factors in the disease process. It follows then that the disease pattern and the chronology of its unfolding may be important indications of the cells in which replication is principally occurring, and of the sequence in which they are affected.

With these thoughts in mind I have selected measles, poliomyelitis and the common cold as prototypes of what appear to be three fundamentally contrasting patterns of susceptibility to viral infections as they occur in passage during epidemics.

All of this may appear steep country in the field of general practice, but in the end all virological studies converge upon the individual, and it is from the individual that there must necessarily emerge an interpretation of viral disease consistent with the knowledge constantly accruing of this world of infinitely minute things. The general practitioner is well placed in this respect. He has unrivalled opportunities in the study of clinical virology, and his basic training enables him to digest and apply more esoteric but narrower studies, which he is obviously unable to undertake himself. And above all he has the stimulus of contact. Nothing enlivens curiosity more than contrast and similarity, and it is in the home where the manifestations of this extraordinary liaison between cell and virus project themselves in the shape of the symptoms and signs of viral diseases, that the vast majority run their course.

An attempt has been made in this paper to give these projections a semblance of form and substance, towards an elucidation of those nebulous abstractions which are at present embraced by the term 'susceptibility.'

THE SUSCEPTIBLE STATE

There comes a time in every new life when the protection afforded by maternal antibodies ceases to be effective and the infant becomes susceptible to the pathogenic viruses. When, during a first infection, virus disease becomes manifest, it follows that the disease pattern which becomes evident is the result of the spread of virus in the cells of the host, uninfluenced by pre-existing antibody. The cell affinities which determine such spread are collectively envisaged in this paper as constituting the susceptible state of the host to that particular virus.

At least three patterns of susceptibility are discernible as successive viruses infect a community. There are those in which silent immunizing infections are rare and virus contact induces the whole of the disease pattern regularly and unfailingly as in measles. There are those in which silent infections are the rule and overt disease appears only in the few as in poliomyelitis. There are those in which the disease recurs from time to time throughout an individual's life as in the common cold.

In the first of these all the conditions required for the development of the major disease appear to be present on contact, a condition which may be referred to as **primary susceptibility**. In the second group, for reasons to be stated, the conditions required for the development of the major disease appear to occur only in those in whom the stress of function, by altering cell states, furthers the field of viral penetration, a condition which may be referred to as

secondary susceptibility. In the third group a successful re-infection occurs from time to time throughout an individual's life, a condition of **recurring susceptibility.**

Generally speaking, the constancy of the disease pattern over the whole field of clinical virology enables the physician to diagnose with accuracy most of the viral infections which come his way. This can only mean that a high degree of specificity exists between virus and host cell in each disease, for otherwise atypical patterns would be frequently encountered in the common viral infections, which is seldom the case. Moreover, when variation does occur, such variations also follow a regular pattern, for instance in the orchitis of mumps, and the neural complications of poliomyelitis. In the former such an extension of the disease is never seen before puberty. It may thus be reasonably inferred that the cell changes in the testicle which accompany puberty also bring about a new relationship towards the virus of mumps. In poliomyelitis it is also this view, for reasons to be stated, that the stress of function is the determining influence in the extension of poliomyelitis into the central nervous system. Virus particles which replicate in this new environment must inevitably be influenced selectively in favour of growth in such cells. The three patterns of susceptibility will be considered from this point of view by reference to the prototype mentioned.

THE SUSCEPTIBLE STATE TO THE VIRUS OF MEASLES

All first encounters with the measles virus almost always result in the development of the typical disease. The pattern in each case is of a most remarkable consistency, so that it can be confidently presumed that an identical chain of events unfolds from beginning to end in each individual and every epidemic. The intensity of the disease, however, varies considerably in different epidemics, so that batches of quite mild and quite severe measles may be seen over the years.

Measles is currently regarded as an epithelial virus affecting chiefly the skin and lung. A consideration of the clinical pattern as it unfolds, however, suggests that replication in the endothelial lining of the vascular tree may play a large part in producing the characteristic clinical spectrum.

The first symptoms and signs are always referable to the portals of entry. These are the conjunctivae, the oral mucosa and the nasal mucosa. The epithelial erosion constantly occurring in these regions probably favours primary inoculation at these sites. The conjunctivae are especially exposed to droplet infections and also to an incessant stream of dust particles which are removed by lachrymation and blinking. Koplik's spots occur mostly on that part of the buccal mucosa which is rhythmically projected between the grinding surface of the molars during mastication, by which means the food is repeatedly returned to the centre of the mouth for moistening into a bolus after being crushed by the teeth. They are sometimes seen at other sites of friction in the mouth and may be reasonably assumed to be sites of primary inoculation of droplet-borne virus. The premonitory symptoms are always related to the portals of entry. Thus there is conjunctival injection, lachrymation, sneezing, Koplik's spots, pharyngeal injection and cough. On about the third day, gastro-intestinal and pulmonary symptoms appear with a rise in the respiration rate and a general worsening in the condition of the sufferer. The rash then makes its appearance, first about the ears, forehead, nose and mouth, then up the scalp and down to the neck and along the arms. The back,

abdomen and legs follow, and it appears last on the palms of the hands and soles of the feet. The rash recedes in the order in which it first appears and sometimes the first formed rash is already fading whilst that on the limbs is emerging.

There is then a chronological sequence of events commencing at the portals of entry where virus might first be expected to mature, and extending centrifugally to the distal parts of the body and terminating in the order of their coming. The essential clinical pathology of the lesions giving rise to the symptoms and signs as they appear is that of a serous exudation causing a displacement and necrosis of the over-lying cells in the mucous membrane and skin, giving rise to the mucous and skin rashes, and an exudation of serum into the peri-bronchial tissues and pulmonary alveoli, giving rise to moist sounds at the lung bases, and congestion in the liver, kidneys, brain and the lymphatic tissue of the intestine.

In the skin the rash starts around the superficial vessels of the corium with the characteristic exudate of serum and sometimes red cells. The vascular endothelium is swollen with cytoplasmic granular change. The exuded serum produces swelling and vacuole formation in the epithelial layers and together with red blood corpuscles and pigment adhering to damaged and dead endothelial cells, gives the skin its characteristic post-measles tint.

Electroencephalic studies of children suffering from measles, but with no clinical evidence of involvement of the central nervous system, show a high proportion of deviations from normal. Of 189 patients aged four months to twelve years, 74 were abnormal of which 48 were grossly so. In the great majority such a change was transient, recovery ensuing within a week with but four exceptions. Of the exceptions one remained abnormal and after two years developed typical grand mal attacks. Such changes were considered by the authors (1) to be quantitatively and qualitatively similar to those previously found in 33 patients with encephalitis as a complication.

Electrocardiographic studies of 106 patients similarly showed transient deviations from normal in 20 of them. (2)

What may be the interpretation in terms of cell-virus relationship to this singularly consistent wave of exudative phenomena which passes through the body in each case of measles and terminates when the extremities of the vascular tree have been reached? It would be remarkable if it did not in some way sign-post the advance of virus during its spread through the cells of the host, just as poliovirus denotes its activity in the motor cells by the appearance of paralysis in striped muscle. Taken in conjunction with the changes in the vascular endothelium, it appears likely that what the physician witnesses may be the result of replication within vascular endothelial cells progressing from the portals of entry by contiguous intracellular spread until the limits of the vascular tree have been reached.

The transitory nature of the changes noted in the encephalogram and electrocardiogram suggests that such disorders are the result of a temporary disturbance of vascular function rather than replication in the cortical cells or myocardium, and that what is witnessed in the capillaries of the skin is manifested with the same variations of intensity in the capillary endothelium elsewhere. The great resurgence of symptoms which occurs when the vast capillary bed of the lungs is affected and again when the reaction is at its height in the capillary network of the skin, and the dramatic decline in spite of a prolific viraemia when the last of the rash appears, lends additional support to the view that measles is in essence a virus disease of the vascular endothelium.

Several instances of sustained hypertension following measles in young adults have occurred in the writer's practice. These cases are being collected with a view to ascertaining whether the association between measles and some forms of vascular disease in young adults is one of cause and effect.

Because the major disease follows infection of otherwise healthy individuals, measles is here regarded as a primary susceptibility occurring at the physiological level of cellular activity.

THE SUSCEPTIBLE STATE TO POLIOVIRUS

POLIOVIRUS infections fall sharply into two groups, namely, those which are wholly inapparent or accompanied only by minor disturbances, and those in which the central nervous system is also involved. This last group is an epidemiological enigma. Why is it that during a poliovirus epidemic the few suffer from infection of the nervous system, whilst the great majority do not? Clearly either virus acquires new properties of penetration of the neural pathways or the host undergoes changes which favour such, or that by a combination of both circumstances the cell-virus relationship increasingly favours strains of virus tending to neurotropism. This last viewpoint is presented here.

It must be pointed out that while mankind as a whole appears to be an alimentary susceptible to poliovirus, neuro-susceptibility is uncommon in the intact individual. That is to say that while during life indisputable evidence of systemic poliovirus infection is manifest from serological studies, there is no corresponding evidence that the central nervous system is infected at all except where paralytic poliomyelitis has occurred. This is borne out by animal studies. On feeding poliovirus to chimpanzees Bodian (3) found no evidence of infection of the central nervous system after sacrifice in spite of a viraemia during life. On the other hand, he found that the same strain of virus introduced directly into the central nervous system produced paralytic poliomyelitis. It is also known that poliovirus can enter the neural pathways through the protoplasmic core of the motor axon.(4) Is there, then, in the intact animal, one state of the motor neurone which will allow access of virus to the grey matter proper, and another which will deny it during the viraemic phase of the illness? It is this view that such is the case and that from a study of clinical poliomyelitis there emerge patterns of neuro-susceptibility consistent with the many procedures or states which are known to predispose an individual to the paralytic disease. After a general consideration of neural poliovirus infections such patterns will be separately described.

Neural Poliovirus Infections

Poliomyelitis is known to be associated with several procedures or states which are quite transitory so that in the intact animal susceptibility in the nervous system must clearly be a variable. The predilection of virus for those nerve cells which innervate striped muscle suggests that this variable is associated in some way with the functional state of the striped neuro-muscular system at the time of infection. Moreover, the existence of two forms of striped muscle, namely the voluntary striped muscle which moves the skeleton and controls facial expression, and the specialized involuntary striped muscle

of the pharynx and upper oesophagus which performs the involuntary stage of deglutition, finds a suggestive counterpart in the existence of the two clinical types of the disease, spinal-type occurring when the motor neurones of the first group are affected, and bulbar-type when the motor neurones of the pharynx are involved.

It would appear unlikely that the known clinical associations of poliomyelitis each reflected a different facet of the susceptible state. It is suggestive then that in all such associations motor neurone stress is a likely common factor. Any conditions which give rise to prolonged and sustained activity of striped muscle, either voluntary or mediated through the reflex arc, must necessarily effect such through the motor neurone which is the "final common path" transmitting all motor impulses. All the known predisposing associations of poliomyelitis have in common new conditions arising in relation to striped muscle groups which might be expected to induce such motor neurone stress. It is this view that such a state is an essential biological requirement of virus for a successful penetration of the motor axon, and thus to its associated pathways in the grey matter proper.

Because the striped neuromuscular system functions through the agency of willed movement, as in effort, or through the reflex arc, as in response, stress patterns might be expected to fall into *effort* and *response* categories. It is significant that all the associations of poliomyelitis fall into one or other of these groups which will now be considered.

(1) The Effort Pattern of Neuro-Susceptibility

The hazard to which the mature voluntary neuro-muscular system is exposed in a non-immune is well illustrated in the report on Poliomyelitis in the Arctic(5) when the Eskimos of Chesterfield Inlet—a "virgin soil" population vis-a-vis poliovirus—suffered an epidemic of acute poliomyelitis in the exceptionally severe winter of 1949. This report is freely drawn upon to illustrate the common pattern of susceptibility in motor neurones following physical effort.

The Eskimos of this tribe are nomadic, depending for their existence on the dog-sleigh as a means of seal hunting and trapping. They live in snow igloos which they build as occasion demands when the long winter season is upon them, and feed on the raw meat which they hunt, and on the products of the trap line, exchanging the skins for milk powder, tobacco and other small luxuries, at the trading centre many miles away. Such hunting and trapping expeditions are long and arduous, and form the pattern of life of the youth and manhood of the community during the winter. The living conditions in their igloos are crowded and insanitary. They soil the ground freely and have no personal or community hygiene so that the community may be expected to become infected as a unit.

Preceding the Chesterfield Inlet epidemic there had been several cases of paralytic poliomyelitis and some fatal ones in the Eastern Arctic, so that a virus with neurotropic affinities was clearly distributed in that region. A white missionary, unaffected himself, was thought to be the carrier, and the disease commenced as an acute infection with fever, headache, and gastrointestinal disturbance affecting 50% of the population. The majority recovered, but in many, after two or three days of comparative well-being during which most returned to their usual activities, the paralytic stage followed with a return of fever and headache and pain in the back. Forty-four males

and twenty-seven females were paralysed or died, a preponderance of males only partly accounted for by the fact that 53.5% of the population is male.

A characteristic of the physical effort pattern of susceptibility was well illustrated by the complete absence of paralytic cases in children under the age of three, and only two cases in the three and four year age groups. Otherwise all ages were affected up to and over 65, as may be well understood in a community of non-immunes; 14 people died and 57 were permanently paralysed a proportion of 5% and 14% of the total population. Death was by an ascending paralysis finally affecting the muscles of respiration.

The absence of any bulbar signs such as difficulties of swallowing or phonation was especially emphasised and in no case was pharyngitis or throat infection mentioned throughout the report.

An analysis of the muscles affected in 50 cases was as follows:

Trunk.....	24
Left lower limb.....	32
Right lower limb.....	31
Left upper limb.....	23
Right upper limb.....	10
Bladder.....	2
Diaphragm.....	2

What is striking about these muscle groups is the equal incidence of paralysis in the lower limbs, but the striking preponderance of left arm paralysis over right. This together with the overall preponderance of males seems likely to reflect the stress of travel on the dog sleigh, where the legs and left arm are used to guide and push the sleigh where the going is rough, and again to hold on with when the going is good, while the right arm holds the whip and enjoys comparative rest for prolonged periods.

One may ask why in such a virulent epidemic bulbar poliomyelitis was not in evidence. It will be recalled that the striped muscle of the pharynx is involuntary and is innervated by the ninth, tenth and eleventh cranial nerves. It is this view that as a consequence of this the pharyngeal neurones are only at risk following sustained reflexly induced activity, as from the trauma of tonsillectomy or some forms of infective pharyngitis. (See below). Since these conditions of susceptibility were completely absent from this epidemic, the pharyngeal neurones were not at risk and bulbar poliomyelitis not in evidence.

Because of the relative infrequency of non-immunes in populous communities, epidemic spinal poliomyelitis of this type is rarely seen. Nevertheless, the effort pattern of susceptibility appears especially during Summer when those outdoor activities enjoyed during the long days and fine weather tend to increase the hazard of the voluntary muscular apparatus in those few who, for one reason or another, have escaped an early systemic immunizing infection.

Infection during the physical effort pattern of neuro-susceptibility thus finds its main incidence upon the lumbar and cervical enlargements of the cord distributing the motor neurones of locomotion and manual exertion, and on any muscle or muscle groups which are brought into sustained use for prolonged periods. For this reason, infants are spared neural infection purely by inaction. For this reason also, whooping-cough epidemics have been sometimes instrumental in precipitating the paralytic disease.(6)

Death when it occurs is from paralysis of the respiratory muscles, and because the pharyngeal neurones are not at risk they are clinically the "dry" cases, in which pharyngeal pooling does not occur.

The effort pattern of susceptibility is well recognized in the vast literature which has now accumulated concerning this disease. It has been long known that those most physically active and in the best of health are frequently afflicted, in contrast to the more indolent members of a community. Thus there are reports following athletic competitions (Abrahams), sculling, cycling, tennis, swimming and even bi-lateral masseteric paralysis occurring in a lawyer after many days of legal exposition in court. A tacit acknowledgement of such a state is the advice tendered during epidemics to refrain from exhausting physical effort.

(2) **The Response Pattern of Neuro-Susceptibility**

Just as prolonged and sustained voluntary effort in a non-immune is a hazard to the **exciting** motor neurones during the viraemic phase of polio-virus infection, so too does it appear that prolonged and sustained reflex response to new conditions arising in or about striped muscle groups promotes a similar hazard in the **responding** motor neurones. The response patterns of neuro-susceptibility are as follows:

- a. The post-inoculation pattern
- b. The gravid pattern
- c. The traumatic pattern
- d. The pharyngeal pattern.

(a) **The pattern of post-inoculation neuro-susceptibility**

The reflex response to any irritant on sensitive tissue is a hypertonia of overlying or adjacent voluntary muscles. This is well illustrated in the board-like rigidity of the abdomen following a perforation, or the more localised rigidity observed in inflammations of the appendix or gall-bladder or in a limb after trauma, and so on.

In an exhaustive survey of this particular aspect of poliomyelitis by the Medical Research Council(7) it was concluded that inoculation genuinely predisposed to paralysis, and did not merely determine its site. The non-specificity of the injection, its increasing risk with increasing irritation, and the segmental relationship of the paralysis all point to a functional interpretation of the phenomenon and that reflexly induced motor neurone stress gives rise to a segmental susceptibility in the respondent neurones in a manner similar to that observed after prolonged and sustained physical effort. It will be noted that the inocula concerned are those designed for a prolonged stay at the site of injection.

When infection occurs during post-inoculation susceptibility it is of the spinal type, segmental in distribution affecting the inoculated limb, bulbar signs being absent because the pharyngeal neurones are not at risk.

(b) **The gravid pattern of neuro-susceptibility**

The gravid uterus at term, together with the foetus, placenta, liquor and membranes, weighs up to one tenth or more of the total body weight. Of the new factors arising in pregnancy, it appears significant that the neurones of those muscles supporting this considerable burden are also those which show the enhanced susceptibility observed during the pregnant state.

The shot-gun term 'hormonal' is commonly employed to account for this enhanced susceptibility, but most observers agree that it is the spinal neurones which are especially affected, and it seems unreasonable to suppose that hormonal influences are not generally distributed to all motor neurones including those of the foetus. Studies of this aspect of poliomyelitis in New York City(8) concluded that "the increase in paralytic cases observed during pregnancy appeared to be limited to the spinal type of disease. It was noted in the second and third trimesters only, particularly in the last, and affected chiefly the lower limbs. It was not accompanied by a parallel increase in bulbar or bulbo-spinal paralysis. . . . Since death occurs most commonly in the bulbar cases it is not surprising that the mortality rate was reduced in pregnant women. Only two deaths occurred, both in the last month of pregnancy."

Caesarian section affords an opportunity to observe one of these muscle groups in the last trimester. It may be then seen that both rectus abdominalis muscles are displaced laterally and form a cup-shaped sling for the support of the fundus uteri. It is scarcely conceivable that the support of these muscles is purely passive, and that the elongation which has occurred is not accompanied by a prolonged reflex response. Making due allowance for the overlapping of effort and other response patterns of neuro-susceptibility in a non-immune it seems reasonable to conclude that it is the response of the pelvic, abdominal and thigh muscles to the progressive enlargement of the uterus which is the determining influence in the heightened susceptibility of these neurones.

Infection occurring during the gravid pattern of neuro-susceptibility is therefore spinal in type, affecting principally the anterior and lateral muscles of the abdomen and the pelvic and thigh muscles, all of which are principally concerned in supporting the enlarging uterus. Because of the uterine displacement of the diaphragm in the last trimester, the extra taxing of the respiratory muscles frequently results in severe degrees of respiratory failure.

(c) **The traumatic pattern of neuro-susceptibility**

A history of trauma is frequently obtained as a precipitating influence in poliomyelitis and is either related to the musculo-osseous system as in fracture, severe contusion or severe sprain, or in the pharyngeal cavity following tonsillectomy. In all forms the neurones of the responding hypertonic muscles are those affected.

(d) **The pharangeal pattern of neuro-susceptibility**

The unique nature of the striped involuntary neuro-muscular system of the pharynx gives the pharangeal neurones a special place in poliovirus susceptibility because of the great ease with which they are thrown into the hyper-active state. The lightest touch on the pharangeal mucosa is sufficient to throw the whole of the pharynx into activity so that, as a consequence, any new conditions arising in the pharangeal cavity must receive special consideration in relation to susceptibility in the pharyngeal neurones. One such, namely tonsillectomy, has already passed into general acceptance as a predisposing cause of bulbar poliomyelitis. A second and more important one, namely infective conditions within the pharyngeal cavity, has not yet been viewed in that light, perhaps because it has been generally assumed that the pharangeitis of poliomyelitis is a part of the disease rather than a condition of neuro-susceptibility, and a product of poliovirus activity rather than a reason

for the passage of virus up the pharyngeal neurones. A transient discomfort in the throat is a frequent accompaniment of the enteroviral infections. With this in mind, a form of infective pharyngitis precipitating bulbar and bulbo-spinal poliomyelitis will be described. Such infections will be referred to as the infective pharyngitis group of illnesses.

Infective Pharyngitis and Poliomyelitis

In the Manitoba epidemic of 1953, one such pharyngeal illness was seen with great frequency in the writer's practice which was then in the farming district of Elgin, in the countryside of that province. (9) Paralytic poliomyelitis is an all too frequent visitation in Manitoba, and the country dwellers as a consequence have a considerable insight into the disease and will quickly seek advice on any infections of the throat which may occur. During the Summer a severe epidemic of poliomyelitis had occurred in Winnipeg, 160 miles to the north-east. Poliomyelitis did not strike Elgin until November, when villagers were once again beginning to visit and return from that city. Running quietly on through the whole of the Summer, however, was an epidemic of acute pharyngo-tonsillitis. Clinically it commenced as a sore throat with an illness curve rising slowly, remaining at a peak for two or three days and then tailing off slowly, the whole lasting up to a week. It was accompanied by moderate fever up to 102° , a mild constitutional disturbance and diffusely swollen plum red throat affecting tonsils, fauces and pharyngeal wall. It was insensitive to penicillin. It varied from quite mild to quite severe, occurred singly or as multiple house cases, and was seen with especial frequency in farms. It was called abortive poliomyelitis, but there appeared to be no justification for this diagnosis.

In November these cases, though at first clinically identical, acquired new characteristics. Sporadic cases of fever and gastro-intestinal disturbance were occurring at the time throughout the village. One girl, aged eleven, who had been visiting Winnipeg, slept with her friend on the night of her return to the village. The friend developed an acute but otherwise symptomless febrile attack three days later, which quickly subsided. The returned visitor at the same time developed a typical attack of acute pharyngo-tonsillitis, and on the third day of her illness was confined to her bed and seen by the writer. On the morning of the fifth day, arm and hand weakness was developing and severe bulbo-spinal poliomyelitis was eventually to be her lot. Eleven cases of paralytic poliomyelitis occurred subsequently, with one death. Five cases occurred in a single home, four children being of the pharyngeal type of onset, and the father (following a deer hunting expedition) of the effort type. The fatal case was a farmer aged thirty-one. He had contracted a severe pharyngo-tonsillitis whilst paring the horns of his cattle in preparation for their winter quartering. He died within a week from pure bulbar poliomyelitis, confirmed at autopsy and by viral studies.

What then was the significance of the pharyngo-tonsillitis? Was it poliovirus or a distinct illness causing susceptibility in the pharyngeal neurones?

It will be recalled that in the Chesterfield Inlet epidemic where at least half the population was affected, no single case of pharyngitis was recorded and no bulbar symptoms occurred at all. Moreover, in tonsillectomy where the same neurones are involved purely by trauma an association with severe bulbar poliomyelitis has already been established. It was therefore concluded that the agent of this infection was the pilot agent of susceptibility to this

outbreak of epidemic poliomyelitis, and that the infective pharyngitis group of illnesses as a whole form the background of epidemic poliomyelitis in proportion as they are able for several days to excite the delicate pharyngeal mechanism. Its frequent occurrence in farmers and cattle handlers and their families suggested a causal relationship and the possibility that bovine staphylococci or diphtheroids played some part in this form of infective pharyngitis.

In a factual analysis carried out by the Canadian Foundation of Poliomyelitis(10), Alberta Chapter, it was evident that the Elgin epidemic as a segment of the Manitoba epidemic of 1953 resembled in all respects the general and local outbreaks in that province in 1951-52. Here again farmers and their families were most afflicted and the many cases treated at the outset with penicillin or aureomycin is presumptive evidence that the pattern of the disease was frequently preceded by a throat infection.

The parallel with the segmental effect of an irritant inoculum cannot escape notice and the variations in intensity in different individuals and epidemics suggests that both the provoking and the response factors vary in different epidemics and individuals.

Infection during the pharyngeal pattern of neuro-susceptibility thus finds its main incidence on the neurones and nuclei of the ninth, tenth and eleventh nerves, and for that reason is the form of the disease attended with the highest mortality. Since pharyngeal paralysis is a common sequel, these cases are of the "wet" variety in which pharyngeal pooling is a major complication.

(3) Response-Effort Patterns of Neuro-Susceptibility

Mixed patterns are frequently seen as the bulbo-spinal type of the disease, since the spinal neurones are at risk even by minor effort once the virus is established within the motor system. (Russell). When the pharyngeal neurones are not at risk, however, the type of disease remains purely spinal. For this reason spino-bulbar poliomyelitis is not seen as a developing clinical pattern.

The Neuro-susceptible phase

Where the pattern of neuro-susceptibility follows a procedure such as inoculation or tonsillectomy, the patient is found to enter the neuro-susceptible phase on or about the fifth day, and to persist until about the thirtieth day after the event. These limits evidently represent the stress and recuperative stages in the response of the neuro-motor units during which time those units which governs the hyperactive muscles from the pre-central gyrus down to the motor neurone enter and leave the susceptible state. From a study of the cytopathogenic changes observed in serial sections ranging from complete destruction to reversible chromatolysis or no change at all, it seems likely that the cell states between these extremes of activity, coupled with the strain of virus, determines the intensity of the infective process within them.

It is inconceivable that the elective site within the motor system should be determined by chance alone, or that the infrequency of attacks during infancy be determined solely by maternal antibody. From the clinical associations already mentioned, it can only be concluded that the motor neurone is the arbiter of the disease process presenting a barrier to virus at the physiological level and a pathway during the phase of stress.

Because the response and activity of the neuro-muscular system is much retarded during infancy before myelination is complete, the disease is uncommon under one year and is correspondingly more severe as the peak years of physical maturity are reached. Thus factors affecting striped muscle tone and activity which are or no consequence in an immune community become increasingly important in one which is incompletely immune during a poliovirus epidemic.

THE EVOLUTION OF A POLIOMYELITIS EPIDEMIC

How is natural immunity acquired so silently and with so little evidence of poliovirus infection? It is now becoming clear from reports on the serological epidemiology of poliomyelitis from many parts of the world that immunity to poliovirus is acquired in the vast majority independently of poliomyelitis epidemics. In the village of Bettws-y-coed in North Wales, for instance, no case of paralytic poliomyelitis has been recorded since notification first commenced in 1912, and yet antibody to type 1 was higher than comparative figures in Liverpool or Cairo.(11) It seems likely from the data presented in this and other papers that in the early months of life, when neuro-susceptibles are rare, silent alimentary infections occur which by reason of the absence of neuro-susceptibles remain true to type, that is enterotropic. Where the social order is such, or where geographic isolation ensures that early immunizing infections are less frequently acquired, infections may occur under conditions such as those in Manitoba which, having given rise to many neuro-susceptibles, some selection in favour of neurotropism is bound to occur in those virus particles which have replicated in neural tissue.

An influx of adult non-immunes into a community is thus in itself a potential source of neurotropic virus since it incurs the risk that benign endemic virus may acquire neuro-tropic characteristics in perpetuity so that immunizing infections from this source may thereafter be more frequently accompanied by the paralytic disease. Troop movements into foreign countries during the war provided many illustrations of this phenomenon. In the Malta (1942) epidemic for instance, after forty years of occasional sporadic cases, 93% of the paralytic cases among the Maltese were in children mostly under the age of five (426 cases), whilst of the 61 adult cases aged twenty and over only four were Maltese, the remainder being British Service personnel. Major epidemics occurred again in 1945 and 1951.

This phenomenon was also observed by Gear(12) in the widespread epidemics which occurred in the Union of South Africa in 1945 and 1948. He states, "Paralytic poliomyelitis was ten times as frequent in the European as it was in the Bantu. It was also apparent that, among the Bantu population the majority of cases occurred in infants under five years of age. Among the European population there were as many cases in the 6 to 10 age group as in the 0 to 5 age group. However, there was no doubt that when the disease was epidemic among the Europeans it was also epidemic among the Africans, and that *among the latter there was a higher prevalence of paralytic disease than had ever been observed before.*" (Author's italics).

Thus the epidemiology of poliomyelitis appears to be in its broadest sense that of motor neurone stress during the viraemic phase of a poliovirus infection, either from voluntary effort or mediated through the reflex arc. Any new condition or state in a non-immune in which the response of the individual

is that of prolonged and sustained striped muscle activity may thus be considered as promoting a susceptible state to poliovirus in the respondent neuro-motor units.

Because the development of the major disease is secondary to changes wrought by function, poliomyelitis is here regarded as a secondary susceptibility and a prototype of the enteroviruses generally which, by reason of the same deferment of infection, are also undergoing a similar transition of pattern.

The Transition of the Enteroviruses

Those who have lived and worked among the teeming, close-packed populations of the East, where sanitary disposal, water purification and infant hygiene do not exist, may perhaps better appreciate how early distribution of entero-viral and entero-bacterial disease, while resulting in an appalling infant mortality rate will, at the same time, provide a comprehensive entero-viral antibody barrier to the developing cell systems in those who survive.

When pure water and piped sanitation were introduced into the cities and towns of the Western world epidemics of cholera, typhoid and dysentery practically disappeared, and it is reasonable to suppose that with them also gradually went those early immunizing influences of the once ubiquitous enteroviruses. They are appearing as a consequence epidemically as this immunological hiatus becomes filled later in life and, like the polioviruses, the Coxsackie and echo viruses, (and probably I. H. virus), all show new cell affinities manifested at present in the 'new' viral epidemics. For just as epidemic poliomyelitis has replaced sporadic cases of infantile paralysis, so too has epidemic infective hepatitis replaced cararrhal jaundice, epidemic echo meningitis replaced sporadic cases of benign lymphocytic meningitis, and epidemic Bornholm disease and epidemic Coxsackie meningitis replaced sporadic infections with the Coxsackie viruses. In all of these diseases a biphasic pattern may be frequently observed as the primary enteric infection and viraemia are followed by a period of comparative well-being, as replication mounts in the newly adapted cells. Looking broadly over the epidemiological scene the premonitory indications of these new adaptations appear as small localized outbreaks of unusual pattern which in later years become increasingly widespread and eventually nation-wide, provided the condition of exposure remain unchanged.

A virologist in the preparation of a live virus vaccine such as yellow fever vaccine seeks by passage through new cell environments to divest the original strain of its viscerotropic affinities, while at the same time retaining its serological identity, and therefore its immunizing influence. It should occasion no surprise when this process is seen in reverse during natural passage, as man-created conditions defer exposure to a time when the activity, function and response of the individual cell is at its greatest amplitude. The diversity of enteroviral epidemics now making their appearance may reasonably be regarded then as a natural sequel to Western civilization.

THE SUSCEPTIBLE STATE TO THE COMMON COLD VIRUS

While there are a number of upper respiratory infections which give rise to similar symptoms, the pattern of the common cold is of a consistency which suggests that the cell-virus relationship is the same with each re-infection. The disease divides itself naturally into three stages, first the head cold with a premonitory tickle in the nose, followed by sneezing and copious mucoid discharge, then the mid period affecting the trachea and larynx, and finally

the chest cold with cough and rawness of the chest. The stages appear at the first, third and fifth days of the disease, and in the absence of secondary infection rapidly clears up. From the sequence of the symptoms the suggestion is once again that of intracellular spread from the portal of entry.

As with other surface infections such as herpes simplex, the role of neutralizing antibody is less sure than in those diseases where viraemia is a part of the disease process, so that the cycle of infection may be determined by the frequency with which desquamated cells are renewed, thus favouring a primary re-infection. Because the infection recurs, the common cold is here regarded as the prototype of a recurring susceptibility.

THE CELL-VIRUS RELATIONSHIP

The knowledge that the cell-virus relationship may take a proliferative form as in myxomatosis and fowl paralysis, a lysogenic form in which both cell and virus regenerate together as in some bacterial viruses and the Rous sarcoma, and a form in which virus particles are liberated from the cell as in the acute infections, and also that the affinities of animal, plant and bacterial viruses are mutually exclusive, tends to suggest that such a relationship was a part of a mechanism of cellular evolution and that virus represents fragmentary forms of parthenogenesis which have survived as a satellite order, knowing growth and reproduction only as they become identified once again with the cell-type which by accident or descent most closely resembles an ancestral parent. However this may be, in poliomyelitis the effect of the cell upon the virus as the arbiter of the disease process is, in this view, paramount. So too does it appear probable that in the hepatitis of the battlefield where great numbers of men are subjected to uniform conditions of metabolic stress such as hunger, fatigue, exposure and low quality diet, that it is a common hepatic cell state which gives to systemic virus its hepatotropic impetus and which, by passage through identicals, vests the virus of infective hepatitis with powers greater than the sword of Napoleon.

May it not be the case that the ever changing, ever responsive cell has been too lightly regarded in the cell-virus relationship which determines the outcome of the infective process? Entry, eclipse and replication of virus particles are phases of virus development each of which requires a reciprocal response on the part of the host cell—a relationship which may have long preceded the evolution of the corporate host and the superlative marvel of the antibody response.

It has appeared reasonable, therefore, to seek in the function, anatomical connections and physiology of the cells principally affected, common factors which might afford a basis for a logical interpretation of what is otherwise an unpredictable disease process. Much of what has been written here is inductive and may or may not be borne out by project research. But the concept of the susceptible state as here defined has every appearance of reality in practice as successive viral infections pass through a community. It is this view then that whilst many strains of orphan or other virus continue to be uncovered in the laboratory, the machine which transmutes them into the agents of active disease is the living cell, at the physiological level, or under the stress of sustained function, or in response to environmental influences or endogenous changes affecting the cells and their tides with the passage of time.

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TISSUE AND ORGAN HOMOTRANSPLANTATION*

Clinical and experimental evidence gathered in the past fifteen years suggests that homotransplants of tissues are rejected by the host on the basis of antigen-antibody reaction. The reaction is specific between an individual host and donor but not for the particular tissue. In identical twins and in patients with agammaglobulinemia, permanent survival of skin and kidney homotransplants has been reported. Structural tissues such as cornea, cartilage, fascia and bone may be successfully transplanted, because survival of the cells of the transplants is not essential for useful function of the graft. Survival of a homograft of this type is marked by local leukocytic infiltration, predominantly lymphocytic, and final dissolution and replacement of the homograft.

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*From Medical Abstracts, December, 1957.

Some Observations On Home Visiting

Miss Phyllis Dickie, R. N.

Public Health Nurse

ALL the world's a stage and [all the men and women merely players." When I am [visiting in the Chester area, Gregory Peck may be a Mr. Jollymore or Mr. Swinimer and Marilyn Munroe, with altered dimensions, may be Mrs. Meister or Mrs. Rafuse. The scenes oft times compete equally well with those showing at the "Drive-In" or "Kenerick" in the field of tragedy, comedy or drama.

The home visiting involved in our work takes us into almost every home in the district where we work, particularly if the nurse is stationed in one area for a number of years. It offers opportunities for health education not found in other places where we meet people during our working day; i.e., school or clinic. The family is not expecting us so we find people as they usually live. I find it preferable to go to the kitchen door in rural areas, that is where the family spends most of its time as a unit. There you get a more realistic impression of family health standards—meal preparation and content, dishwashing methods, garbage disposal and other sanitary matters. Hand washing facilities are nearby. The busy housewife can continue to pare potatoes or watch over her cake in the oven while she talks with you. Accident hazards are often obvious; such as, the javex bottle the toddler finds in the cupboard under the sink, or carelessly placed knives. These things can never be learned about a family over a clinic desk or in the spic and span parlor, sitting ready to make the most favourable impression on those who enter, that family circumstances or budget club will allow.

I plan to have some definite reason for visiting in each home so that when the door is answered I can introduce myself and say I've come to see you because "Your children are due for another patch test," "You have a new baby," "Your sister, Mrs. Brown, told me you were expecting a baby and she thought you might like to have me call," or "I visited the school today and saw your son."

An infant in the home is the primary reason for many of our home visits. The births are reported to us on an M.C.H. 9 (immunization record) card from the Divisional Office, which is forwarded as soon as the weekly report is sent from the local hospitals. In the case of home deliveries or babies born outside of this Division, the reports come from the Central Office to the Divisional Office and then to the nurse in the district. The newspapers, especially small town weeklies, are good sources of information and of course when visiting or living in a community you are always told who has new babies. In one area the local doctor tells me of the recent deliveries, often suggesting that I try to visit certain homes soon. In infant visiting the contents of the Canadian Mother and Child (1) is the basis for teaching.

Tuberculosis patients and their contacts are the second largest group to whom home visits are made. Unfortunately, many of these are made to persons delinquent from clinic, and we do fail to keep a fairly large proportion of these continuing to come regularly for follow-up X-rays. A list of such persons is obtained in this Division when we go through the files with the Divisional Medical Health Officer during the winter. I feel this has helped to reduce the number of persons in the active and inactive files by, in some cases, finding the person has moved away, or in others to have them come for another X-ray, and it is safe then to consider they do not need further yearly X-rays. There

are visits made to apply Tuberculin Patch tests to children who are contacts of cases—active and inactive—others are recommended on the X-ray report. By and large I find that this patch testing can be done in districts so that it is not necessary to drive to a remote area to read one or two patch tests. I have found it unsatisfactory to do this in the summer because of the mobility of the population. **There is one exception to this.** Any T.P.T.'s or other follow up of contacts of a newly diagnosed case should be undertaken as soon as possible and while the emotional impact of the diagnosis is at "its" peak. In my opinion, the most fruitful of all visits in connection with tuberculosis control are those made to the patient and his immediate family between the time of the diagnosis and admission to a Sanatorium. At this time we can help them to understand the implications of the diagnosis, the importance of sanatorium care, discuss what may be expected while in the hospital, tell of welfare services which may be available to them, and obtain information to complete the Tb.C 9 (tuberculosis case record) card. In some cases these visits can be the difference between a cooperative curetaker and a recalcitrant patient with all the problems that involves bother to the Health Department, danger to the family and the general public and harm to the patient concerned. Prior to visiting newly diagnosed cases, I do consult the family physician to see that the patient has been made aware of the diagnosis and that sanatorium admission has been recommended. If this has not been done after a reasonable length of time, I suggest I see the patient and have him go and see the doctor.

Visits to persons with Venereal Disease and their reported contacts are made on directions from the Divisional Medical Health Officer or personal physician. These visits present two major problems (1) to discreetly locate the person concerned, often with limited information, and (2) to secure a private conversation with the person concerned without being obvious about it.

For the most part, visits concerning school children are made to inform the parents of defects or signs of disease found during the school examination and to endeavour to have them secure medical care. I have found that these visits are extremely well received and think it is at least partially due to "the Public Health Nurse," being an established professional worker throughout the province. In other cases, the health of a school child may be discussed during a home visit although the primary purpose of the visit was directed to another member of the family. Of all home visits, it does seem to me I have more consistently good results when the visit is made because of an eye defect found at the time of the school examination. This may be because a visual defect found with Snellen Chart Testing may be easily illustrated to the parent. Squints are usually obvious, and poor eyesight doesn't carry a social stigma.

Pre-school children are too rarely the primary reason for entering a home except for the application of patch tests. However, in a generalized program a good deal of health teaching is done concerning this group, particularly in the field of habit training. I do make some visits where further follow-up seems indicated at the time of the last infant visit. The book "Up the Years" (2) is a very helpful guide in all phases of pre-school health.

Post-natal visits are part of all first infant visits. I find two good sources of information on expectant mothers, (1) the neighbours and (2) the one year infant visits with the third source, an occasional referral from a family doctor. When visiting pre-natal women there are certain areas of instruction which I try to cover, however, not all can be done in one visit. Firstly, I encourage her to visit her doctor as often as he advises; if a doctor has not been consulted,

I urge her to do so without delay. A copy of the "Canadian Mother and Child" is given to each prospective mother. An attempt is made to plan the what and why of an adequate diet; in this respect, I find a low milk content the most widespread deficiency. I discuss breast feeding and encourage the woman to review any problems she may be having with respect to her pregnancy. With primiparas, a discussion of the signs of labor and an explanation of nursing care during a hospital confinement seems to be very reassuring.

Other visits are made for as wide a variety of reasons as the title implies. Referrals from the tumor clinic fall into this category.

I am sure whatever be the reason for visiting, the most frequent advice given is—"See your family doctor."

When I was endeavouring to write down some comments on results of home visiting which I could read to you and then say, "See there really is a lot of value in home visiting!", I picked up the September letter of Health Education Notes (3) which contained this quotation from Lord Kelvin: "When you cannot measure what you are speaking about, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind, it may be the beginning of knowledge but you have scarcely in your thoughts advanced to the stage of science, whatever the matter may be." By what standards can we measure the results? It will take about twenty years to show a decline in the admission rate to mental hospitals if our work in mental health bears any fruit. Death statistics are of no value. I cannot recall the death of any infant that I have visited, yet I can call to mind some cases of infants being admitted to hospital for the treatment of pneumonia or diarrhoea who were receiving regular medical care and who in my opinion were receiving good care. If we are to use the percentage of infants immunized as our scale of effectiveness, we are patting a lot of backs that don't deserve to be patted. Immunization is encouraged by every family physician and also becomes a popular topic once a year (Immunization Week) via radio, press and T.V. Many children are born into homes where they will receive everything that money can buy regardless of what it is. In other cases, people are willing and anxious for this protection but cannot afford it. Here, I will remind you that we recommend that each child receive eight immunization procedures before they are one year of age. At \$3.00 per dose that comes to \$24.00, add on transportation and the cost of a baby sitter and one month's family allowance doesn't go far. We can send armies of women to doctors for post-natal examinations but if they are not examined, our result has been good but do the mothers benefit? A winter when heavy colds or flu is prevalent seems to bring more delinquents to clinic than the visits the nurses make do, so here we are not getting the desired result or we are not making enough visits.

In reading over family folders the majority do show that something has been accomplished; be it a screen door obtained, a sanatorium admission, a visit to the family doctor for a formula adjustment or a mother feels more competent to deal with her problems. One mother of three pre-school children said to me one day recently, "You really haven't solved anything for me, but talking things over has helped me a lot." I note that home visiting increases the use of clinic facilities.

I realize much has been written on home visiting by "the cream of the crop" of Public Health Nurses and read by you. In conclusion, I would like to point out that the family visited has just as much impact on the nurse visiting them as she does on the family. I recall sitting through a series of lectures on

interviewing. It was spring, the pee-wees were out on the campus, and I fear made more impression on me than the lecturer. When he did have my attention, he seemed to be continually repeating—"You must be a warm friendly person." The more home visiting I do, the more often do I feel that I have not reached this objective. When people tell me they cannot discipline a young school child, I can just feel my spine getting rigid—perhaps hoping theirs will too. Wastage of food goes against my nature and when I see it occur, I feel the adult responsible deserves to starve to death. When I am greeted by a swarm of flies, my impulse is to get out of the house before I am bitten rather than stay and encourage the people to get rid of the flies. Under such circumstances as these, I just cannot be a warm friendly person.

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The Doctor's Dream

It was the night before Christmas and the doctor was putting up the Christmas tree and hanging up the last year's ornaments, stopping occasionally to sample the payment for his confrere's twins until finally he made the mistake of sitting down whereupon he fell fast asleep and dreamed:

1. That the government meant what it said about not interfering in the practice of medicine.
2. That someone had come up with a definition of fee-splitting that was acceptable to all.
3. That all doctors thought the fee schedule was equitable.
4. That P.S.I. has abolished modifications and the ten per cent.
5. That only doctors were allowed to practise medicine.
6. That all emergency calls were emergencies.
7. That newspapers carried only articles which portrayed the profession in a favourable light.
8. That consultants always returned the patient.
9. That general practitioners showed as much consideration for specialists as they expected from them.
10. That a magic formula had been developed that cured all the patients whose diagnosis was obscure.

and then he wakened, adjusted his wings and settled down to play on his harp that well known composition entitled **OH! What a Beautiful Morning.**

G. S.

INFECTIOUS DISEASES—NOVA SCOTIA
Reported Summary for the Month of November, 1958

Diseases	NOVA SCOTIA				CANADA	
	1958	1957	1958	1957	1958	1957
	Cases	Deaths	Cases	Deaths	Cases	Cases
Brucellosis	0	0	0	0	0	0
Diarrhoea of Newborn	0	0	0	0	0	0
Diphtheria	0	0	0	0	13	17
Encephalomyelitis— Infectious	0	0	0	0	2	1
Food Poisoning	0	0	0	0	0	0
Gastroenteritis (1) Infectious	153	0	59	0	0	0
Hepatitis—Infectious Including Serum Hepatitis	119	0	3	0	0	0
Impetigo of Newborn	0	0	0	0	0	0
Influenza (if unusual number of cases)	191	1	3623	20	603	124600
Meningococcal Meningitis and Meningococemia	0	0	0	0	24	25
Pertussis	17	0	55	0	653	725
Poliomyelitis (paralytic (non-paralytic)	0 0	0 0	0 0	0 0	15 7	7 4
Scarlet Fever and Streptococcal Sore Throat	133	0	320	0	1429	584
Tuberculosis (pulmonary non-pulmonary)	13 0	4 0	7 0	4 0	318 28	614 36
Typhoid and Paratyphoid Fever	0	0	1	1	10	21
Venereal Disease (syphilis) (gonorrhoea)	7 25	1 0	2 39	0 0	224 1322	199 1353
Anthrax	0	0	0	0	0	0
Cholera	0	0	0	0	0	0
Psittacosis	0	0	0	0	0	0
Rabies	0	0	0	0	0	0
Smallpox	0	0	0	0	0	0
Tetanus	0	0	0	0	0	0
Trichinosis	0	0	0	0	0	0
Tularemia	0	0	0	0	0	0
Other rare diseases	0	0	0	0	0	0
Other (if unusual number of cases)	0	0	0	0	0	0

(1) amoebic and bacillary dysentery and salmonellosis

Remarks: One death in a child age 8 years old was attributed to measles and one death in a child 11 years old from pneumococcal meningitis occurred in the Province during the month.

REMARKS:

The last month's report of tuberculosis cases were not available in time for printing. They are as follows:

Pulmonary: 16

Non-Pulmonary: 4

An outbreak of Infectious Hepatitis (at least 34 cases) in Queens County during the last five to six weeks. A consolidated school had 16 cases from an enrolment of 198. One teacher also developed jaundice. An Immune Serum Globulin Clinic is being held in this school.

A case of haemophylus influenza meningitis in a child 19 months old during the month of October.

Four cows in a milk producing herd of cattle in the Province recently showed a positive test for Bangs' disease. Appropriate measures of control are being taken.

WEIGHT LOSS AND PERNICIOUS ANAEMIA*

Cases are described to show that weight loss, caused by anorexia, may be commonly associated with Addisonian anaemia. Severe weight loss with a clinical picture suggestive of malignancy may occur even before the anaemia has become obvious, and it is suggested that pernicious anaemia should be kept in mind in the differential diagnosis of otherwise unexplained loss of weight.

Read, A. E., and Asher, R., *Lancet*. 1:882, 1957.

*From Medical Abstracts, December, 1957.

CHRONIC DISSEMINATED TUBERCULOSIS*

Chronic disseminated tuberculosis is a prolonged disease which involves several organs of the body. It is not easily recognized. Any person with prolonged undiagnosed fever, weight loss and positive tuberculin deserves a trial with antituberculosis drugs. Eleven cases are presented to illustrate the multiple organ involvement in chronic disseminated tuberculosis and the results obtained with antituberculosis drugs. Treatment of this disease must be generalized and prolonged. Residuals in involved organs after prolonged drug administration should be treated by procedures recommended by appropriate experts.

Cleve, E. A., Young, R. V., and Vicente-Mastellari, A., *Diseases of the Chest*. 32: 671:677, 1957.

*From Medical Abstracts, December, 1957.

Society Meetings

Antigonish-Guysborough Medical Society

A meeting of the Antigonish-Guysborough Branch was held on Sunday, December 14th, 1958, at St. Martha's Hospital, Antigonish. Fifteen members were present and Drs. H. J. Devereux, President of The Medical Society of Nova Scotia, D. I. Rice, Chairman of the Executive Committee, and C. J. W. Beckwith were welcome visitors.

The meeting opened with a demonstration of certain laboratory techniques, applicable to private office practice, by Dr. O. C. MacIntosh, Director of the Pathological Laboratory of St. Martha's Hospital. A film showing latest methods of collecting blood samples was exhibited.

The Minutes of the previous meeting were read and adopted. Arising from the Minutes there was some discussion of the fate of resolutions passed at Branch Meetings and members were pleased to hear that a sub-committee of the Executive Committee of The Medical Society of Nova Scotia was being set up to review all such resolutions and recommend the appropriate action to be taken. Further consideration was given to the medical examination of applicants for Disability Pensions (which had been discussed at length at the previous meeting).

Very lengthy discussion was devoted to the problem of providing prepaid medical care to the people of the Province. Criticism of Maritime Medical Care was expressed both in general and in detail. The local member of the Board of Directors of M.M.C. was asked to raise several points at the next Board Meeting in January, 1959. After the rival merits of M.M.C. and Blue Shield had been described the meeting agreed to postpone any formal resolution on the subject until the annual meeting in June, by which time it was hoped the situation would have been clarified.

Dr. Devereux spoke to members on the implications of the Hospital Insurance Scheme and on the responsibilities of individual doctors in relation to the Scheme. He also appealed for more support from the younger men for the activities of The Medical Society of Nova Scotia.

Dr. Rice also appealed for such support in what may prove to be difficult times ahead.

The meeting again expressed interest in enlarging the geographical area covered by the Branch to include Inverness and Richmond Counties as had been the case in the days of the old Eastern Counties Branch. There was no desire to compete with the Cape Breton Branch, but it appeared that doctors in the two counties would find it easier to take part in the activities of the proposed enlarged Branch than in the Cape Breton Branch. It was felt that it was particularly important at this time for every doctor to be able to make his views known to the Provincial Society through active participation in a local Branch. Authority to revive the Eastern Counties Branch is to be sought from The Medical Society of Nova Scotia.

An excellent dinner was served by the Sisters of the Hospital during the course of the meeting. The next meeting is to be held in March, 1959.

A. J. M. GRIFFITHS,
Secretary-Treasurer,
Antigonish-Guysborough Branch.

Hay For Hobby Horses

The hobby horse for this month is books. The holiday season, and the reading done during these weeks, has brought the following to my attention. "When you give a friend a book you not only furnish his house, you furnish his mind. The room which he always carries with him and into which he can always retire—there is no mind so dark that a book will not lighten it, no mind so enlightened that a book will not decorate it, no mind so well furnished that a book will not make it more habitable." Can anyone say with whom these excellent lines originated?

In the monthly letter of the Royal Bank of Canada, I found this paragraph—"There may be many people who honestly believe that they are too busy, to occupied with affairs to spend time with books. But reading may be the most important thing they could do—upon their reading may depend the continued success of their undertakings; upon it certainly rests their mental well-being."

It seems to me that a man learns to read twice. At age six or seven he reads as a utility to help him along in the world, and, between ages twelve and thirty, he takes up books again when he re-discovers the rewards, both in entertainment and in inner nourishment, which spring from a good reading habit. Many of us, in the profession and without, are diligent and ambitious in other spheres but stop at the Saturday Evening Post, Argosy, and True magazine for our mental fodder. What a pity!

As Edward Weeks said recently in his column in the Atlantic Monthly—"The star by which I steer is literature and the concern I wish to share with you is whether enough of our young people have more than a flickering interest in the light which has warmed and sustained me.—To me the love of books is inseparable from the sense of wonder which we all know, however briefly, in our adolescence. What I am seeking is some way to exhilarate the experience of learning, especially the learning of English, when we are at the sunrise of our education."

E. M. Forster wrote an essay in the New York Times Book Review some years ago called "On the Meaning of a Man's Books." Part of this essay reads as follows:

"It is very pleasant to sit with them (his books) in the firelight for a couple of minutes, not reading, not even thinking but aware that they, with their accumulated wisdom and charm are waiting to be used and that my library in its tiny and imperfect way, is a successor to the great private libraries of the past. 'Do I ever lend books?' Someone may say in a public spirited tone of voice at this point. I do, and I can see some of them unreturned around me. I favour reciprocal dishonesty. But the ownership of the thing does give me peculiar pleasure which increases as I get older. It is of the same kind though not so strong, as the desire to possess land.—The deepest desire in us is the desire to understand, and that is what I meant just now when I said that the really important things in books is the words in them—words, the wine of life—not their binding or their print nor their edition value. I don't favour reciprocal dishonesty as Forster seems to do. I would willingly send back the few that have lodged in my bookshelves if only my lost treasures would be returned to me. Let us sponsor a "Bookkeepers Anonymous" and start a flood of books on the way home in 1959.

An interesting problem in eugenics has come to my attention. A lad named Fagen O'Hagen was enlisting, the following exchange took place with the recruiting sergeant. Sgt: "Who was your mother?" Fagen:—"I had none." Sgt: "And who was your father?" Fagen: "I had none, your honor." Sgt: "Come now, boy. How is it you had neither father or mother?" Fagen: "The way it was told to me, your worship, a milk-man got the better of me aunt."

Quote for January 1959: "All the troubles of man come from his not knowing how to sit still." Pascal.

Best wishes to all our readers from the Editorial Board of the Nova Scotia Medical Bulletin.

Brother Timothy.

REPLACEMENT ARTHROPLASTY*

A new method of replacement arthroplasty with a metal hinge type prosthesis for damaged joints of the finger has been described. The procedure is an alternative to amputation or arthrodesis and is designed to restore a useful degree of function in an otherwise stiff and useless finger. The results in this brief series have been sufficiently encouraging to warrant further attempts at this method of replacement arthroplasty.

Brannaon, E. W., *Military Medicine*. 121: 325-327, 1957.

*From Medical Abstracts, December, 1957.

NUTRITIONAL EVALUATION OF COFFEE*

Samples of retail coffee were found to contain from 7.4 to 11.0 mg niacin per 100 g of coffee. Most of the niacin is readily extracted in making the beverage. It is estimated that a cup of beverage may contain about 1 mg of niacin, and that 3.5 cups per day could supply about one third of the daily minimum requirement. "The niacin supplement from coffee might be important to certain individuals." Moderate amounts of extractable calcium and iron were found present, and low levels of other B vitamins and fluorine.

Tepley, L. J., and Prier, R. F., *Journal of Agric. and Food Chem* 5:375, 1957.

*From Medical Abstracts, December, 1957.

Personal Interest Notes

Doctor Howard I. Goldberg of Halifax has returned from attending the annual meeting of the Academy of Dermatology in Chicago.

Mrs. Christine M. MacKenzie, widow of Doctor Kenneth A. MacKenzie, passed away Sunday, December 28, 1958, at the home of her daughter, Mrs. Albert Burditt, Quebec City. One other daughter, Mrs. William A. Murray at present in Germany, survives her.

The Bulletin extends sympathy to Doctor Donald I. Rice of Halifax on the death of his brother, Mr. Lorimer Dwight Rice of Liverpool, who died suddenly on December 26, 1958.

Doctor S. C. Robinson has been appointed to the Department of Gynaecology, Victoria General Hospital. Doctor Robinson was born in Japan. He graduated from the University of Toronto and has had extensive post-graduate training in the U.S.A. and in Halifax.

Doctor A. M. Sinclair who comes from Prince Edward Island has been appointed to the Department of Orthopaedics, Victoria General Hospital. Doctor Sinclair has been trained on this Continent, London and Exeter, England. He is a graduate of Dalhousie 1952.

At the annual meeting of the Amherst Medical Society which was held recently Doctor H. A. Myers was elected President, succeeding Doctor R. E. Price. Other officers elected were Doctor J. A. Langille, Vice-President and Doctor W. M. Grant, Secretary-Treasurer. Other officers elected as Chairmen of Committees were Doctors W. R. Morrison, E. G. Kelley, H. E. Christie and G. McK. Saunders.

Doctor Grant was named medical representative to the Hospital Board of Commissioners and Doctor David Drury representative to The Medical Society of Nova Scotia.

The situation at Yarmouth re construction of a new hospital has not been solved. At a meeting held recently in Yarmouth, at which time the local situation was discussed with the Minister of Health, Hon. R. A. Donahoe, no decision was reached on the suggestion that any hospital built to serve Yarmouth, Argyle and Clare should be staffed, at least partly, by the Roman Catholic Sisters.

The Town and the Municipality of Yarmouth at first contemplated building a new hospital, but at the same time the Roman Catholic Episcopal Corporation had considered sometime ago the building of a hospital of their own to serve the same area.

The Hospital Planning Commission visualizes one large regional hospital rather than two smaller units. They further suggested that a single building be built with shared laboratory, X-ray and similar facilities, but with separate accommodations—one section staffed by Sisters, the other by secular staff.

The Hon. Mr. Donahoe promised to give the local hospital problem serious consideration.

PROLONGED BLOOD LEVELS WITH SUSTAINED-ACTION PAS*

Sustained-action PAS tablets (Parasal-S.A., 1.0 Gm., sodium free) offer a convenient means of PAS therapy with a high degree of toleration. Acceptance of this drug was excellent since a four gram dose of free PAS consisted of only four tablets. Patients who manifested symptoms of gastrointestinal irritation due to standard PAS preparations tolerated sustained action PAS tablets with minimal, if any, gastrointestinal side-effects.

Sustained-action PAS tablets, in dosage of four grams (4 tablets) three times daily at six-hour intervals, generally provided sustained therapeutically-effective PAS blood concentrations for 24 hour. No other PAS preparation, in equivalent dosage, studied to date, produced such sustained 24-hour PAS blood levels.

The clinical implications and probable advantages inherent in the use of sustained-action PAS, administered concurrently with isoniazid or streptomycin, are believed to be as follows: (a) sustained PAS concentrations within the tuberculous lesions; (b) sustained and increased biologically-active isoniazid levels in the blood and diseased tissues; (c) greater inhibition or delay in the emergence of isoniazid or streptomycin resistant bacilli. Sustained-action PAS may, therefore, serve to potentiate the therapeutic efficacy of antituberculous combined chemotherapy regimens.

Katz, H. L., *Diseases of the Chest*, 626-635, 1957.

*From Medical Abstracts, December, 1957.

HYPOTHERMIA FOR THE POOR-RISK SURGICAL PATIENT*

Modern hypothermia protects the brain against acute anoxia by reducing the cerebral metabolic rate. When hypothermia is used, adrenal stress reactions are both reduced and delayed. Patients under hypothermia during operation do not show the usual retention of water and salt during the early postoperative period. Poor surgical risks have tolerated operative procedures better with hypothermia than with other forms of anaesthesia.

Alberta, S. A., et al., *Journal of the American Medical Association*, 163: 1435, 1957.

*From Medical Abstracts, December, 1957.