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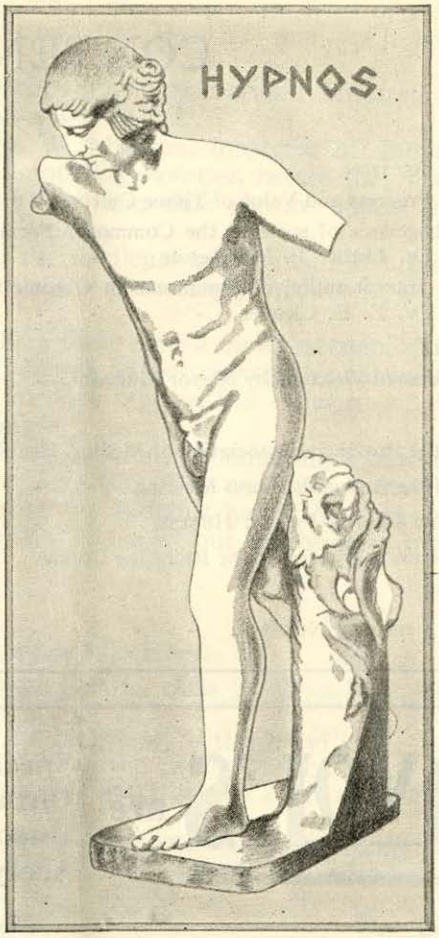

SLEEP

"Sleep, mildest of all the gods, thou art thyself sweet peace of mind, a soothing balm, an alien to care, and brightest rest and strength to mortals worn and weary with the toils of life."

—OVID

IN troubled mind or weakened body, sleep has ever been Nature's own restorer. The quiet halt of sleep alone can yield a sound retreat from mental unrest, from the fretful thoughts which plague the mind in time of stress. It affords that pause during which the physiologic forces are directed toward the rehabilitation of the worn or diseased body. Without it, the best of therapeutic efforts may often go awry. Yet many times when sleep is needed most, the patient frets himself into a frantic wakefulness. It is here that the induction of sleep may be vitally important. When the physician desires a mild hypnotic action, relatively free from side-actions which might complicate the function of recovery, Ortal Sodium may be employed; its action is prompt, and the dosage can be regulated to provide the proper degree of sedative or hypnotic action, according to individual requirements.

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Progress and Value of Tissue Culture*

DR. MARTIN SILBERBERG.

TISSUE culture means cultivation of tissues outside the body in an especially prepared medium and compares with the bacteriological cultivation. Growth can take place without the influence of nerves and vessels under those conditions.

Reviewing the history of tissue culture we find that during the past eighty years Roux was the first to succeed in producing growth outside the body. He kept a chicken embryo in a weak solution of sodium chloride and observed the further development of the neural canal and the intestine tube. To this process he gave the term "explantation".

At the beginning of this century Leo Loeb studied the behavior and fate of explanted blood clots which he kept within the vessel in a saline solution. He showed that a further development of cells and organization of the blood clot occurred in vitro very similar to the conditions within the body. Simultaneously he and Harrison tried to cultivate different tissues in various media and they succeeded in keeping the tissues alive for shorter or longer periods.

Loeb pointed out that migration and growth of cells only occurs, if the pseudopodia of the cells have a stabile support as a basis, a phenomenon which he called "stereotropism", while the cells in a liquefied medium become round thus stopping their movement.

The experiments of these authors were preparatory for the tissue culture method of nowadays.

Abour twenty-five years ago in his investigations Carrel introduced blood plasma as a culture medium, and up to date this medium is unsurpassed for the purpose of explantation as the routine method in laboratories. The methods have been improved since, especially by the work of American research workers.

Before discussing progress and value of tissue culture we may briefly consider the technique. It consists of two procedures: in the first place the preparation of the nourishing medium, secondly the preparation of the tissues to be explanted.

To prevent contamination the procedures have to take place under strictly aseptical precautions. The instruments, the glassware, the solutions must be sterilized thoroughly, the plasma obtained under absolutely sterile conditions as well. Usually we get the plasma by centrifuging blood taken at body temperature. The plasma containing serum and fibrin is separated from the red and white blood cells with a pipette. In order to prevent clotting we keep the plasma frozen, yet it is to be prepared as freshly as possible. To provide a richer food medium some artificial nutritive solutions are prepared such as physiological saline or Ringer or Tyrode solutions.

The tissues are cut out in a most careful aseptic way. The organs are taken from the living or still warm body and kept in one of the lukewarm salt solutions mentioned before. They are cut into more or less tiny pieces

*Delivered at the Dalhousie Refresher Course at Halifax, August 26th, 1935.

and mounted on a cover glass with a drop of salt solution. A drop of plasma is added. As soon as it is clotted, the coverglass is fixed on a hollowed slide like a hanging drop, sealed by wax and kept at the body temperature of the animal, whose tissue was explanted. For the explantation of larger pieces we put the cell material into a small Carrel flask. Nutritive solution and plasma are added in the way we have described already.

The cultures are examined once or twice daily and, if there is any contamination, it is discarded. The cultures are observed either while living or after being fixed and stained like any other specimen.

We are able to stimulate the growth of a culture, in a limited degree, with embryonic extract; usually, extract of chicken embryo is used and freshly and aseptically prepared. Besides, substances as needed for experiments may be mixed with the plasma or added to the culture after clotting.

After four or five days food stuff and oxygen are exhausted. Therefore the cultures must be transplanted after that time. For this purpose the cultures are opened aseptically, washed out in fresh solutions and mounted afresh in a drop of plasma. Sometimes the newly grown tissues are divided with a sharp knife into small pieces. By repeated transplantations we may keep cells and cell stems alive as long as we want to, even for years and years. In the course of those transfers we can separate single cells and cell groups. Thus pure cell stems can be gained and cultivated.

The main value of the tissue cultivation is thus seen, namely that we have a new biological method, which allows us to make microscopical observations of living material. We need not rely anymore upon fixed and stained material, as we are able to watch the behavior of cells and tissues while living, in other words, the morphological and physiological as well as the pathological phenomena of growth can be analyzed in every respect.

I shall now discuss, how growth of a living culture occurs. The earliest signs are found in a migration of the amoeboic wandering mesenchymal cells from the periphery of the explanted piece into the plasma. Leucocytes, lymphocytes, monocytes and histiocytes are the advance guard. The cells show a very fast movement. They creep along the cover glass with the help of pseudopodia, while their nuclei and subsequently their cytoplasm change their appearances every moment.

After two hours the first movement is noticeable, increasing after six to ten hours. Within twelve to twenty four hours the culmination point of the cell migration has been reached, when the cells have considerably penetrated the plasma. The explanted piece itself undergoes certain changes. At the periphery the cells increase in size, and regenerate and multiply by mitosis. Within twenty-four to forty-eight hours true outgrowth of cells is seen from the explanted piece, as indicated by a new formation of the specific cells of the cultivated tissue. These observations confirm the old thesis "omnis cellula e cellula eiusdem generis", that means, each cell originates from another cell of the same species.

After three days abundant growth outside of the explant is found, while in the central portion, commencing after one day, more and more symptoms of degeneration, necrosis and autolysis are evident. The growing cells cause an increasing liquefaction of the plasma, which may be explained by the metabolism of the living cells. The better the growth of the culture is, the more liquefaction of the nourishing plasma results. In order to support the stereotropism of the cells, the culture must be transferred to a new solid plasma.

According to Maximow we may distinguish three different kinds of growth: 1. Cytotypic growth, that means the cultivation of isolated cells, the example "kat exochen" being mesenchymal cells. 2. Histiotypic growth, as shown by the membraneous like growth of epithelial cells. 3. Organitypic growth, signified by the combined growth of mesenchymal stroma and the epithelial cover.

As far as the last group is concerned, some investigators tried to explant whole organs, for instance, the foot of an embryo. In the beginning a new formation of cartilage was observed, but after three days the whole explant became necrotic and finally dissolved. Similar experiments have not been successful either, and the prospects in this direction are not yet promising at all.

We must distinguish between the growth tendency of epithelial cells on the one hand and mesenchymal cells on the other. While the first investigagators disagreed and usually believed that epithelial cells have a poor growth tendency, more recent experiments proved epithelial cells may show even a better growth than connective tissue cells. But simultaneously the liquefaction of the plasma spreads so rapidly and widely, that following the law of stereotropism growth stops. Therefore, transfers must be performed very often. The conclusion we draw, is, that cultivation of epithelial tissue and cells is more difficult. Yet the difficulty is not to be explained by a poor growth tendency of the cells as such, but by a still limited technical perfection.

However a number of epithelial tissues have been successfully explanted, such as of the retina and iris, breast, urinary bladder, kidney, liver and lungs.

Naturally the growth tendency of embryonic tissue is better. Furthermore we may state the general rule: the lower the differentiation of an animal is, the better is the growth tendency of its tissues. Tissues of fishes, amphibia and reptilia grow better than those of birds and mammals, those of guinea-pigs and rabbits better than those of monkeys and human beings. The same fact holds good as to the plasma. The plasma of chicken, guinea-pigs or rabbits is a good medium for cultivation, while monkey's and men's plasma is not suitable.

By the culture of iris and retina it was proved that these epithelia are able to produce pigments, that liver cells manufacture glycogen, that some other epithelia under certain circumstances may take part in the phagocytosis.

In comparison with those results the cultivation of mesenchyme has brought about progress in a good many respects. As a whole, the various cells of mesenchymal origin reveal a very good growth. For the study of the mesenchymal function vital storage and supravital staining were successfully used. You remember that certain cells of the connective tissue have the ability to phagocyte small particles of dyes, cell débris and so on, cells, in former times described under the names of clasmatocytes, rhagiocrine cells, adventitial cells and so on, now mostly denominated as histiocytes according to Aschoff and Kiyono, cells belonging to the reticulo-endothelial system. It cannot be my aim to-day to deal with the entire physiology and pathology of this apparatus, but I should like to point out that by the tissue culture method we can easily analyze function and significance of the different mesenchymal cells. Summarizing it may be mentioned that the histiocytes have been acknowledged as macrophagocytes in the sense of Metschnikoff, while the polymorph leucocytes are microphagocytes that means leucocytes digest only small particles as chinese ink and cocci. On the other hand by the supravital

staining with Janus green and neutral red, a method especially worked out by Sabin, Cunningham and Doan, we are able to study the behavior of mitochondria and the Golgi apparatus in living cells. Thus, differences between polymorph leucocytes, lymphocytes and monocytes were found. Furthermore we could observe whether or not a transformation of those cells may occur. For the cytological problems of the inflammation new viewpoints were detected or we could support the one or the other theory. It could be elucidated that the polymorph leucocytes have no ability of further differentiation, that they die after having fulfilled their function as pus cells. The old theory of Maximow is supported that lymphocytes may be transformed into polyblasts, macrophagocytic histiocytes and that the monocytes undergo the same differentiation. The histiocytes are then transformed into fibrocytes thus playing an important rôle in elaborating the granulation tissue. Fibrocytes multiply indefinitely by mitosis showing the same function as within the body. The observation taught that their essential function is to be seen in the outworking of reticulum fibers, which later on develop into collagenous fibers.

The endothelium of the vessels does not show hemopoietic function, but grows continuously or like fibrocytes. Higher differentiated mesenchymal organs show very striking behavior. During the first stages the specifity of the various cells such as leucocytes, lymphocytes, monocytes, histiocytes, reticulum cells and so on is well preserved. Later on we may only obtain pure cultures of fibrocytes not revealing any more the slightest sign of their origin. Thus all the different mesenchymal cells must have undergone changes in the same direction.

The tissue culture method was introduced successfully for the analysis of tuberculous conditions. Cultivated lung tissue was inoculated with tubercle bacilli, and the characteristic histological features, formation of the tubercle including necrosis and giant cells were obtained. We could demonstrate that the epitheloid cells originate from the mesenchymal cell layers and that the giant cells are formed by fusion of those epitheloid cells. A defensive function of the so called large exudation cells of the lung was elucidated by the findings of the tubercle bacilli in their cytoplasma.

Furthermore the pharmacological and pharmacodynamical problems may be studied by the way of explantation. By adding a drug to the plasma its direct effects on the cells can be investigated.

In this field research has just commenced, and further essential progress is to be expected in the future. We shall be able to answer as to how the pharmacodynamic mechanism takes place, whether or not the growth of explanted cells can be influenced by drugs without the intermediation of vessels and nerves.

Effects of radiation on cells and tissues can be easily investigated in vitro. X-rays and radium can be applied in tissue cultures without difficulty, and we can investigate the irritative as well as the deadly doses of radiation and all the details of its influence on single cells and tissue pieces.

More recently investigations of the problems of allergy were launched, and the outlook is very promising. By applying hyperergic or immunized plasma upon tuberculous tissue we could reproduce the conditions alike within the body. Immune plasma stops the growth of tuberculous tissue, while hyperergic plasma causes a rapid caseation of the explant. The consequences of those findings are obvious and will play a decisive rôle in the question, if the anti-bodies are tied to the cells or to the serum.

The consideration mentioned just now led to the further studies concerning nature and origin of viruses. Virus could not be cultivated by means

of the previously known methods. It is characteristic of a nature of a virus that its existence is bound up with living cell material. Therefore it seemed very logical to carry on investigations in this field by tissue culture. The results we obtained are very interesting in so far as an increase of virus could be produced. Carrel and Parker added from within twenty-five to two hundred fifty units of small pox virus to explanted embryonic chicken tissue. After eight days of cultivation those units increased as high as to 10,000 and 100,000 units. These figures prove that an explanted chicken embryo can produce as much virus as a calf. Similar experiemts with other virus gave alike result.

The theory of production of virus could be supported by further findings. Small amounts of cell poisons such as methylviolett, snake poison, hydrargyrum bichloride and so on were added to explanted tissues, and bacteriophags could be grown. Doerr transferred material of human aseptic orchitis into a rabbit without result. Afterwards he prepared an extract of the orchitis material, added it to a culture of connective tissue and transferred the cultivated material into another rabbit. By this inoculation he obtained an aseptical orchitis in the rabbit.

The tissue culture method is of essential significance for research on tumor growth. Correspondingly to the behavior of epithelial and connective tissue in cultures at large we must expect that cells of a sarcoma show better growth than the epithelial cancer cells. Indeed the cultivation of sarcomatous tissue is easier. For the study of the sarcoma problem the spontaneous chicken sarcoma is a very suitable. This tumor can be transplanted from chicken to chicken. Rous added a filtrate of this tumor to a culture of embryonic chicken tissue and retransplated the well grown culture into another chicken. A new tumor developed. Thus the material had kept its malignant growth tendency over a long period of explantation, though according to Carrel sarcomatous cells cultivated alone lose their malignant growth tendency after a cultivation of three to four days.

Carrel himself cultivated fibroblasts together with a filtrate of an experimentally produced sarcoma and observed a transformation of the fibroblasts into sarcomatous like cells.

Albert Fischer explanted normal cells and cells of animals injected with tar preparations. He demonstrated that this cultivated material has a very malignant growth tendency, if reimplanted into other animals.

Those facts seem very important as to the problem, whether the malignant principle in a cell is to be regarded as a chemical substance or as an ultramicroscopical viruslike organism, with other words, if it is a living principle or a non living one. In addition, it is to be decided, if such a principle might be produced by an exogenic irritation of the cells or if it is an endogenic one.

Criticising the facts we must consider that the chicken sarcoma is to be ound in two types, namely a fibromyxomatous and a chondroosteomatous one. By transplanting the tumors as well as the cultivated material it was surprising that only the same type could be reproduced, never a mixed form or a transformation of the one type into the other. Repetition of Rous' experiments by other investigators failed. Therefore they assumed that in experiments with positive results some sarcoma cells might have passed through the Berkefeld filter and kept their malignant growth tendency which they developed in the reimplants.

However the fact stands that the malignant growth tendency of the sarcoma cells can be stimulated by their cultivation in parabiosis with normal tissues.

As to the epithelial cancer cells their biological behavior in tissue culture is similar to those of normal epithelial cells. They grow more slowly than the latter, undergo faster degeneration and necrosis, and produce a stronger liquefaction of the plasma. The cancer cells reveal in vitro a very highly pronounced destructive power which acts not only on normal cells but also on the cancer cells themselves. They are regenerating and multiplying under the influence of irritation; especially necrosis of their own acts as a growth promoting factor. The cancer cells are unable to grow without stroma of connective tissue. If there is any stroma present, the growth of the cancer cells stimulates the growth of the stroma at large. We have apparently to deal with the same phenomenon of parabiosis noticed in sarcomatous growth. The biology of both carcinoma and sarcoma cells thus becomes evident especially by investigations concerning metabolism and the glycolytic ability of the cells. With Warburgs method it was established that all the cells are able to produce glycolysis dissociating carbonhydrate into lactic acid, carbondioxyde and water. As to the production of lactic acid, the more recent work on various normal cells has shown that it is only characteristic of a high growth tendency not at all specific of malignancy. It was further clarified in tissue cultures that tumor cells do not grow better than normal cells under anaerobic conditions, but it seems that they are more sensitive and therefore less resistant. I cannot deal to-day with the entire tumor problem, but summarizing we may state that between tumor cells and normal cells up to date are only known differences as to quantity, whereas conclusions as to differences within the biological principles are not yet justified.

DEMONSTRATION

SUMMARY

Reviewing the work carried out in tissue cultures we certainly may say that this method is a very fruitful one for the study of anatomical, physiological and pathological problems.

Like every new idea especially in the beginning of the explantation era, the method was seriously attacked. Some investigators claimed that the life in tissue culture is an artificial one and that the results cannot hold good for the living body. These objections cannot stand any longer. The results obtained by tissue culture are often identical or agree completely with the findings gained by other methods. I should like to give only a few examples. First of all, explanted heart muscle beats according to his rhythm for several hours; the results of inflammation caused in tissue cultures show the same morphological structure and the same transformation of cells, the same phagocytotic abilities as specimens taken out of bodies of animals and human material. Furthermore the morphological and physiological behavior as observed in regeneration, transplantation, normal growth and tumor growth within the body could be reproduced in the tissue culture experiments. Just recently I studied fate and behavior of transplanted lymphoid tissue of the rabbit. I could demonstrate that the healing and growth processes in the transplants are identical with the results obtained by the cultivation of those tissues. In addition I remind you of the production of virus in vitro, which certainly proves the conditions within the culture to be similar to those in the body. Many facts more can support this viewpoint. It is not too much to emphasize that a considerable progress of our knowledge has been accomplished by the tissue culture method and that we are justified to expect further important contributions from this field of research work.

Pathogenesis of Some of the Commoner Forms of Cardiac Disease*

LUTHER B. MACKENZIE, M.D.

THE matter to be discussed in this paper is the origin and development of the more common diseases of the heart. For the purposes of discussion it is advisable to classify these diseases and consider them separately; and accordingly they have been classed as (1) Congenital and (2) Acquired. The acquired have been further subdivided into (a) Structural and (b) Functional disorders.

Congenital

The Congenital Anomalies met with are numerous and briefly enumerated are as follows:

(A.) Abnormalities of Position:
- (1) Heart on Right Side (dextrocardia).
- (2) All Organs inverted Situs Transversus).
- (3) Heart situated in neck (Cervical Heart).
- (4) Abdominal Heart.

(B. The Abnormalities of the Valvular Orifices:
- (1) Pulmonary Stenosis or Atresia.
- (2) Additional or defective cusps of Pulmonary valves.
- (3) Tricuspid and Aortic Stenosis with defects of the cusps.

(C.) Defects of Septa:
- (1) Interventricular Septum.
- (2) Interauricular Septum with foramen ovale.

(D.) Defects of the Cavities, as 2 and 3 Chambered hearts.

(E.) Patent Ductus Arteriosus, and this does not complete the list.

It is to be remembered, however that it is unusual to find these lesions singly but often combined in groups, and in many instances the concomitant defects are mechanically dependant upon and explained by the primary anomaly. This is well illustrated in pulmonary stenosis the pre-eminent and outstanding proto type of the Congenital defects. The Congenital lesions, while of some interest to the clinician, have been studied principally by the pathologists and the comparative anatomists and it is their researches and deductions that have moulded our view point. In the main there are two schools of thought concerning the origin and development of these lesions. First, that of a foetal endocarditis and, Second, that of an evolutional or developmental defect. The ramifications of the arguments for and against these positions are beyond the scope of this outline. In brief, however, Lancereaux, one of the foremost and much quoted advocates of the foetal endocarditis theory, has said that Cardiac Teratology represents the pathology of intrauterine life, and in some of the lesions, especially around the Pulmonary Cusps,

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there are undoubted evidence of inflammatory reaction. Letulle, also, stated that Endo-myocarditis of the Embryo is the point of departure of all Cardiac Malformations. Rokitansky however pointed out that these inflammatory lesions were not constant, and that the older the patient was, the more likely was one to find the evidences of an inflammatory character. It is well known that every Cardiac defect, Congenital or Acquired becomes a susceptible region for subsequent infection, and that the finding of the lesions in the older patients made it seem likely that the Congenital defect was the cause of the Endocarditis, rather than the result. Furthermore, in 80 to 85 per cent of the cases of Pulmonary Stenosis there is found a defect in the interventricular septum. Now the pulmonary valves are laid down about the seventh week of intrauterine life, and the septum closes about the eighth week. Therefore, this infection must take place during the seventh week, and as Osler sagely remarks, it is rather difficult to conceive of an Endocarditis limited to an area the size of the Pulmonary Valves in the seventh week. There are other objections. Many other malformations, such as harelip, horse-shoe kidney, absence of spleen, etc., are found in about ten per cent of these cases. The weight of the evidence, seems largely against the infective theory.

The Embryonic or Evolutional Theory.

The first evidence of a heart is exhibited in the earth worm, in the form of a simple tube. Through ascending orders, the circulatory apparatus becomes more and more complex, forming a chamber, then two chambers, then three and finally the mammalian heart. In the human embryo the first evidence of a heart is a simple tube and it has been held that the development of the human heart is a replica of the development through ascending species as they evolved throughout the ages, and that therefore, a study of the hearts of the lower orders should be of value in illuminating some of the problems of the human heart. Meckel formulated the view that Congenital Anomalies represented the failure to evolve beyond what was normal for the lower orders and constituted a kind of retrograde anomaly. Keith, an out and out evolutionist, believes that these anomalies are due to a failure of evolution. In some mysterious way the evolutionary impulses cease. There are others who, while agreeing with Keith that development ceases, believe that this is brought about by some injurious influences or insult, possibly a maternal fever or toxemia. Whether you believe with Keith that it is strictly a failure to evolve, or on the other hand that it is a cessation of development due to some injurious influence, is not of much importance so far as this discussion is concerned. It is of importance, however, to recognize that the commonly accepted view of the manner in which these Congenital lesions arise is largely due to the contributions of Keith. As he remarks, it had been customary (before 1909) to think of the mammalian heart as composed of three parts: 1st—the Sinus Venosus; 2nd—the Auricles and 3rd—the Ventricles. The Sinsus Venosus which is developed at the posterior portion of the primitive cardiac tube where the Great Veins empty, becomes incorporated in the right auricle, and from it is formed in the fully developed heart, the Sino-Auricular Node, whose function we believe to be the pace maker of the heart. But Keith points out that there is a fourth part or chamber in the Mammalian heart of which no cognizance had previously been taken. This fourth part, called the Bulbus Cordis is well marked in animals having gills. Before 1903 it was not believed that this structure was present in Mammalian hearts. Almost simultaneously Greil a prosector at Innsbruck University and Keith concluded from ex-

tended studies that the Bulbus Cordis persisted in the Mammalian heart, and had become incorporated, as the Sinus Venosus had been in the Right Auricle, mainly in the Right Ventricle. However, the manner in which this Bulbus produces Congenital Anomalies is chiefly the work of Keith. As before stated the Bulbus Cordis is prominent in animals with gills, especially so in the shark tribe, and Keith believes that its function in these is connected with the regulation of the blood supply to the lungs. In these animals with gills the muscular fibres of the Bulbus Cordis persist throughout life. However, in the hearts of birds and mammals these muscular fibres disappear very early in embryonic life, a point to be noted. The cavity of the Bulbus however remains, normally undergoing great expansion and forming the infundibulum of the Right Ventricle. Furthermore from studies on the human embryo about the end of the fourth week, Keith has found the primitive Aorta arising from the Bulbus Cordis, at its Aortic end. When this primitive Aorta divides later to form the pulmonary artery and the Aorta proper, part of the Bulbus becomes incorporated in each, most of it going to the pulmonary artery side. Further the tricuspid valves are formed by an outpouching of a part of the Bulbus. Thus we see that the Bulbus Cordis is in intimate relationship, in the right heart, with the infundibulum, the pulmonary valves, pulmonary artery, and the tricuspid valves. In the leaft heart, this structure extends upwards towards the Aortic valves in the so called Sub Aortic region, the locations in which congenital lesions are found. Now if about the seventh week of Foetal life, when this cavity of the Bulbus should normally expand, it fails to do so, in one or several places, we would have according to the site of failure, a complete or partial atresia of the infundibulum, Stenosis of the Pulmonary valves, a narrowing of the Pulmonary Artery or of the Tricuspid Valves. In the Sub-Aortic region it normally completely disappears, but if it should fail to atrophy, it would produce a Sub-Aoratic Stenosis. It was pointed out above that in Mammalian hearts, the muscular fibres of the Bulbus disappear very early. Keith has found in some of the Congenital defects, muscular fibres of the Bulbus, additonal evidence that the course of events in the Bulbus has stopped. Thus we see that failure of the Bulbus to normally expand explains numerous right sided lesions; failure to atrophy, Sub-aortic Stenosis. On the basis of this conception Keith has explained many, if not most of the Congenital lesions. A few are problably due to a Foetal endocarditis. Whether the underlying cause is to be regarded as an evolutionary failure, or as a cessation of development, is a matter of opinion, but it seems clear that the conception of the role of the Bulbus Cordis has greatly simplified a perplexing question.

Pulmonary Stenosis.

Pulmonary Stenosis, the proto-type of Congenital lesions is thus due to failure of the Bulbus to expand at the Valve region, and this occurs before the interventricular septum has developed. The back pressure from the Stenosed Pulmonary Valves will force blood through the open septum, and if sufficient will prevent eventual closure, thus explaining this defect so commonly associated. The blood then goes into the Left Ventricle and Aorta, and in a retrograde direction through the ductus Arteriosus to the Pulmonary Artery, thence to the lungs, (after birth) and tends to keep open the Ductus Arteriosus. The original pulmonary stenosis, through mechancial factors which it brings about is responsible for the associated defects of defective Septum and patent ductus.

Acquired Structural Diseases.

Structural heart disease is a subject of such great proportions that in this brief paper, only the merest outline can be attempted. These Structural lesions may be classified according to the tissue involved:

1. Valvular Endocardium, (or occasionally Mural); 2. Myocardial; 3. Pericardial; 4. Coronary Vessels.

Valvular Disease. A Valvulitis may be either: (a) Acute; (b) Subacute; or (c) Chronic.

Acute Valvular Disease.

It seems most probable that Acute Valvular Endocarditis is essentially of Bacterial origin although organisms cannot always be demonstrated. Some have held that toxins might produce injury of the Valvular Endothelium, and experiments to that end have been done, with but indifferent success. While cases of Endocarditis differ among themselves in detail, according to the Bacteria concerned, and their varying virulence and their localizations, they are alike in principle and in their method of involvement. It seems most likely that the Bacteria are brought to the Valves in the blood stream coursing over them, and from the situation of the vegetations, it seems that they lodge directly upon the surface of the Valve, and it also seems clear from inspection of early lesions that this lodgement is upon the line of closure upon that somewhat fortified portion just back of the filmy edge which completes their closure. From here the process may extend to other parts of the Valve to the Mural Endocardium or to the Chordae Tendineae, and to the heart wall. This finding of the first lodgement of Bacteria at the line of closure is so constant that it seems more than accidental, and the usual explanation given is that it is due to the mechanical beating together of the Valves at this point, catching the Bacteria out of the blood and pressing them into close contact with the tissue, so that they cannot slip by as they do over the smooth walls of the Arteries. There follows injury to the Valve, and then Thrombus formation at the site of the injury. Fibrin is poured out and vegetations ensue. Rosenow has revived an old thoery that the Bacteria arrive at the Valve as Bacterial Emboli by way of Capillaries in the Valve Structure. Against this theory however is the work of some German investigators who have found that there are no Capillaries in the Valves, or only at their bases, so that Emboli could hardly be carried to the margin where the lesions begin. After Thrombus formation occurs, however, Capillaries soon develop in the tissue of the Valve. However, Herschfilder seemingly accepts Rosenow's thoery of Embolic origin. It should be pointed out here, as Sir James MacKenzie has so emphatically stated that practically always with Valvular Involvement, there is also invasion of the musculature.

It has been stated that these cases of Acute Valvulitis are in principle, and Modus genesis, the same, but differ in detail according to the Bacteria involved. These differences entail marked dissimilarities in clincial behaviour and end results. The Bacteria involved in the acute types are: 1. The Rheumatic Organism or Organisms. (There is no definite agreement on the nature of this organism—whether it is one, or more—recent work seems to point to several varieties of Streptococcus.)

2 Staphlococci; 3. Hemolytic Streptococcus; 4. Pneumococcus; 5. Gonococcus. Numerous other organisms have been found in the lesions possibly

as secondary invaders. The ones enumerated are the chief ones. In the Sub-acute types of the disease are —1st, and principally the Streptococcus Viridans and 2nd the Spirochete of Syphillis (limited to the Aortic Valve), and Influenza bacillus.

Rheumatic Type. This occurs in the course of rheumatic fever, or one of the allied disorders as Chorea, Tonsilitis, Erythema Multiforme, etc., although quite frequently there is no history of such disease. It is most often a simple benign type of disease, anatomically of the verrucose or warty variety. Rarely it is malignant in type. It exhibits a tendency to heal by granulation with ultimate scarring. The Streptococcus Hemolyticus and other organisms of this acute group are more virulent producing larger vegetations, and exhibit a tendency to ulceration, sometimes with valve perforation and destruction. Particles of the vegetations may be swept off with embolic infarctions. Rarely they may granulate and heal, with much scarring and deformity but usually they tend to a fatal termination. These Acute lesions are frequently engrafted upon a previous rheumatic valvulitis. It is surprising how many escape detection during life.

Sub-acute Types.—(1) Streptococcus Virdians and (2nd.) Spirochete Pallidum. The Viridans infection is variously designated as Sub-acute Bacterial Endocarditis, Endocarditis Lenta, Slow Septic Endocarditis, etc. The organisms may gain entrance to the blood stream from some focus as tonsils, teeth, accessory sinuses, etc. Frequently no nidus of infection can be found. This organism has a predeliction for Valves which previously have been infected by rheumatic disease. The vegetations usually attain large size and are soft and crumbling and particles are frequently swept into the blood stream with ensuing infaration very commonly in the kidney and spleen. Seemingly healing occurs periodically on the ulcerating valves, but with inevitable recurrence, death occuring usually within a year.

It is definitely conceded that the Spirochete may cause a Sub-acute Endocarditis of the Aortic Valve, usually by extension from the Aorta.

Chronic Valvular Disease.

In the vast majority of instances chronic disease of the Valves is the result of an acute healed lesion principally rheumatic with thickened, distorted and imperfectly closing cusps, obstructing the onward flow, or permitting a return flow. It has been quite generally held that the deposition of Atheromatous plaques about the Aortic Cusps in the course of a general Arterio-Sclerosis might produce chronic disease of this valve. In recent years some slight doubt has been expressed concerning this mode of origin. Syphilis undoubtedly is a common cause of chronic Aortic Valve disease, as well as of the Aorta itself.

Diseases of the Musculature.—Acute.

The term Myocarditis, meaning literally an inflammation of the Myocardium, is by common acceptance usually applied to degenerative and fibrous changes in the heart muscle, and is therefore not well chosen. Acute degenerative changes of more or less extent, are practically always present in the acute infectious diseases, and intoxications. These changes are seen in and following typhoid, pneumonia, scarlet-fever, etc., and usually are not of much significance, and may completely recover. However, they may and

probably do leave behind a certain amount of scarring. In contra distinction to these mild degenerative changes, there are a few notable exceptions, viz: in diphtheria where the process may be very extensive and destructive. Also in rheumatic fever where muscle degenerative changes with the formation of Aschoff bodies are a constant accompaniment of the Valvular disease and occasionally too in Scarlet fever this so called Myocarditis may be quite marked. Recovery with scarring is the rule, and this is one of the factors in the production of a chronic Myocarditis. Prolonged over indulgence in alcohol is thought to produce a Sub-acute type of Myocarditis.

Chronic Myocarditis.

In the entire field of Cardiology there is no term more loosely applied than that of Chronic Myocarditis, and the more authors one reads, the more confused does one become, especially confusing are the many fine distinctions of the pathologists. At the present, from the clincial point of view at least, this term may be used to designate the chronic inflammatory conditions and more especially degenerative changes that occur in the muscle of the heart. As above pointed out when the acute Myocarditis lesions occuring during one of the acute infections such as Rheumtic Fever, Sacrlet fever, etc, heal, fibrosis and scarring may result. A more important factor than the above is disease of the Coronary Arteries. Narrowing of these Vessels, will result in impaired nutrition of the muscle fibres with resulting degenerative changes.

The Coronaries may be Sclerosed and narrowed through localized Atheroma, or as a part of a generalized process. Syphilis plays a distinct role in producing Coronary disease, as probably does Gout. Essential hypertension whatever its cause, so called Chronic interstitial Nephritis, and the strenous life have all been thought to contribute to Coronary disease and Myocardial Degeneration. Nor must one omit the part played by toxic Thyroids in the causation of this condition. There is a growing belief that the Spirochete of Syphilis apart from its effect on the Aortic Valves and Coronary Vessels, may invade the structure of the heart. Warthin has demonstracted the Spirochete in great numbers in the heart muscle, and there is general agreement that in children with Congenital Syphilis invasion of the musculature by the Syphilitic organism is frequent. It also may produce a sub-acute type. This must also be included in our list of factors responsible for Myocarditis and this list might be indefinitely extended. In the main then these various factors are responsible for what is commonly called Chronic Myocarditis.

Angina Pectoris. is classed under the structural diseases because of its frequent association with Coronary Sclerosis, these narrowed vessels permitting a very inadequate blood flow, and under the increased requirements of exercise, an ischemia of the heart muscle follows with the resulting paroxysms of pain, analogous to intermittant claudication. In those cases of Angina where no Coronary narrowing is found, the theory of Coronary Spasm is invoked to explain the ischemia. While this is the commonly accepted view, there are those who believe that the pain is an expression of an exhausted heart muscle and is functional rather than structural. The factors enumerated as having an etiological bearing on Myocardial disease, as Hypertension, Nephritis, Art, Sclerosis, etc., etc., are, when conjoined with Chronic Valvular disease, the most constant associated findings in Cardiac Hypertrophy. Much has yet to be learned concerning the origin of this condition

but according to Hirschfelder these various factors act by causing an overstrain of the heart. To re-establish itself it must put forth an increase of force. The stimulus for this seems to lie, among other things in an increase of tonicity. This increase of tonicity Hirschfelder regards as a prime factor in producing hypertrophy, and is a compensatory adaption to overstrain.

Coronany Thrombosis.

Coronary thrombosis sometimes referred to as the doctors' disease, because of the toll it is taking in our profession, is generally held to be very largely on the increase. The stress and strain of modern living, to say nothing of the anxieties that have beset a sorely tried world for the past twenty years have been rather readily assumed to be responsible. A little more critical survey, however, is not so conclusive of this recent rapid increase, some of it at least, being more apparent than real. Doctors in recent years have become more "Heart-minded", the incentive to this having received a great impetus from the work of Sir James MacKenzie. The clinical picture of Coronary thrombosis has become much more definitely defined and established, and much more accurate diagnoses are being made. Acute indigestion as a cause of death is properly on the wane. A survey at the Presbyterian hospital in New York of their autopsy material shows an incidence of Coronary disease of 12.9 per cent in 1920 and of 12.1 per cent in 1930, approximately the same. However, there has probably been some increase of this disease in recent years.

The underlying structural factor in Coronary thrombosis, in the vast majority of cases, is a *Sclerosis* of the coronary arteries, the rather rare condition of embolus of the Coronaries being the outstanding exception. This sclerosis may be limited chiefly to the Coronary vessels but is more often a part of a generalized atheroma. This narrowing of the Coronary vessels, with the ensuing slowing of the blood stream, and with a deposition of Calcareous plaques readily leads to thrombus formation, and occlusion, and although there is an extensive colateral circulation infarction of the heart muscle frequently follows. In addition slowing of the circulation through an enfeebled heart, or by an increase in the viscosity of the blood, as in diabetes, are contributing causes, the enfeebled heart in auricular fibrillation being a notable exception, as thrombosis rarely occurs with a fibrillating auricle. Thrombosis may occur in any of the coronary vessels but is much most frequent in the anterior descending branch of the left coronary artery which furnishes the supply to the left apex, left Anterior third of the R. Ventricle, and to part of the inter V. Septum. A rapid occlusion of a large vessel may quickly induce ventricular fibrillation with immediate death. If avoiding this, the infarcted area during a later period undergoes softening which may extend through the heart wall, with perforation and death; if avoiding perforation, the infarcted area ultimately becomes fibrosed with a weakened wall, and an aneurysm of the heart may ensue. During this period of softening, too, emboli may be set free with lodgement in a cerebral vessel with death or hemiphgia. A corollary of the above, then, would be, that a patient, with any considerable degree of infarction should during this critical period have activities restricted to a vegetative existence.

Functional Disorders.

The clinical disorders about to be discussed have been classified under functional disturbances, although quite frequently they are found associated with structural defects; on the other hand they are observed without any

demonstrable alteration of structure. Frequently, too, many of these disorders are of brief duration, and a few of them seem to have an etiological relationship with various poisons, as tobacco, caffein, digitalis, etc. It seems, with our present knowledge, then, better to classify these conditions as arising from disturbed and disordered function, remembering too that a perverted function is as much of a clinical entity as a structural lesion. The commonly met with disorders of this group are: (1) Sinus Arhythmia; (2) Premature contraction, and Paroxysmal Tachycardia; (3) Auricular flutter and fibrillation and (4) Heart-Block. A few others and combinations of these.

Before proceeding to a discussion of these various disorders, it may be well, to review, briefly the mechanism involved in the normally beating heart. There is incorporated within the musculature of the heart a very specialized neuro-muscular tissue known as the Keith-Flack-His system, or more simply as the specific or specialized system. This system begins in the sino-Auricular Node, situated in the wall of the Right Auricle at its junction with the Superior Vena Cava, extends downwards in the wall of the Auricle forming in the inter-Auricular septum, the Auriculo-Ventricular Node, crosses over the Auriculo-Ventricular septum in the bundle of His, and divides into right and left bundle branches, and terminates in its final distribution in the fibres described long ago by Purkenjie.

It will further be recalled that the earliest evidence of a heart in the human embryo is a simple tube, at the posterior portion of which there is a widening into which the Superior and Inferior Venae Cavae empty their Venous blood. This widening, known in the embryo as the Sinus Venosus (and it is much more evident in the lower Vertebrates than in the human,) becomes incorporated in the right Auricle, and it is only within comparatively recent years that its identity has been established. It is believed that it is from this structure (the Sinus Venosus) that the Sino-Auricular Node is developed. The remainder of this special system, viz: the A. V. Node and the His's Bundle with its divisions and ramifications are thought to be the remnants of the primitive Cardiac tube, referred to above. This specialized system of Keith-His may be divided then into two parts, viz: the Sino-Auricular Node whose function is stimulus production and the remainder of the system whose function in the main is stimulus conduction.

The Sino-Aurcular Node.

There is ample evidence (studies on lower vertebrates, electro-cardiographic tracings, experiments of cooling the node, etc.), for the belief that the stimulus for the contraction of the heart is elaborated in the Sinus Node. This Node sets the tempo for the heart beats and has been termed by Lewis the pacemaker of the heart. This it does because its rate of stimulus production is faster than any other part of the special system. This impulse production is elaborated at regularly repeated intervals with great constancy under given conditions, requiring in normally beating hearts about two-thirds of a second. It is this time of impulse preparation which controls the rate of the heart beat. When the impulse is built up it is discharged causing Auricular contraction followed by Ventricular contraction. This regular elaboration of impulse with its discharge by the Sino-Auricular Node determines the rhythmic and sequential beating of the heart. It is also to be remembered that nerve fibres from the Vagus and Sympathetic enter the Sino-Auric Node, in fluencing the rate of impulse creation and discharge, the former slowing and

the latter accelerating the action of the pace maker. Normally these two opposing forces balance each other and we then have the ideal heart rate of about 72 per minute. The remainder of this specialized system of Keith and His (apart from the S. A. Node) is for the conduction of the impulse to Auricle and Ventricle, the rate of conduction varying somewhat in different areas, being most rapid in the Purkenjie system in the Ventricle and slowest in the A. V. Node and Bundle of His. In normal hearts the time for the impulse to traverse this junctional tissue is remarkably constant and is spoken of as the conduction time or P. R. Interval and is approximately 0.13-0.20 of a second. Having sketched in meagre outline the mechanism of normal functioning we are in position to consider briefly how the disorders of function arise. . . . *Sinus Arhythmias.* In these disorders the normal pace marker, viz: the S. A. Node is in command and dictates the cardiac tempo—only the pace set is an irregular one, the whole heart however following in an orderly and sequential manner. The most potent factor in bringing about this disturbance is some imbalance between Vagus and Sympathetic control. An attack of fright by stimulating the sympathetic induces rapid heart-simple Sinus Tachycardia, Conversely heightened Vagal tone slows it, Sinus Bradycardia. A continual shifting of the balance between these two forces will cause a quickening and a slowing of the heart beat. This irregularity of Sinus Arhythmia is most often observed in the young and in convalescence from infectious diseases, and is of no great seriousness.

Premature Contraction or Extra Systole.

The S. A. Node sets the pace for the heart by virtue of its being able to elaborate more quickly than other portions of the specialized system, the impulse for heart contraction, the reason alleged for this being that it is more irritable than other portions of this system. It is quite conceivable however that some other area might, by becoming unduly irritable usurp this pace making function and "load and fire" quicker than the S. A. Node. This area might conceivably be in the auricle or in the Ventricle or in the Nodal tissue joining them. This area, also might send out these impulses occasionally and irregularly or send out a sequence of them. There is excellent evidence (principally gathered by Electro-graphic tracings) that this is exactly what happens. If this new irritable ectopic focus is in the Auricle the beats which it engenders are known as Auricular extra-systoles, similarly if in the Ventricle, as Ventricular extra-systoles, and rarely there may be Nodal extrasystoles. Naturally if the focus is in the Ventricle, the Ventricle alone will contract although rarely a retrograde impulse may spread back to the Auricle causing it to contract. When the ectopic beat arises in the Auricle the Ventricular contraction follows. Extra systoles are very frequent in advanced years, but also found in infancy. They may be produced by large dosage of digitalis but occasionally digitalis will abolish them. They are found associated with focal infection, and disappear with the removal of the focus. Tobacco and coffee will occasionally induce them but there is still lacking exact knowledge of how these factors bring about the mechanism described above.

Paroxysmal Tachycardia.

In the creation of extra-systoles it was stated that an ectopic irritable focus assumed the pace making function for occasional beats. In paroxysmal Tachycardia it is held that this irritable focus holds sway and dominates the rhythm for varying periods of time, viz: from a few seconds to several hours, or

even several days. As in the extra-systoles there are Auricular, Ventricular and Nodal Paroxysmal Tachycardias. During the paroxysms of Auricular Tachycardia the S. A. Node is elaborating impulses, but these are extinguished by the very rapid formation of impulses in the dominant ectopic focus, situated near by in the Auricular tissue. In the Ventricular type of Tachycardia the Ventricle is under the sway of the ectopic focus, in the Ventricle, beating about 150-200 per minute. However the impulse from this Ventricular focus to affect the Auricle would have to traverse the junctional tissue in a retrograde manner, which rarely occurs. The Auricles thus, under, the dominance of the S. A. Node (the normal pace maker) beat in a normal manner, the Ventricles on the other hand beating at an extremely rapid rate. These attacks are not of grave seriousness and but little is known of their causation.

Heart Block.

In the normal mechanism it was pointed out that the time for the transit of stimulus through the A. V. Node was remarkably constant being 0.13 to 0.20 of a second. In heart block there is impedence of the transit in varying degree. It may be so slight that there is merely a slight lengthening of the P. R. interval in the electrocardiogram, or it may be so complete, that no impulse passes at all constituting what is known as complete block, with a dissociation of Auricle and Ventricle. A new pace maker for the Ventricle then arises which is usually situated in the Ventricular division of the Bundle of His', and sets a very slow tempo, about 35-40 per minute. Between these two extremes, there are all grades of block the 2:1 being the most common, where only alternate Auricular beats cause Ventricular response. Most of the block disturbances of milder grade are temporary in character, while the complete ones are in the main, permanent. The mild ones occur frequently during acute infections, as rheumatic fever, typhoid, tonsillitis, pneumonia, etc. They are explained as being due to edema of the bundle or hemorrhage within the bundle. The majority of the complete blocks are found in elderly people with Coronary Sclerosis, and fibrosis in the bundle or from pressure of a thickened endocardium. Rarely a gumma has been described. Digitalis medication if carried to toxicity is frequently associated with A. V. Block (partly through its action on Vagus and partly through its action on the A. V. Node).

Auricular Fibrillation and Auricular Flutter.

These two conditions, the former so common, and the latter more common than usually suspected, were formerly ascribed to the development of irritable (fragmentation of muscle) ectopic foci. In the condition of fibrillation, there were thought to be many such foci scattered throughout the Auricle, in flutter only one. These hypotheses have both been superseded. About 1913 Mines and Garrey, two physiologists, working independently came upon the same discovery simultaneously. They found, while working with excised rings of heart muscle (taken from fish) that if an excitation wave were induced, a self perpetuating, circling wave could be set up which would persist for hours. This they designated "Circus movement". The perpetuation of this movement depends upon the maintenance of a gap of receptive muscle between the crest and the wake of the excitation wave. It must be remembered that immediately following the passing of the excitation wave through a strip of muscle, that portion becomes refractory, i.e. will not react to a stimulus, and if the wave should complet the circuit before the above referred to preo-

tion has recovered from its refractory period, the movement will stop. So the necessity for having a gap of receptive muscle intervening. As Reid puts it, it is like a cat trying to catch its tail, the gap between mouth and tail representing the receptive strip of muscle. The minute the cat catches the tail the game stops. So with the circus movement. Lewis and his co-workers in 1920 applied this theory of circus movement to the conditions of flutter and fibrillation, and as the result of experiments and dedutions from the actions of various drugs, (Quinidine, Digitalis, etc.) in these conditions, feel that they have established the Validity of their contentions that flutter and fibrillation have underlying their causation the same basic condition, viz: the "Circus Movement". The path of the circulating wave in flutter is longer than in fibrillation and is constant. It generally encircles the mouths of the Superior and Inferior Venae Cavae. In fibrillation on the other hand, the path is shorter and inconstant and shifting, generally encircling only one orifice. As a result of these differences there appear differences in their clinical manifestations. Thus in Auricular flutter the wave completes the circuit uniformly about every one-fifth of a second, 300 times a minute, being the Auricular rate in flutter and the Ventricular rate depends upon the integrity of the A. V. Node, the usual condition being a 2.1 block with a Ventricular rate of 150. In Auricular fibrillation, as stated above, the path of Circus Movement is shorter, and the rate is more rapid (450-600 a minute), because of the shifting path the individual circuits are not completed at a uniform rate, hence the stimulus to the Auricles from this type of Circus Movement is very rapid and irregular, and effectual Auricular contraction practically never occurs. Hence, also, a rapid and irregular Ventricle. This is a most meagre outline of the Circus Movement, and it is generally held that it best explains the mechanism of Auricular flutter and fibrillation, which under this theory are genericially the same.

In Conclusion.—It has been attempted to show that Keith's conception of the role of the Bulbus Cordis has largely superceded the theory of foetal Endocarditis, thus explaining many, if not most of the Congenital Anomalies, although in a few instances foetal Endocarditis is not to be denied. It has, also been stated that acute and sub-acute Valvular disease largely are Bacterial in origin and are the same in principle and in their Modus Genesis, their differences being due to differences of the invading bacteria; further that in most cases, Chronic Valvular disease (a true Valvulitis, not merely a functional incompetency) is a sequel of an acute disease, although Arterio-Sclerotic changes may be responsible for some. The Arhythmias have been classed under the functional disorders, although it is recognized that they are frequently associated with Structural Alterations. The Premature contractions and Tachycardias were explained on the theory that an ectopic focus usurps, for varying intervals, the pace making function and finally that flutter and fibrillation generically are similar and are dependant on the Circus Movement.

*The Interpretation of Symptoms in Chronic Gastro-Intestinal Disease

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A CONSIDERATION of symptoms in chronic gastro-intestinal disease demands a clear conception of gastric and intestinal physiology with a particular knowledge of the various activities of smooth muscle. It also demands a knowledge of the development of the abdominal organs and their nerve attachments, and lastly it requires an appreciation of the value of a careful history.

Disturbances of secretion are responsible for a few symptoms but the majority of visceral symptoms are related to the activities of smooth muscles. The mucosa of the alimentary tract is not sensitive to tactile, thermal or chemical stimuli, except in a limited portion from the teeth to the pylorus. The lower end of the oesophagus is sensitive to thermal stimuli,—for instance, cold drinks or ice cream produce the well-known brow pain, a reflex of the oesophageal branch of the vagus, referred by the fifth nerve to the brow.

Regurgitation of acid contents from the stomach into the oesophagus is said to be responsible for the production of so-called heartburn. Reichmann carried out a series of experiments with gelatine covered sponges, with attached strings. These capsules were swallowed and allowed to remain in the oesophagus for one hour and then withdrawn. The contents were expressed and gave the characteristic reaction for HCl in cases of heartburn. Normal controls showed no free HCl. Recent experiments do not confirm the work of Reichmann. The most recent opinion is that heartburn is due to increased tonic and peristaltic action, perhaps with squeezing of oesophageal mucosa.

In the stomach, Carlson, Hurst and others have proved that chemical stimuli do not produce any sensation of the gastric mucosa, either under normal conditions or in the presence of a gastric ulcer. Carlson has definitely proven that the gastric mucosa is sensitive to thermal stimuli—that is, to water at a temperature of 10 to 50°C. Hurst believes that the mucosa is not sensitive to thermal stimuli. Alcohol, mustard or pepper, introduced by a tube into the stomach, produces various degrees of pain, accompanied at first by a peculiar feeling of warmth.

Although the mucosa of the stomach is only sensitive to thermal stimuli, the stomach has, in health, a sensibility of its own. These sensations, according to Ryle, are four—the first hunger, second appetite, third satisfaction, and fourth repletion. Carlson, after numerous experiments, concludes that the local element in the sensation of hunger is dependent upon the tonus and contractions of the gastric musculature. He also does not believe that hunger and appetite are different intensities in the same sensation curve. Ryle draws a very interesting comparison—appetite is a pleasant and hunger an unpleasant sensation. Appetite may occur when the stomach contains food. Hunger

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occurs when there is undue abstention from food. Appetite is a daily experience. Appetite may occur without hunger but hunger seldom without appetite.

In the state of satisfaction there is no sensation, the stomach walls are adequately relaxed and muscle fibres have assumed a normal posture. Repletion may give rise to sensations which are mildly uncomfortable or definitely painful and is experienced when the stomach is over-filled or too rapidly filled.

Cannon's theory of the acid control of the pylorus is at present being challenged. The radiologist has shown that the duodenal cap or bulb, generaly fills during the first few minutes after the taking of a barium meal. Again, in the case of achylia gastrica, we frequently find the stomach empty in half to one hour after ingestion of a meal. The acid may indirectly be responsible for the relaxation of the pylorus but that HC1 forms the major part in the control of the pylorus seems doubtful.

The observations of the physiologist and the radiologist have been most helpful in the study of the movement of food contents in the alimentary tract. When a solid bolus passes into the upper end of the oesophagus, the first law of the intestine comes into action. There is relaxation in front and contraction above and behind. The bolus requires from four to five seconds to pass from the upper to the lower end of the oesophagus. When the bolus reaches the lower end of the oesophagus, the cardiac sphincter relaxes and a reflex inhibition of the musculature of the stomach takes place to receive the oncoming bolus. In the case of fluids, we find the fluid arrives two or three seconds before the peristalitic waves reach the cardiac orifice. In the stomach, we find the peristaltic waves commence at the cardiac orifice on both the lesser and greater curvatures. The amplitude of the peristaltic waves at the cardia are very small, but they slowly increase in depth until their arrival at the pyloric antrum, and here we find the waves almost cutting the stomach in two. If there is any interference with the passage of the wave along either curvature, the waves may fail to arrive synchronously at the pylorus and the result is reflex peristalsis, with nausea and vomiting. Immediately following the arrival of the peristaltic waves at the pylorus, there is a relaxation of the pylorus and the duodenal cap fills. There is some doubt as to whether every peristaltic wave reaching the pylorus is followed at once by filling of the duodenal cap. Under normal conditions the barium meal passes readily through the duodenum, jejunum and terminal ileum. Four to five hours after taking the meal, the barium commences to enter the caecum. In the caecum, the contents of the bowel are subject to a churn-like action, both peristaltic and antiperistaltic waves occur. In the colon, the movement of the contents of the bowels is very slow, and there is a mass movement that takes place once or twice a day. Under normal conditions, the contents of the bowels reach the splenic flexure in about ten hours and the rectum in eighteen to twenty-four hours.

Alvarez has pointed out that the mechanism producing peristalsis is to be found in the wall of the gut. The circular fibres contract after removal of Auerbach's plexus. He also points out that smooth muscle is more sluggish than striated muscle—slower to react and slower in recovering original length. Smooth muscle is able to maintain a firm and lasting contraction without fatigue. Smooth muscle reacts to tension. Smooth muscle shortens under influence of direct irritation.

It does not fall within the scope of this paper to discuss in detail the nerve connections of the viscera, but some mention must be made of the bulbo-

sacral outflow (parasympathetic) and the thoracic lumbar outflow (sympathetic). The abdominal viscera are connected through the sympathetic system with certain definite metameres or segments of the spinal cord. We assume that both afferent and efferent impulses pass to and fro in connection with the spinal segments. The nerve connections of the stomach are related to the 6th, 7th and 8th dorsal segments; the duodenum to the 9th; the appendix to the 7th and 8th; the colon to the 11th and 12th; the liver 6th to the 10th; the gall bladder to the 10th and the pancreas to the 10th and 11th dorsal segments. The dorsal segments have their nerve connections with the skin, muscle and connective tissues of the abdominal parietes. Regarding the contractions of smooth muscle fibres of the gastro-intestinal tract, efferent fibres travel both in vagus and sympathetic; sympathetic mainly to the sphincters and the vagus through Auerbach's plexus to the musculature of the visceral wall.

Goldie points out the importance of a careful history. He states that 80% of the points of evidence upon which a diagnosis is based arise directly from the history, 15% from physical examination, and less than 5% from laboratory findings. In investigating a case presenting gastro-intestinal symptoms, attention should be directed towards determining: first, the nature of the complaint; second, the duration of the complaint; third, the character of the symptoms (have they remained the same since onset?); fourth, have there been periods of freedom from symptoms? fifth, have the symptoms been produced by unusual exercise, indiscretion, etc.? sixth, have the symptoms been relieved by change of diet, manner of living, etc.? It is often very difficult to obtain a clear history from patients in the wards of a general hospital. Many of the patients are foreigners and understand very little English. We find that the history of the gastro-intestinal activities throughout the 24 hours is very helpful. We commence by asking the patient whether he has any symptoms before breakfast; whether he has any symptoms after breakfast; and we continue this investigation of his daily cycle throughout the day and night until the following morning.

I wish now to discuss certain outstanding symptoms seen in gastro-intestinal disease; 1st, anorexia; 2nd, nausea; 3rd, vomiting; 4th, heartburn; 5th, water brash; 6th, flatulence, and 7th pain.

In *Anorexia*, we have diminished tone or muscular rigidity of the stomach. In fatigue the smooth muscle of the stomach has loss of tone. Emotion, worry, etc., may cause impaired gastric tone, probably due to the influence of the sympathetic nervous system. In acute fevers and chronic systemic infections, muscular tone is impaired. In chronic alcoholism, loss of appetite is due to general effect of poison on muscular function and metabolism and excessive secretion of mucus, which prevents normal stimulation of gastric mucosa. In the alcoholic, appetite for breakfast is very poor.

We generally see anorexia in cases of marked visceroptosis, with an associated hypotonus of the stomach. In carcinoma of the stomach, when there is involvement of the body wall, there is loss of appetite. Absence of free HC1 is generally associated with loss of appetite.

Loss of appetite may not actually exist. Patients frequently are afraid to eat because the taking of food causes distress or pain—example, gastric ulcer, carcinoma of the stomach and in certain nervous and reflex conditions of the stomach. A poor appetite with a rapidly developing sense of fullness suggests structural disease of the stomach or a hypotonic stomach in a state

of general poor health. In contrast, a good appetite with a rapidly developing sense of fullness suggests a small hypertonic stomach,—as in disease of the biliary tract.

Nausea.—Carlson points out that the sensation complex of nausea and vomiting may be initiated by stimulation of nerves in gastric mucosa, but many of the sensory elements in nausea involve a mechanism outside the stomach. The sensation of nausea is associated with a feeling of bodily weakness and a characteristic pain and distress, (sinking feeling). Frequently one may experience headache, dizziness, chills (from cutaneous vaso-constriction and sweating). Reverse peristalsis occurs in the stomach.

Vomiting.—In considering the causes of vomiting, there are:

1st. Those acting directly on the vomiting centre.
2nd. Those acting reflexly on the centre.

Central stimulants acting directly on the vomiting centre are toxic in nature, and include tobacco, toxins of uraemia, etc. Reflex causes: Stimuli acting reflexly on the vomiting centre include stimuli from the stomach itself and, by afferent fibres, from other parts of the body by the vagus.

A. Gastric. Improper food, excessive ordinary food, irritant poisons, ulcer and malignant diseases of the stomach, and hepatic cirrhosis.

B. General visceral causes, appendicitis and peritonitis generally, intestinal obstruction, Dietl's crisis, pelvic disease, pulmonary tuberculosis, violent coughing, shock from a blow on the epigastrium.

C. Through the central nervous system:

1. Through the special senses, taste, smell or sight.
2. Brain. Concussion, meningitis, haemorrhage, tumor, mal demer, hysteria.
3. Spinal cord. Gastric crises of tabes.

Heartburn.—The mechanism of this symptom we have already discussed. It is frequently met with in gall bladder disease, pregnancy, visceroptosis, co-called chronic appendix and, rarely, in duodenal ulcer. Heartburn not infrequently occurs as a persistent symptom for years, in cases in which no organic lesion can be demonstrated.

Water Brash.—Water brash is due to the pouring out of excessive secretion from the salivary glands. This secretion may be watery or mucoid in character. Not infrequently the secretion can actually be seen jetting out from the salivary ducts. Water brash occurs as a symptom occasionally in gastric and duodenal ulcer.

Two cases of carcinoma of the stomach had water brash as the only persistent symptom for a period of several months.

After a hearty meal, regurgitation of food occurs involuntarily and without strain or nausea, due to relaxation of the cardia. It also occurs during periods of fatigue or in anxiety states.

Regurgitation of food also occurs in cardiospasm, when we have a closed cardia.

Flatulence and Discomfort.—These symptoms are met with in two different types of stomach. In the hypertonic, steer-horn type we find the greater curvature of the stomach three to four inches above the intercristal line. Discomfort commences some time after taking a meal. This condition is illustrated in patients suffering with gall bladder disease. In contrast, the hypotonic, hook-shaped stomach is characterized also by a sense of fullness;

greater curvature frequently three to four inches below the intercristal line; seen in visceroptosis and in cases of pyloric obstruction with associated dilatation. Epigastric fullness and discomfort lead naturally to the consideration of the symptom of gastric flatulence.

Flatulence is due to: First—swallowed air, probably accountable for 90%. A certain amount of air is swallowed with saliva and food. Second—Regurgitation of gas from the duodenum. Third—Gas resulting from diffusion through the stomach wall. Fourth—Gas resulting from fermentation in cases of pyloric obstruction. Gastric flatulence may be defined as a feeling of pressure high up in the epigastrium, often underneath the sternum and sometimes widely diffused throughout the chest. Flatulence rarely ever produces actual pain, but is characterized by intense discomfort, often so marked that the patient wishes he could plunge something into the epigastrium to relieve the condition.

Flatulence coming on immediately after a meal, with a relaxed cardia and associated belching, is frequent in individuals who overeat. Flatulence occuring one-half to three-quarters of an hour after a meal is frequently a symptom in gall bladder disease. When the discomfort becomes acute, the individual, in an endeavor to relieve the symptom swallows air and forces the cardia. Before the cardia can contract down, the gas and, not infrequently, some of the contents of the stomach are forced through the cardiac orifice into the oesophagus, producing the belching, regurgitation, etc. This phenomenon is accentuated by the contraction of the strong abdominal muscles. Patients frequently repeat this process many times and apparently it affords them some relief, although there is very little change in the amount of gas in the stomach.

Pain.—Visceral pain is by far the most important symptom in chronic gastro-intestinal disease. Hilton says: Every pain has its distinct and pregnant signification if we but look for it. In investigating visceral pain, we have to consider several points:

1st—The character of the pain. Is it intermittent or continuous?
2nd—Type. Is it burning, boring, dull or acute?
3rd—Is pain general or localized?
4th—Radiation of pain.
5th—The timing of the pain. The relationship it bears to the functioning of the stomach, gall bladder, etc.
6th—Is the pain relieved by the taking of food?
7th—Is the pain increased by the taking of food?
8th—Is the pain continuous? Is the pain recurring day after day after the same meal or meals? Are there intervals of weeks or months of entire freedom from pain?
9th—Is the pain aggravated by excercise?

It is very important to see your patient when he has the pain. He is able then to define more clearly its character, radiation, etc.

Visceral pain may be classified as: 1st—intermittent; 2nd—constant; 3rd—postural; 4th—capsular.

1st. Intermittent pain is due to excessive muscular contraction and the stretching of contracted muscle. Pain due to excessive muscular contraction is not constant, but the pain due to the stretching of a contracted muscle is more prolonged. Pain of this type is at its height during muscular activity. At the cardiac end of the stomach there is no marked muscular contraction and the amplitude of the peristaltic waves is small.

Gastric ulcer involving only the mucous coats of the stomach does not produce pain. Introduction of dilute HCl by means of the stomach tube in

a case of gastric ulcer does not produce any gastric sensation. When gastric ulcer has existed over a long period, it frequently loses its periodicity and becomes somewhat continuous in character. This generally indicates a chronic perforation with perigastric adhesions.

The pain of gastric ulcer is generally relieved by the taking of soda bicarb. or the emptying of the stomach. This is probably due to the lessening of muscular spasm and gastric tension.

The variability of pain in gastric ulcer may be due to the differences in properties of smooth muscle.

In duodenal ulcer we may have the intermittent type of pain. This pain occurs from 1 to 4 hours after meals. Pain may occur after every meal and during the night. Frequently it may occur only after the midday meal,—i. e. at from 3 to 5 p.m. The pain varies in character, just as in gastric ulcer, and may be burning, tearing, gnawing, etc. The location of the pain in the epigastrium is variable. Most frequently it is limited to the left of the medium line and above the umbilicus, although not infrequently it is localized on the right side. The pain in duodenal ulcer is practically always relieved by taking food. Water rarely relieves it. Soda bicarb. frequently does. Pressure often affords temporary relief. If the pain is not relieved by the taking of food, pressure and an alkaline mixture, it is very unlikely that we are dealing with an uncomplicated duodenal ulcer.

Duodenal ulcer may give symptoms for weeks or months, with a daily hstory of pain, and then be followed by a remission of symptoms for months or years.

We meet with a certain number of cases that do not present the characteristic symptoms of pain but have nausea, distress, discomfort, or even heartburn, occuring with a definite periodicity. Again, we have a smaller group of patients who present a picture closely simulating ulcer. Pain occurs with a definite periodicity but persists only for a few days at variable intervals. Pain does not always occur after the same meal. This type of case also is relieved by the taking of food. Frequently, we find no evidence of an intrinsic lesion in the duodenum but find evidence of an extrinsic cause, such as appendix, caecum, gall bladder, etc.

2nd. Continuous or peritoneal pain is characterized by persistent pain, gradually increasing in intensity and associated with the general constitutional picture of peritonitis. This naturally falls into the group of acute abdominal conditions.

3rd. Postural pain arises when tissue is stretched or pressed upon and is relieved by change of position or posture. It is seen in cases of lymphangitis and perilymphangitis, extending from ulcer or carcinoma.

4th. Capsular. This occurs when we have a rapid enlargement of an inflamed solid organ, such as liver, spleen, etc. This type of pain is constant in character.

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Historical Section

MAYOR H. F. MUGGAH'S ADDRESS TO THE MEDICAL SOCIETY OF NOVA SCOTIA, SYDNEY, N. S.

Gentlemen:—

My first word must be a personal one of respectful acknowledgement, at the privilege which is mine to-day in being invited to address some words of welcome on behalf of the citizens of Sydney to this meeting of the Medical Society of Nova Scotia, which we are so honored and delighted to have gathered in our city this year.

It is always a pleasing duty to welcome any assembly of outstanding citizens to our community, but when the gathering to be welcomed is such an august one as the Medical Society of Nova Scotia, composed as it is of many of the country's most distinguished men of science, it not only pleasantly gratifies, but it creates serious misgivings as to just what one can say to meet adequately the requirements of the occasion.

However, judging you all from the excellent men who practise the medical profession in Cape Breton, I am venturing to take a little of your valuable time for the purpose of looking backward into the days that are past, as regards fragments of medical history, both in Sydney and Halifax.

I know but little of the history of the medical profession in Sydney and the Island of Cape Breton, and assume that the first medical men to come here must have been attached to the military units, from time to time stationed here.

One of the oldest medical cards which I have been able to find is that of Dr. Joseph Elmsley, who, on September 12th, 1850, hung out his shingle on Mr. Anderson's premises near Cann's point, afterwards called Anderson's Point, and now occupied by the Sydney Foundry and Machine Works, Marine Railway. As far as I can find out Dr. Elmsley who was a nephew of Robert Anderson, the owner of the Anderson Point property, only practised a short time at Sydney, moving to Baddeck in 1851, where he married Miss Lydia Ingraham. In addition to practising his profession he was appointed Prothonotary for the County of Victoria, and occupied that position for only a few years. Dr. Elmsley left Baddeck on December 1st, 1859, with his wife and family on board of the Brig. *Ellen Lewis*, built at St. Ann's, for Auckland, New Zealand, where he arrived in due course; and with this brief reference he fades out of the picture as far as practice of medicine in Cape Breton is concerned. He was, I have been told, a graduate of Edinburgh University. The Miss Ingraham whom he married was one of the well known Ingraham family of Margaree. Dr. Elmsley has two nieces living in Sydney, Mrs. Emily Sparling and Miss Elmsley of No. 22 Douglas Place.

Dr. Lewis Johnstone, Sr., whose family is too well known to require any comment here, also has his card appearing in the Sydney press about the same time as Dr. Elmsley. Passing on after many years of practice he left two sons, Dr. E. J. and Dr. L. W. Johnstone, the former also having been called by death a year or two ago. The latter is the popular and highly esteemed M.P. for Cape Breton north and Victoria.

A Dr. John Whyte practised in Sydney in those early days, but I have not been able to ascertain much about him, other than that he came from the same county in Scotland as my own people, viz. Banfshire. He was a son of Dr. Joseph Whyte, R.N. and arrived in Sydney in the summer of 1826. With him came his sister Margaret Whyte, who married John L. Hill. This lady died on Nov. 18th, 1881, and was the first person to be buried in the new Hardwood Hill Cemetery. Mr. W. A. G. Hill, K.C., Deputy Stipendiary Magistrate of Sydney is a grand-nephew of the late Dr. Whyte.

Dr. Whyte must have removed to Montreal as there is an authentic record of the death of his father in that city, July 5th, 1851, which reads as follows:

"Died at Montreal at the residence of his son, Dr. John Whyte, on Saturday at 11 O'clock P. M. the 5th of July, 1851, Joseph Whyte, M.R.C.S.P. Surgeon R.N. who practised in Banff, Scotland for over thirty years."

And that they must have been a medical family is disclosed by the epitaph on a stone still to be seen in a Banff grave yard. It reads as follows:—

"In memory of William James Whyte, M.D. Edinburgh, M.R.C.P. London, of Banff, son of Dr. Joseph Whyte who was born Jany. 14th, 1814, and died Nov. 17th, 1864, age 51 years. Erected by a number of his friends and patients in Banff and MacDuff in grateful remembrance of his warm and generous nature and of high professional ability."

I ask you to notice from this that at least enough of this doctor's patients survived him to erect a tomb-stone over his grave. A portrait of Dr. Joseph Whyte of Banff, painted by his son, Dr. John Whyte, was within quite recent years in the possession of the late Mrs. C. H. Harrington of Sydney, who was, of course, grand-daughter of the subject and niece of the painter. Part of the time spent in Sydney by Dr. Joseph Whyte he lived in a house still standing on the north Esplanade, where it is said he carried on for a short time a school of anatomy, subjects for this research being furnished by unclaimed bodies of soldiers, who died in the Barracks not far away—so much for Dr. Joseph Whyte.

There was also a Dr. Haire who practised in Sydney in the early eighteen hundreds, but I have not been able to obtain much information about him, other than that his daughter Martha was married to James P. Ward, owner and editor of the *Cape Breton Times*, and was the mother of Mr. James T. Burchell, and grandmother of Dr. H. W. Burchell, North Sydney, J. Sydney Burchell well known and highly respected business man of Sydney, George B. Burchell, Manager of Bras d'Or Coal Company at Little Bras d'Or and Mrs. Henrietta Clarke, wife of W. E. Clarke of this city.

Coming down to later days the names of Doctors Oakes, Foreman, McGillivary, W. MacK. MacLeod and Kendall have been associated with the alleviation of suffering and prolongation of life in this community. The latter named gentleman is still with us we are glad to say, though not in active practice, after serving his country as a competent and kindly medical man, and also as a fearless representative of the people in the Assembly at Halifax, and in Parliament at Ottawa. Doubtless Dr. Kendall will be able to give many details of early medical practice in Sydney as his store of information on all matters pertaining to this Island is very wide.

As this is a meeting of the Nova Scotia Medical Society perhaps I may be pardoned if I turn for a moment to Halifax, on the history of which, from a medical standpoint, there seems to be much more material available.

The period of the American Revolution, 1775-1783, is rendered notable by the arrival of the Loyalists, says an old periodical. About 1,000 people came to Halifax after the evacuation of Boston by the British. In comparison to lawyers and clergymen, only a few of the Loyalist physicians were banished; others, and those chiefly who became surgeons to the army or provincial corps, settled in New Brunswick or Nova Scotia where they resumed practice. After the evacuation of Boston, 1776, a number of prominent medical men came to Halifax, and remained for a short time. One or two died shortly afterwards, and the majority either went to England or returned to the seat of war. Among them was John Jeffries (1776). He was appointed chief of the surgical staff in Nova Scotia. In 1777 he went to England and, returning to America shortly afterwards, held a high position in the British forces at Charleston and New York. He practised in London for many years. He was eminent as a surgeon, midwife and physician. Sylvester Gardiner came in 1776. He afterwards went to England. He was a very able man, and very wealthy. In 1785 he returned to Boston, and made claim to his property, without success. Wm. LePerkins came to Halifax in 1776, from Boston. General Washington, on taking possession of Boston, ordered his stock of medicines to be taken for the use of the continental army. He afterwards left Halifax for England, where he died.

A very interesting personality was William Brattle. He was eminent for his talents and eccentricities. He graduated at Harvard in 1722, and subsequently was representative from Cambridge and a member of H. M. Council. He seems to have been of every profession, and to have been eminent in all. As a clergyman, his preaching was acceptable; as a physician he was celebrated, and he had an extensive practice as a lawyer. His military aptitude secured for him the rank of Major-General of Militia, an office, in his time, of very considerable importance and of high honor. He loved good living, and possessed the happy faculty of pleasing both the government and the people. A prominent Loyalist, he was prosecuted and banished. In 1776 he came to Halifax, where he died a few months afterwards.

I would like to refer for a moment to two occasions when Asiatic cholera made its appearance at Halifax. The first case recorded was on August 14th, 1834. By the 28th the disorder was making frightful ravages in the community. The Indians retired from the vicinity of the town and not one died of the disease. Two hundred and ten cases occurred within four days, and 103 soldiers and very many townspeople died. All who could had left or were preparing to leave the place. In the week ending Sept. 4th, 227 new cases appeared in town and 313 during the week ending Sept. 11th. It was decided to force those diseased to go to the cholera hospital. The 17th was appointed a day of humiliation. On Oct. 8th cholera disappeared.

Now follows one of the most splendid acts of bravery and devotion to professional duty on the part of a medical man which is anywhere recorded, I believe. It refers to Dr. John Slayter, who was then Medical Officer for the port of Halifax.

The steamship "England" of the International Steamship Company's Line, arrived in Halifax with a large number of cholera cases on board. She had sailed from Liverpool, G. B., for New York on the 25th of March, 1866, with 1,202 passengers besides the crew. When four days out from England, a death occurred from Asiatic cholera. Two days later another death occurred. The disease now began to spread, and the passengers as well as the crew were affected. When the ship arrived in Halifax Harbor, 160 cases were reported, and 56 dead.

Dr. Slayter went on board on the 10th of April, and perceiving the desperate condition of the ship he said farewell to his family and friends, and volunteered to place himself in quarantine. A boat laden with dead bodies was afloat at the stern of the ship, for which graves were dug at Thrum Cap—the extreme southern point of McNab's Island.

Dr. Slayter was seized with the plague and passed away on the 17th. His remains were interred at McNab's Island, near Finlay's Cove (formerly Huguennon's). There were in all 250 deaths. The cholera ship left for her destination on Wednesday 18th April, of the same year.

The *Recorder* of April 20th, 1866 said:

"On April 19th, the remains of the late lamented Dr. Slayter, who died so heroically at his post of duty, were interred at high twelve, with proper Masonic ceremonies, by the officers, medical gentlemen and passengers of the steamer "England", many of whom belonged to the Fraternity. The funeral scene is said to have been very impressive. Peace to the ashes and honor to the immortal memory of a noble physician and a brave gentleman." It is stated that the remains of the deceased surgeon were interred between willow trees on the shore, having first been enclosed in a metallic coffin.

Within the last few days I have seen a copy of the names of the Nova Scotia Medical Society for the year 1865 and the following are the officers:

President - - - -	Dr. Chas. Cogswell.
1st Vice President - - -	Dr. B. De W. Fraser,
2nd Vice President - -	Dr. C. J. Gossip.
Treasurer - - - -	Dr. R. S. Black.
Secretary - - - -	Dr. J. B. Garvie.
Corresponding Secretary -	Dr. Andrew Cowie.

Council: Drs. P. W. Smith, D. McN. Parker, R. S. Black, Wm. J. Almon, Wm. H. Davies, J. B. Garvie.

Honorary Members: Dr. Jas. F. Avery and Dr. Chas. Cogswell.

In the medical register of that year only four medical men appear from Cape Breton Island. They are:

Dr. Lewis Johnston - - - - - -	Sydney.
Dr. J. E. Jeans - - - - - -	Sydney Mines.
Dr. H. C. Fixott - - - - - -	Arichat.
Dr. Joseph Creamer - - - - -	Arichat.

I fear that I have by now wearied you over much with tiresome material of which you all doubtless know much more than I can tell you.

In closing, I again with very sincere feelings of pleasure welcome you to the city of Sydney.

I trust that your meetings here to-day may be very enjoyable, that the social and friendly intercourse which you will have with each other will make for new and lasting friendships, and strengthen the ties that already exist.

I feel that your scientific discussions of the different subjects to be considered will be mutually helpful, and I know that those to whom you are called to minister in the great and noble art of healing, will be better served by reason of your learned and helpful interchange of ideas and opinions at this gathering.

I bid you again a sincere and hearty welcome to Sydney, and now leave you in the capable hands of the local medical men who are all eminently qualified to prescribe for all the wants of visitors.

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THE DALHOUSIE REFRESHER COURSE.

On this occasion we have departed from our usual practice and have asked others to discuss the Refresher Course.

Dr. Benvie has been a very regular attendant upon it for years. He is a graduate of another school. These and the fact that he is now President of our Society make him, quite obviously, the one best qualified to give our members an unbiassed and reliable estimate of the value of this year's effort in post-graduate medical education.

Dr. Schwartz, our most energetic chairman of the Refresher Course Committee should, we felt, have other ideas of interest. He, too, was asked to contribute and he has kindly acquiesced.

In this way, it was hoped that we could present certain aspects of the Course, both external and internal, as they are seen through the eyes of those who see best.

N. H. G.

THE Dalhousie "Refresher Course" has become an institution. Year by year, one notices a larger number who have attended previous courses returning which is the best possible evidence of their opinion of the value received.

The usefulness of these clinics lies in that every day problems are discussed. Patients suffering from common diseases are shown, the treatment outlined and in many instances the end results demonstrated. This year, haemorrhage from the intestinal tract, nasal haemorrhage, diseases of the colon, gall-bladder disease, lung abscess, infections of joints, fractures, obstetrical accidents, etc., were dealt with.

The occasional introduction of the unusual lends spice to the programme, (e. g. Addisons disease (two cases) and the enlargement of the liver in a young girl, were exhibited).

The "outside" clinician is a very attractive feature, and it is of double interest to hear of their methods and results.

The Committee are to be congratulated on their selections from year to year—and one always has a thrill of anticipation in looking forward to the next course.

The anatomical exhibition of this year was outstanding. The work shown there compared very favourably with any that any school could produce and was itself quite worth a trip to Halifax.

In 1936 our hope and expectation is to combine the Nova Scotia Medical meeting with the Refresher Course with, we trust, mutual benefits to each.

R. M. B.

THE 13th Annual Refresher Course conducted by the Faculty of Medicine was well attended, 106 registering. This year's programme was well balanced and, we believe, compared favourably with any of its predecessors. The six guest teachers were all of the first rank and some of international renown. The clinics, lectures and demonstrations showed evidence of careful preparation. I have no hesitancy in saying one would have to travel a long way to hear better. That such a Course could be arranged and presented to the Doctors of these Maritime Provinces reflects most creditably on the Medical Faculty. Such a feast of good things if served at any other teaching centre—of which we are aware—would cost in teaching fees anywhere from $25.00 up. Yet Dalhousie gives it absolutely free.

A trivial registration fee of $2.00 is charged which is used to defray, insofar as it will go, such unavoidable expenses as stamps, stationery, printing, stenographer's services, preparation of lantern slides, telegrams, etc., and the hotel and travelling expenses of the visiting clinicians. As we always end up with a deficit we still are able to exercise our imaginations on what we would do with a surplus. Strange as it may seem it is those who contribute most in time and energy and bear the burden of worry and anxiety who register first. One regrets that several of our associates begrudged this pittance which is used towards paying expenses incurred on their behalf by the School which seeks to serve them throughout their professional life.

Enough of the depressing. The year before last this Committee received a letter of appreciation reinforced by a cheque for $25.00. What a grand and glorious feeling!

H. W. S.

Annual Meeting of Provincial Association of Medical Health Officers

THE twenty-first annual meeting of the Provincial Association of Medical Health Officers was held at Sydney on Tuesday, July 2nd, 1935.

The number of officers in attendance was not large, nevertheless, the meeting was considered a representative one. Dr. Freeman O'Neil, the president elect, presided at all Sessions.

Dr. J. J. Heagerty of Ottawa, Chief Executive Assistant, Department of Pensions and National Health, gave an interesting and instructive talk on the history and activities of the Federal Department. He showed how, without overlapping or duplication, his Department endeavored to co-operate with provincial, territorial and other health authorites, with a view to co-ordinating all efforts for preserving and improving the health of the Canadian people.

Special activities of the Federal Department are:

1. The maintenance of a national laboratory.
2. The inspection and medical care of immigrants and seamen and the administration of marine hospitals.
3. The supervision, as regards public health, of railways, boats and all other methods of transportation.
4. The supervision of Federal Public Buildings and offices with a view to conserving and promoting the health of the civil servants and other Government employees.
5. Collection, tabulation, publication and distribution of Vital Statistics.
6. The administration and enforcement of the Food and Drugs Act, the Opium and Narcotic Drug Act, the Proprietary and Patent Medicine Act, the Quarantine Act, and the Leprosy Act.
7. Matters relating to the treatment or re-establishment in civil life of persons who served in His Majesty's Forces during the Great War.

Dr. H. G. Grant, Dean of the Medical Faculty, Dalhousie University, followed with a paper on "Full time Rural Health Units." Dr. Grant stated that so far as the United States is concerned, these units were the outcome of efforts to control Hook Worm disease. Full time sanitary officers were placed to develop proper privies, and to supervise milk and sanitation generally. About the year 1911 the first units were established in Washington and North Carolina. To-day there are many. They, however, have not been accepted in all parts of the United States. Development has taken place more rapidly in the South. In Canada, with the exception of the Province of Quebec, very few are in operation.

The personnel of a unit usually consists of a Health Officer, a Sanitary Inspector, a Clerk and a Nurse or Nurses, all centrally located. Supervision is given to sanitation, disease control, school inspection and health education.

In his presidential address Dr. O'Neil referred particularly to the seriousness of neglect of smallpox vaccination. In places where the neglect is prevalent, generations of susceptibles are growing up, a condition which favours spread of smallpox, should it be introduced. Support should be given to all efforts being made to provide vaccination gratuitously to those who are unable to pay.

An excellent address on the subject "Infection" was given by Dr. J. K. MacLeod, Health Officer for the City of Sydney. In his own unique way,

Dr. MacLeod showed how in earlier years such infections as smallpox, diphtheria, typhoid fever and others, carried off thousands of persons, whereas to-day we have definite means of combatting these. By the adoption of a proper technique, isolation, and sera and vaccine therapy, the public can now be protected. Tuberculosis in student nurses and the means of combatting it was referred to at length.

The Secretary gave a short talk and demonstration on "Sanitary Rural Necessities", which was illustrated with working drawings recently prepared by the Department of the Public Health.

The matter of establishing within the Association a Tuberculosis Section where, each year, questions pertaining to the treatment and control of tuberculosis could be dealt with, was discussed and a committee consisting of Dr. T. R. Johnson, Dr. C. M. Bayne, and Dr. J. J. MacRitchie, was appointed to go thoroughly into the desirability of such a move, and to report at the next meeting.

Perhaps of greatest value to all concerned were the discussions that followed the presentation of all addresses and papers. These proved, beyond a doubt, that we have, within the organization, men well versed in all phases of Public Health, and all actuated by one desire, viz: to bring about a better state of affairs relative to the healtn of all the people of Nova Scotia.

One resolution only was passed: "Resolved that the Dominion Government, ever solicitous for the welfare of the people of Canada, adopt the principle of making financial grants to Provincial Departments of Health to aid in the solution of special health problems."

Officers for the ensuing year were elected as follows:

President - - - - - - - - Dr. F. F. Eaton, Truro.
First Vice President - - - - - - Dr. P. E. Belliveau, Meteghan.
Second Vice President - - - - - Dr. H. J. Townsend, Louisburg.
Secretary - - - - - - - - Dr. P. S. CAMPBELL, Halifax.

Council

Dr. F. O'Neil, Sydney. Dr. G. V. Burton, Yarmouth.
Dr. R. M. Benvie, Stellarton.

P. S. CAMPBELL,
Chief Health Officer.

Minutes of the Annual Business Meeting

Provincial Medical Board.

In the absence of Dr. J. G. MacDougall of Halifax, the Report of the Provincial Medical Board was read by the Secretary.

"Halifax, N. S., June 26th, 1935.

To the President, Officers and Members of
The Medical Society of Nova Scotia.

Gentlemen:

I beg to submit a resume of the activities of the Provincial Medical Board for the past year:

During this period two meetings were held, each preceded by a meeting of the Executive of the Board. Each was well attended. Besides routine business, occupying a very considerable portion of these meetings, the following items of major importance were dealt with:

(a) The case of a Medical practitioner, graduate of the University of Oklahoma and licensed in that, as well as other American States, applying for registration in the Province of Nova Scotia. The University of Oklahoma has a four year course in Medicine, while the Province of Nova Scotia requires Medical study covering five academic years in an approved Medical school. It was impossible, therefore, to grant Dr. Coolen's request for immediate registration but he was offered the opportunity to register at Dalhousie or any other approved Medical school and there take the final year of the Medical Course, at the end of which time he would be permitted to sit for examination for a license. Of this offer Dr. Coolen has not so far availed himself.

(b) The activities of a Chiropractor in Dartmouth had been under scrutiny for some time. Information had been secured regarding his activities. A client furnishing the information was threatened with legal action to collect an account. Counsel was retained by the Board to represent it at the forthcoming Court proceedings. The plaintiff, however, did not move farther in the matter and has since left the Province.

(c) The Dr. W. H. Hattie Shelf of the Cogswell Library continues to receive the support of the Board, which, during the past year, made it a grant of Twenty-five dollars for the purchase of books.

(d) A Licentiate of the Board, Dr. D. D. Outhouse of Auburn, New York, applied to the Board for change of name on License and in the Register to "Althouse". The Board has decided that at such time as Dr. Outhouse, by Act of Legislature in Nova Scotia, has his name changed to "Althouse" in this Province, his request will be granted.

(e) The Conjoint Examining Board conducted the first and second parts of the Final Examinations in Medicine during the latter part of April. The results of these examinations have been published by the University and have appeared in the local press. The Medical men who have conducted these examinations have examined the candidates this year, as in other years, in a most careful and conscientious manner and their services in this regard to the Profession and Public in Nova Scotia is worthy of the deepest appreciation.

Respectfully submitted,
(Sgd.) J. G. MacDougall, M.D.,
President."

It was moved by Dr. Benvie and seconded by Dr. McGregor that this report be received. Carried.

Narcotic Drugs.

In the absence of Dr. D. W. Archibald, the Secretary read the report of the Committee on Narcotic Drugs.

"Sydney Mines, N. S., June 26th, 1935.

H. G. Grant, M.D.,
Secretary, Nova Scotia Medical Society,
Halifax, Nova Scotia.

Dear Sir:—

As Chairman of the Committee on Narcotic Drugs, I beg to submit the following report:

During the year 1934, only two addicts, both females, were treated in the Nova Scotia Hospital.

One patient had a history of addiction to morphine for thirteen years. She improved somewhat under treatment and was discharged on November 24th, 1934, but has reverted to her old habits and should be returned to the institution.

The other patient, admitted in September, 1934, gave a history of morphine addiction for a period of two years following a series of abdominal operations. This patient improved greatly and at the time of her discharge, December 7th, 1934, was apparently cured. Nothing has been heard of her since.

Respectfully submitted,
(Sgd.) D. W. Archibald,
Chairman."

It was moved by Dr. Granville and seconded by Dr. J. J. Macdonald that this report be adopted. Carried.

Editorial Board Report.

The following report of the Editorial Board was read by Dr. Gosse:

Report of the Editor-in-Chief of the Bulletin.

"Mr. President:—

I beg to report again a very successful year for the BULLETIN, which was regularly published throughout the year. The same general policy was follow-

ed, the feature of numbers from different sections of the Province showing increasing popularity. Though the work of those responsible for its direction might have been somewhat greater in consequence of greater volume it was made much more pleasant by the greater readiness with which our members contributed to its pages. In no year since the inception of the Journal has that readiness been more apparent.

Further pleasure is found in the fact that members have from time to time commented upon the generally improved quality of the material published. While this involves a compliment to our contributors, which we are glad to pass on, your Board is disposed to interpret both these facts—readiness to contribute and improved quality—as indicating an increasing respect for the Journal.

There are certain acknowledgments which we would like to make; during the last few months, at the request of the Refresher Course Committee of Dalhousie University, your Board was glad to provide space for some teaching in Cancer by Dr. Bloodgood of Baltimore preparatory to his lecture demonstration, the coming August, believing that in this you would heartily concur.

(1) The success of the BULLETIN depends to a very great degree upon the maintenance of an efficient Secretary's office. This makes for stability and consistency of quality. The efforts of a voluntary staff alone must be susceptible to fluctuation, depending upon how busy its personnel is. These necessary qualities for success have been met in the arrangements which involve Dr. Grant's office, and he has personally done much, in co-operation with your Board, to produce the enhanced reputation which your Journal now enjoys.

(2) The thanks of your Board is tendered to the Secretaries of Branches who have assisted in collecting material and to all others who have contributed to our satisfactory position.

(3) Our appreciation of the co-operation of our publishers.

(4) Dr. Atlee has seen fit, after eight years or more of service, to give notice that he will not again accept nomination to the Board. This is matter for real regret, for Dr. Atlee brought to our councils such enthusiasm for the work and such a quality of literary and scientific judgment as made him most valuable to us. His loyalty, too, found him attending Board meetings many a time when calls to more profitable activities were very insistent. The BULLETIN owes him a great deal.

(5) My personal acknowledgment to the Secretary and his stenographer for many courtesies and to my associates for their co-operation.

Respectfully submitted,
(Sgd.) N. H. Gosse."

Dr. Gosse moved the adoption of this report which was seconded by Dr. D. J. MacKenzie. Carried.

Committee to Investigate Nursing Conditions in Nova Scotia and in Nova Scotia Hospitals.

In the absence of Dr. C. A. Webster, of Yarmouth, the Secretary read the following report.

"Your Society in appointing this Committee named a Chairman, but neglected to appoint any other members. It was late in the year before your Chairman was informed of his appointment, so that very little time was available to investigate nursing conditions in Nova Scotia.

The Chairman sent letters to 13 Nova Scotia Hospitals and received 11 replies. There are training schools in 6, and none in 5 of these Hospitals. These Hospitals employ 13 Superintendents, 63 graduate nurses and 217 nurses in training, making a total of 293. Add those nurses employed in the Sanatorium, Grace Maternity, the Infirmary, and a few other hospitals whose personnels are not included here and the number of nurses employed in the public institutions of Nova Scotia must amount to somewhere between 350 and 400. The 6 training schools graduate about 63 nurses a year.

Graduate nurses in private work are charging $35.00 per week. Some of the replies state that they believe this too high a charge, and a cause of unemployment.

Pupil nurses are receiving from nothing in one hospital to $12.00 per month in most of the others; mostly $6.-$8. first year, $8.-$10. second year and $10.-$12. the third year. Graduate nurses in hospitals are paid $50.00 to $70.00 per month.

Some of the replies claim that there are too many training schools and that too many nurses are being turned out yearly. This is a question that will have to be considered. Some of the hospitals claim that it is cheaper to run the institution with pupil nurses.

Nursing conditions as regards employment seem to be better in Cape Breton than in other parts of Nova Scotia. There is much complaint about unemployment by the graduate nurses themselves. There is a large shrinkage in the number of nurses from removal, marriage, and death, from year to year, but the number of nurses graduating increases.

Your Chairman does not believe in extending the period of training for a longer period than three years. Neither does he think that a trained nurse needs to be over educated in the various medical subjects, so that she becomes practically a physician.

(Sgd.) C. A. Webster,
Chairman."

It was moved by Dr. Muir and seconded by Dr. Mack that this report be adopted. Carried.

Workmen's Compensation Board.

Dr. Grant reported that the report of the Committee to deal with the Workmen's Compensation Board had been prepared by Dr. Lynch, and sent to the Secretary's office, and from there forwarded to the Halifax members of the Committee; so far it has not been returned.

Dr. A. McD. Morton: "I was very much surprised when this report came to me as it was the first intimation I had that I was on that Committee. I passed the report on to the other members, but it was not returned to me. It was a very lengthy report and showed considerable work on the part of Dr. Lynch. One recommendation that was considered advisable was to have a medical man on the Workmen's Compensation Board, and while there was not time for us to get in touch with many members of the profession to express their views, I spoke to one or two doctors in Halifax, and they did not approve of it."

It was moved by Dr. K. A. MacKenzie and seconded by Dr. Benvie that when the report was found it be published in the BULLETIN. Carried.

Dr. Lynch reported that he had consulted with a few of the legal profession who stated that the medical men had no status at all and he thought that the medical profession on the whole should have a member on the Board, instead of a medical referee; as far as Compensation goes in Nova Scotia we have no status, either in Canada, United States or in England.

Dr. Gosse: "This is a matter of sufficient importance to demand that we have a discussion on this, and it should be referred to another meeting."

Cogswell Library Committee.

Dr. Corston: "I must apologize for not submitting a written report. I shall give it in writing later."

It was moved by Dr. Corston and seconded by Dr. J. J. Macdonald that this be accepted. Carried.

It was moved by Dr. Lynch and seconded by Dr. H. K. MacDonald that business be suspended to hear the Canadian Medical Association representatives. Carried.

The Chairman introduced Dr. J. C. Meakins, the President of the Canadian Medical Association who addressed the Society on Health Insurance and the proposed merger of the different Canadian Medical Societies with the parent branch, namely, the Canadian Medical Association.

Dr. Meakins was followed by Dr. T. C. Routley, the General Secretary of the Canadian Medical Association who spoke along the same lines.

Dr. McLeod thanked both gentlemen for addressing the Society and named the following slates; Nominating Committee: Dr. M. R. Elliott; Dr. J. J. Roy; Dr. J. K. Hewat; Dr. H. W. Schwartz and Dr. A. F. McGregor.

Committee to consider the Historical Medicine Report; Dr. K. A. MacKenzie, Chairman: Dr. R. M. Benvie and Dr. J. K. McLeod.

Meeting adjourned at one o'clock.

Department of the Public Health

PROVINCE OF NOVA SCOTIA

Office—Metropole Building, Hollis Street, Halifax, N. S.

MINISTER OF HEALTH - - - - HON. F. R. DAVIS, M.D.,F.A.C.S., Halifax

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Chief Health Officer - - - - - -	DR. P. S. CAMPBELL, Halifax.
Divisional Medical Health Officer - -	DR. C. M. BAYNE, Sydney.
Divisional Medical Health Officer - -	DR. J. J. MACRITCHIE, Halifax.
Director of Public Health Laboratory - -	DR. D. J. MACKENZIE, Halifax.
Pathologist - - - - - - - - -	DR. R. P. SMITH, Halifax.
Psychiatrist - - - - - - - - -	DR. ELIZA P. BRISON, Halifax.
Superintendent Nursing Service - - -	MISS M. E. MACKENZIE, Reg. N., Halifax.

OFFICERS OF THE PROVINCIAL HEALTH OFFICERS' ASSOCIATION

President - - - -	DR. F. O'NEIL - - - - - -	Sydney.
1st Vice-President - -	Dr. H. E. KELLEY - - - - - -	Middleton
2nd Vice-President - -	DR. W. R. DUNBAR - - - - -	Truro.
Secretary - - - -	DR. P. S. CAMPBELL - - - - -	Halifax.

COUNCIL

DR. C. G. MACKINNON - - - - - - - - - -	Mahone Bay.
DR. B. C. ARCHIBALD - - - - - - - - - -	Glace Bay.
DR. G. V. BURTON - - - - - - - - - -	Yarmouth.

MEDICAL HEALTH OFFICERS FOR CITIES, TOWNS AND COUNTIES

ANNAPOLIS COUNTY

Hall, E. B., Bridgetown.
Braine, L. B. W., Annapolis Royal.
Kelley, H. E., Middleton (County & Town).

ANTIGONISH COUNTY

Cameron, J. J., Antigonish (County).
MacKinnon, W. F., Antigonish.

CAPE BRETON COUNTY

Densmore, F. T., Dominion.
Morrison, J. C. New Waterford.
Johnstone, L. W., Sydney Mines
McNeil, J. R., Glace Bay.
McLeod, J. K., Sydney.
O'Neil, F., Sydney (County), South Side.
Murray, R. L., North Sydney,
Townsend, H. J., Louisburg.
Gouthro, A. C., Little Bras d'Or Bridge, (Co. North Side.)

COLCHESTER COUNTY

Eaton, F. F., Truro.
Havey, H. B., Stewiacke.
Johnston, T. R., Great Village (County)

CUMBERLAND COUNTY

Bliss, G. C. W., Amherst.
Drury, D., Amherst (County).
Gilroy, J. R., Oxford.
Hill, F. L., Parrsboro.
Eaton, R. B., River Hebert (Joggins).
Withrow, R. R., Springhill.

DIGBY COUNTY

McCleave, J. R., Digby.
Rice, F. E., Sandy Cove (Mcpy.).
Belliveau. P. E., Meteghan.Clare Mcpy.

GUYSBORO COUNTY

Chisholm, A. N., Port Hawkesbury (Mulgrave).
Sodero, G. W., Guysboro (Mcpy).
Moore, E. F., Canso.
Monaghan, T. T., Sherbrooke (St. Mary's Mcpy).

HALIFAX COUNTY

Almon, W. B., Halifax.
Forrest, W. D., Halifax (County).
Glenister, E. I., Dartmouth.

HANTS COUNTY

Bissett, E. E., Windsor.
MacLellan, R. A., Rawdon Gold Mines (East Hants Mcpy).
Reid, A. R., Windsor (West Hants Mcpy).
Shankel, F. R., Windsor (Hantsport).

INVERNESS COUNTY

MacLeod, J. R., Port Hawkesbury
Chisholm, D. M., Port Hood.
Chisholm, M., Margaree Harbour (County).
Ratchford, H. A., Inverness.

KINGS COUNTY

Bishop, B. S., Kentville.
Bethune, R. O., Berwick (Co. and Town).
deWitt, C. E. A., Wolfville.

LUNENBURG COUNTY

Marcus, S., Bridgewater (Mcpy.).
Rehfuss, W. N., Bridgewater.
McKinnon, C. G., Mahone Bay
Zinck, R. C., Lunenburg.
Zwicker, D. W. N., Chester (Chester Mcpy).

PICTOU COUNTY

Crummy, C. B., Trenton.
Blackett, A. E., New Glasgow.
Chisholm, H. D., Springville, (County).
MacMillan, J. L. Westville.
Stramberg, C. W., Trenton.
Sutherland, R. H., Pictou.
Benvie, R. M., Stellarton.

QUEENS COUNTY

Ford, T. R., Liverpool (County).
Hebb, F. J., Liverpool.

RICHMOND COUNTY

Deveau, G. R., Arichat (County).

SHELBURNE COUNTY

Brown, G. W., Clark's Harbour.
Churchill, L. P., Shelburne.
Fuller, L. O., Shelburne.
Banks, H. H., Barrington Passage (Barrington Mcpy).
Herbin, C. A., Lockeport.

VICTORIA COUNTY

MacMillan, C. L., Baddeck (County).

YARMOUTH COUNTY

Blackadar, R. L., Port Maitland (Mcpy).
Burton, G. V., Yarmouth.
O'Brien, W. C., Wedgeport.
Siddall, A. M., Pubnico (Argyle Mcpy.).

Those physicians wishing to make use of the free diagnostic services offered by the Public Health Laboratory, will please address material to Dr. D. J. MacKenzie, Public Health Laboratory, Pathological Institute, Morris Street, Halifax. This free service has reference to the examination of such specimens as will assist in the diagnosis and control of communicable diseases; including Kahn test, Widal test, blood culture, cerebro spinal fluid, gonococci and sputa smears, bacteriological examination of pleural fluid, urine and faeces for tubercle or typhoid, water and milk analysis.

In connection with Cancer Control, tumor tissues are examined free. These should be addressed to Dr. R. P. Smith, Pathological Institute, Morris Street, Halifax.

All orders for Vaccines and sera are to be sent to the Department of the Public Health, Metropole Building, Halifax.

Report on Tissues sectioned and examined at the Provincial Pathological Laboratory from August 1st., to September 1st., 1935.

The number of tissues sectioned is 190. In addition to this, 5 tissues were sectioned from an autopsy, making 195 in all.

Tumours, malignant	49
Tumours, simple	16
Tumours, suspicious	1
Other conditions	124
Tissues from 1 autopsy	5
	—195

Communicable Diseases Reported by the Medical Health Officers for the month of August, 1935.

County	Chicken Pox	Diphtheria	Influenza	Measles	Mumps	Pneumonia	Scarlet Fever	Paratyphoid	Tbc. Pulmonary	Tbc. other Forms	V. D. G.	V. D: S.	Whooping Cough	German Measles	Undulant Fever	Erysipelas	Goitre	Impetigo	TOTAL
Annapolis	..	..	..	..	3	1	..	..	..	..	1	..	14	..	..	..	..	..	19
Antigonish	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Cape Breton	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1
Colchester	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Cumberland	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Digby	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Guysboro	..	..	..	..	3	..	..	..	..	..	2	..	..	..	..	..	..	..	5
Halifax City	..	1	..	1	..	..	13	..	2	..	..	..	1	..	..	..	..	..	18
Halifax	..	..	..	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	4
Hants	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Inverness	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Kings	2	1	7	2	..	..	..	..	..	..	3	2	8	..	..	..	..	3	28
Lunenburg	..	..	..	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	4
Pictou	5	..	2	..	..	1	..	..	1	..	2	2	5	..	..	..	1	..	19
Queens	..	..	..	..	..	..	6	..	..	..	..	..	..	..	..	..	..	..	6
Richmond	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Shelburne	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Victoria	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Yarmouth	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...
TOTAL	7	3	9	3	6	2	28	..	3	..	8	4	28	..	..	..	1	3	105

Positive cases Tbc. reported by D. M. H. O's. 52.

RETURNS VITAL STATISTICS FOR JULY, 1935.

County	Births		Marriages	Deaths		Stillbirths
	M	F		M	F	
Annapolis	11	18	9	7	7	1
Antigonish	13	12	9	14	9	2
Cape Breton	90	95	48	28	22	4
Colchester	28	29	26	11	9	2
Cumberland	41	29	29	17	13	4
Digby	14	12	10	5	6	1
Guysboro	10	8	3	9	4	1
Halifax	109	87	91	59	44	7
Hants	26	38	11	14	13	2
Inverness	21	14	7	10	11	2
Kings	19	24	16	9	7	4
Lunenburg	30	26	15	13	13	2
Pictou	34	28	17	21	17	4
Queens	11	14	6	8	4	0
Richmond	10	4	3	7	4	0
Shelburne	16	15	4	10	6	0
Victoria	18	11	3	1	5	0
Yarmouth	18	13	17	6	11	3
	519	477	324	249	205	39

OBITUARY

THE death of Dr. Daniel McNeil, at his home in Glace Bay on September 10th, removed from Provincial Medical circles one of its most outstanding members.

Born in Mabou, Inverness County, fifty-two years ago, his early education was received there and he entered St. Francis Xavier University graduating from that Institution in 1904. After a few years spent in Cape Breton he entered Dalhousie University in 1908 and received his M.D. Degree from there in 1913. He began at once to practice his profession in Glace Bay and he practised there continuously for the past twenty-two years.

Perhaps no native son of Cape Breton has been as outstanding in all-around athletics as "Dr. Dan". He was one of the best full-backs in Eastern Canada, playing the position for St. Francis Xavier, Dalhousie and Glace Bay. He was also one of the finest goal-keepers in Provincial hockey circles. In every field of amateur athletic activities he shone conspicuously, and has left his name indelibly inscribed on the athletic Halls of Fame of his Alma Mater and his home team.

He, too, was an outstanding physician; kindly, conscientious and skilful he was one of the foremost practitioners on his native Island. He spent his entire professional life as a colliery practitioner, and was one of the Senior Surgeons on the staff of St. Joseph's Hospital. He had been on several occasions Medical Health Officer for the Town of Glace Bay, and was at the time of his death immediate Past-President of the Medical Society of Nova Scotia.

In religion he was a Roman Catholic and an enthusiastic member of the Glace Bay Council of the Knights of Columbus.

His place will be difficult to fill in his native town for he possessed all those essential qualifications which are so indispensable in a colliery physician. Dr. McNeil was respected by his acquaintances, esteemed by his patients, loved by his friends. His fellow students and classmates in St. Francis Xavier and Dalhousie will remember him always as "Big Dan McNeil", the kind of student whom everybody respected and none will very soon forget.

To his bereaved wife and family we extend our deepest sympathy and those of us who knew him most intimately, remembering his kindliness, his courage and his great suffering, can only say with deepest reverence, "Requiescat in pace".

Dr. John Alexander MacIsaac, a native of Inverness, and for years a well known New York doctor, died suddenly at his home on West 58th Street, New York, August 16th. Deceased was a son of Allan and Margaret MacEachern MacIsaac. After graduating at St. Francis Xavier College, Antigonish, he entered Harvard University Medical School, and graduated in 1896. The next year he began practice in New York, and in the course of time became associated with Central and Neurological Hospitals on Welfare Island and the City Hospital and Randall Island. Dr. MacIsaac was attend-

ing otologist at New York University and Bellevue Hospital College, surgeon at the New York Eye and Ear Infirmary, and consultant at Northern Dispensary. He contributed to various medical journals and was the inventor of the tongue depressor which bears his name. During the world war he served as plastic surgeon in the U. S. Navy, holding the rank of Lieutenant Commander. Surviving are his wife, nee Lilian Green, and three daughters, Jean Lillian, Margaret, Isabel Ann. The funeral took place with solemn Mass at the Paulist Fathers' Church. Interment was at the National cemetery.

Dr. George R. Morse, Eye, Ear, Nose and Throat specialist in Saskatoon, passed away on August 5th. Dr. Morse was sixty years old, a son of the late Mr. and Mrs. Robert Morse, of Melvern Square, Annapolis County. His father was an outstanding farmer of that district. Dr. Morse graduated from Dalhousie in 1902 and after practising in Chester and other places in Nova Scotia moved to Saskatoon in 1908. Here he filled a prominent place in the community. Surviving is one brother, Charles, of Melvern Square.

Equal to the Occasion.

Every teacher should ponder the remark of a five-year old. In an intelligence test she was asked, "Are you a boy or a girl?" She looked the teacher squarely in the eye and solemnly replied, "Boy."

Later she told her mother, "When a person asks you a silly question, it's all right to give a silly answer."

Son Knew Dad.

Dad and Dave were working about the yard when Dad stubbed his toes against an old tree stump. "— —that—stump!" he cried. "I wish the—thing was in hell."

"You shouldn't say that, Dad," drawled Dave; "cause it might be, and, then you'd be fallin' over it agen some day."

Personal Interest Notes

Dr. J. A. Sponagle of Middleton visited Boston during August to receive medical treatment. All of his medical friends will be glad to know that the Doctor is very much improved in health. The Doctor and Mrs. Sponagle are now spending a short vacation at Margaretville.

Dr. and Mrs. W. W. Barraclough, of Toronto, were guests of Dr. and Mrs. W. N. Rehfuss at their summer home at Crescent Beach during August. Dr. Barraclough formerly practised in Bridgewater associated with Dr. Rehfuss.

Dr. W. W. Chipman, of Montreal, visited Bridgetown during August spending a few days with Mr. and Mrs. W. A. Warren.

Dr. W. H. Chase, graduate of Dalhousie, 1922, Mrs. Chase and children, spent their summer vacation at Bay View, Pictou County.

A survey of tuberculosis in and about Glace Bay is being conducted by Dr. H. G. Grant and his associate, Dr. A. L. McLean, of the University of Dalhousie. The survey will include the thorough examination of all contacts of open cases and the investigation of those living in homes in which deaths from tuberculosis have occurred within the past ten years. Contacts will be tuberculin tested where agreeable and as far as is possible X-rayed. The milk supply of Glace Bay will also be investigated and housing conditions studied. The work is well under way but it is not likely that a report will be given until well on towards the end of the year.

Dr. and Mrs. L. B. W. Braine, of Annapolis, are visiting their daughter in Newfoundland.

Dr. Sidney Gilchrist returns to Africa. His fifteen months of furlough completed, Dr. Sidney Gilchrist, Nova Scotian United Church medical missionary to Portuguese West Africa, left on the S.S. "Newfoundland" sailing from Halifax on August 3rd, for his mission post at Angola. He was accompanied by his wife and five children.

Dr. T. H. MacDonald, graduate of Dalhousie 1904, and Mrs. MacDonald, have returned to their home at Somerville, Mass., after spending a pleasant vacation at New Glasgow and parts of Cape Breton.

Dr. Abie Gaum, graduate of Dalhousie 1934, who has recently returned from a post-graduate course of study at Kingston, N. Y., has located at Sydney.

Dr. and Mrs. H. R. Corbett, of Kentville, have returned home from a week's visit to Mahone Bay.

Dr. H. W. Moyse, of Bedeque, P. E. I., and bride, who were recently married at Halifax, were guests during the first week of August of Rev. and Mrs. L. P. Archibald at the United Church parsonage, Lockeport.

Dr. and Mrs. G. A. MacIntosh, of Halifax, visited Dr. MacIntosh's arents, Rev. John and Mrs. MacIntosh, of Sydney, in August.

Eight men were once wrecked on a desert island. A year later a ship picked them up. The skipper of the ship noted in his log that:

"The two Irishmen had fought each other twice a day during the whole year.

"The two Scotchmen had founded a Caledonian Society.

"The two Englishmen had not spoken because they had never been introduced.

"The two Americans had opened a real estate agency in a palm-leaf hut, with a Kiwanis club, a boosters' league and a hootch-making plant in the cellar."

Tough!

Weelum MacTavish: "Whit wey are ye lookin' see solemn, Dauvit?"

Dauvit: "Solemn! Nae winder I'm solemn. I've juist been thinkin,' when we sit doon ye wear yer troosers out, and when ye gang about ye wear yer buits throug."

Descriptive.

Small child to her mother, after they had passed a man in plus-fours: "Oh, look, Mummy, there's a man with puffed sleeves on his legs."

A Queer Case of Military Justice.

A bullet fired in the Mesopotamian campaign disabled a soldier's left ankle. He was pensioned out of the army and given work on a government farm. A little time ago a gun, carried by his companion, went off accidently, and the charge so badly injured the soldier's left leg that it had to be amputated. He was then informed that his pension would be stopped because it had been payment for a maimed ankle, and he no longer had the ankle. The lawyers say he has no redress, although (a) he would have been better off financially if the leg had been amputated in Mesopotamia, and it was no fault of his that it was not; (b) if it had been amputated then, he could not have been shot in it later; (c) and if he had not been disabled on war service he might never have been in front of an explosive gun on a government farm.—*Yarmouth Herald.*

Physicians Registered at Dalhousie Refresher Course

August 26th to 30th, 1935.

A. C. McLeod, Caledonia
A. B. Campbell, Bear River
K. A. Baird, Saint John, N. B.
C. O. Homans, Hubbards
M. E. Commins, Bath, N. B.
M. J. Carney, Halifax
Joseph Hayes, Halifax
H. W. Schwartz, Halifax
E. F. Ross, Halifax
Ian Macdonald, Halifax
J. A. Noble, Halifax
W. G. Colwell, Halifax
M. J. Macaulay, Sydney
H. E. Kelley, Middleton
F. R. Shankel, Windsor
J. R. Corston, Halifax
F. T. Densmore, Dominion
John McKiggan, Dominion No. 6
C. M. Bethune, Halifax
C. W. Holland, Halifax
Gerald R. Burns, Halifax
H. A. Creighton, Lunenburg
Dan Murray, Tatamagouche
Robert F. Ross, Elmsdale
O. B. Keddy, Windsor
W. Alan Curry, Halifax
K. A. MacKenzie, Halifax
K. P. Hayes, Halifax
H. B. Atlee, Halifax
R. C. G. Hawkins, Halifax
V. O. Mader, Halifax
A. A. Shaffner, Halifax
Allan R. Morton, Halifax
A. L. Winsor, Norton, N. B.
V. A. Snow, Hampton, N. B.
H. D. O'Brien, Halifax
C. S. Morton, Halifax
Frank G. Mack, Halifax
C. E. Kinley, Halifax
H. G. Grant, Halifax
A. L. McLean, Halifax
John J. Roy, Sydney
M. A. B. Smith, Dartmouth
A. C. Gouthro, Little Bras d'Or, C. B.
D. F. McInnis, Shubenacadie
M. Jacobson, Halifax
Gordon Wiswell, Halifax
Luther B. MacKenzie, Bedford
H. K. MacDonald, Halifax
F. F. Eaton, Truro
E. T. Granville, Bedford
G. A. Dunn, Pictou
T. W. MacLean, Scotsburn
G. H. Murphy, Halifax
A. L. Murphy, Halifax
H. C. S. Elliot, Halifax
F. V. Woodbury, Halifax
H. B. Havey, Stewiacke
A. W. Ross, Souris, P. E. I.
G. A. Winfield, Halifax
R. M. Benvie, Stellarton
P. S. Cochrane, Wolfville
W. D. Forrest, Halifax
N. H. Gosse, Halifax
E. T. Kennedy, Sussex, N. B.
J. F. L. Brown, Woodstock, N. B.
J. W. Merritt, Halifax
D. W. N. Zwicker, Chester
A. R. Reid, Windsor
M. A. Macaulay, Halifax
R. H. Fraser, New Waterford
E. Ross Faulkner, New York
Edward B. Hodge, Philadelphia
T. J. Granville, Halifax
A. McD. Morton, Halifax
M. G. Patterson, Dartmouth
W. R. Dunbar, Truro
A. E. Murray, Halifax
D. Mainland, Halifax
Philip Weatherbe, Halifax
T. B. Acker, Halifax
L. L. Kirkpatrick, St. Martins, N. B.
Peter Hebb, Malagash
Grace E. B. Rice, Halifax
T. M. Sieniewicz, Halifax
P. A. Macdonald, Halifax
W. J. Barton, Halifax
A. F. Miller, Kentville
Arthur E. Doull, Halifax
H. H. Banks, Barrington Passage
D. S. McCurdy, Truro
R. C. Zinck, Lunenburg
A. Philip Magonet, Mulgrave
E. E. Cleaver, Toronto, Ont.
L. R. Morse, Lawrencetown
Chas. J. W. Beckwith, Kentville
A. E. Blackett, New Glasgow
C. E. Stuart, Parrsboro
D. R. Macdonald, Halifax
Hugh R. Peel, Truro
T. R. Johnson, Great Village
Ira S. Wile, New York
Gordon A. McCurdy, Halifax
A. R. Mackintosh, Amherst
G. K. Smith, Hantsport
S. R. Johnston, Halifax

NEW PLAN FOR UNEMPLOYMENT MEDICAL RELIEF IN ONTARIO.

In October, 1932, provision was made by the Government of Ontario to assist the municipalities in providing medical services to persons on relief. In those municipalities adopting the plan, physicians were paid for their services to persons on relief to a maximum of $100 per month and provision was made later for payment up to $12 a month for drugs. The increasing cost and the limited service provided therefore made it imperative that changes be effected. The Council of the Ontario Medical Association presented to the Government a plan which it believed would be acceptable to the profession and would assist the Government and the municipalities in meeting the urgent needs. This plan has been accepted by the Government and becomes effective on April 1st.

The Ontario Medical Association will undertake the administration of this measure. Medical relief will be provided in every municipality receiving money from the Government for unemployment relief. The Government will provide the Ontario Medical Association with a monthly amount equivalent to twenty-five cents for each person on relief. The municipalities will be grouped together in suitable areas, where necessary, and the work will be supervised by a medical relief committee. The committee will include the relief officer, not less than three doctors, who are to be selected by the affiliated medical society in the area, and a druggist named by the Ontario Retail Druggists' Association. The nominations of the physicians are to be approved by the Ontario Medical Association. To the committee each doctor will submit his accounts and a summary of the work done during the month. Provision is made for the payment of local administration expenses and for the general administration by the Ontario Medical Association, which will receive 4 per cent. of the funds. From the net funds the medical relief committee will pay the doctors' accounts pro rata. With the exception of certain household remedies which are provided from general relief funds, the physician is required to supply all drugs used.

The placing of the responsibility directly with the provincial medical association is unique and without precedent in Canada. It is only reasonable to expect that some changes may be found necessary, but the principle that the profession should take the leadership in providing medical services has the hearty endorsation of all who are concerned with the problem.—*Canadian Public Health Journal.*

Caught in the Act.

Entering a London bar, an elderly man ordered a whiskey and soda, and was about to drink it when he looked up and noticed a painter at work upon the walls.

Immediately the customer went out without touching his drink. The painter climbed down his ladder and lifted the customer's glass.

"Hi!" said the barman, "you can't do that. That chap will be back in a minute, I expect."

"Oh, no, 'e won't," said the painter. "You see, he's the president of our local temperance society. . . and I'm the secretary."