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ON THE PART PLAYED BY HEREDITY, AND UPON THE EXTENT TO WHICH MORBID CONDITIONS ARE INHERITED.\*

A DISCUSSION UPON HEREDITY IN RELATION TO LIFE INSURANCE.

BY

J. GEORGE ADAMI, M.A., M.D., F.R.S.E.,  
Professor of Pathology, McGill University, Montreal.

Mr. President and Gentlemen,—When asked by you to give a short address upon some medical subject, I confess that I felt considerably in doubt as to what possibly I could give that would appeal to you. You are practical men, and what you would desire would be something having a more or less direct bearing upon your subject of Insurance. I, on the other hand, am not in practice. My subject is the science of medicine, and not the application thereof, and my life work, while not abstract, is, nevertheless, more in the direction of seeking out the causes of disease and the broad principles at the bottom of morbid processes. Thus, you will understand my difficulty in choosing something which I might fruitfully and appropriately talk to you about.

Yet, on further thought, there is a subject which I have been studying to no little extent during the last year or two, which also, I know, interests you. I refer to the subject of Heredity, and in its influence upon the individual, and if, taking up this subject this evening, I may not be able to give you a series of practical hints, at least I may put before you what heredity really is, what is the extent to which disease can be inherited, and may thus to some extent indicate to you the lines along which you, as insurance men, can best proceed to judge the

\* Read before the Insurance Institute of Montreal.

weight that should be given to evidences of inheritance of one or other condition in estimating the probable duration of life of the individual.

It seems to me all the more necessary at the present time to bring these matters before you when educated men in general are discussing this subject of inheritance, and when, owing largely to the teaching of Weismann, the popular opinion is that after all, inheritance plays a very small part in development of disease, and more especially when Weismann's teaching concerning the non-inheritance of characters acquired by the individual has been, as I firmly believe, extensively misapplied, so that there is at the present moment a state of very general uncertainty as to whether we are right in taking parental disease into account in estimating the probable duration of life of the offspring.

To note one example, what is to be our position with regard to tuberculosis? We are told that this disease is very, very rarely inherited. Nay, I would go further and say that tuberculosis as such is never truly inherited. But is this to lead us to assume that, therefore, because there is no direct inheritance, the child of tuberculous parents is to be treated identically the same as the child of a family in which there is no tuberculous history? All these are matters which, it seems to me, directly interest you, and I shall feel satisfied if to-night, in the short time at my disposal, I may be able to give you a certain amount of information which may lead you to comprehend these matters and their bearing.

In the first place, it is necessary to have a clear understanding of what inheritance really is, and this because even among medical men and in medical writings, not to speak of the laity, there are the vaguest ideas upon this matter. We have to recognize that it is wrong to consider that everything is inherited which is the property of the child at the moment of birth. There are, in fact, two very distinct conditions to be recognized, as I can best explain to you by a brief reference to the development of the individual. The whole body of each individual is, I need scarcely tell you, composed of a collection of cells, and these cells have different structures and different functions, according to the organs of which they form a part. For example, a bone cell has a very different appearance from a liver cell or a nerve cell, although each of these has certain properties in common with all other cells, namely, it possesses a central body or a nucleus, which is the controlling portion of the cell, and this lies in and controls the surrounding cell substance. One special set of these cells thus forms an essential constituent of the male and female reproductive glands, namely, of the ovaries and the testes respectively.

Each individual is the product of the union of what we may speak of as two organisms—of two germ cells derived from these reproductive glands, one discharged from the father and the other from the mother. The essential fact of the process of reproduction is the passage of a male reproductive cell, or spermatozoon, into the female reproductive cell, or ovum, a passage which is characterized by a very remarkable fusion of the nuclear material of the one with the nuclear material of the other, so that there results a single cell with a single nucleus. The life of the individual—nay, the individual himself—begins the moment that this process is complete, and once thus the individual existence has its origin, the cell proceeds to divide and redivide, and, in man, gaining nourishment from the maternal tissues, this new individual passes the first part of his existence in the uterus, growing rapidly.

It will be seen from this brief account that everything that is brought to this developing individual, embryo or foetus, anything which is absorbed from the maternal blood, is not really *inherited*—it is *acquired* by the individual after the individual has begun its existence. Only that is truly inherited which is a property of the conjugating ovum and spermatozoon, or which is developed during this act of conjugation, or conception, by the interaction of the one cell upon the other. Everything affecting the individual after this moment which is not conveyed from the original conjugating cells, is acquired, so that we have to distinguish clearly between truly inherited conditions and conditions which are acquired either during the uterine existence of the individual or by the individual after birth. Thus we can divide diseases into (1) inherited, (2) those of intrauterine acquirement (these we term congenital), and (3) those of post-natal acquirement.

Once we make this distinction we limit materially our subject. If, for instance, a child is born with the lesions or disturbances of active tuberculosis or syphilis, it is not right to speak of that as inherited syphilis or inherited tuberculosis until we are quite sure that the disease actually affected either the ovum or the spermatozoon, which conjugated to form the individual.

Now, as a matter of fact, every consideration points to the conclusion that this cannot be. Both these diseases I have mentioned are obviously of microbic causation—and we cannot imagine the microbes passing into, and being present in these minute cells without setting up so much disturbance that they destroy those cells and render conjugation impossible. And even if they were there, they would not be actual properties of the material of the germ cells; they would be accidental inclusions which, in an inert condition, had not acted on the

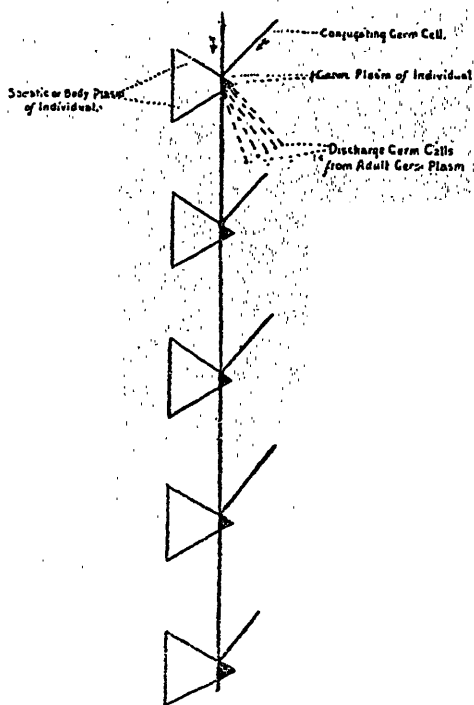
cells, but only come to act upon the embryo during the course of its development. There is, therefore, no such thing as inherited tuberculosis or inherited syphilis. At most there is congenital syphilis and congenital tuberculosis, the microbes of the disease being passed to and acting upon the foetus during intrauterine existence.

But now, do these considerations render it impossible that there should be anything of the nature of inherited disease? What I wish to demonstrate to you to-night is that they do not.

We may regard the developing individual as composed of two portions—the main body and the germ cells—and for purposes of inheritance the main body is the husk or envelope which protects these germ cells, so that, to quote the words of Sir Michael Foster:—"When the animal kingdom is surveyed from a broad standpoint, it becomes obvious that the ovum or its co-relative, the spermatozoon, is the goal of an individual existence; that life is a cycle, beginning in the ovum and coming round to an ovum again. The greater part of the actions which, looking from a near point of view at the higher animals alone, we are apt to consider as eminently the purposes for which animals come into existence, when viewed from the distant outlook whence the whole living world is surveyed, fade away into the likeness of a mere byplay of ovum-bearing organisms. The animal body is in reality a vehicle for ova; and after the life of the parent has become potentially renewed in the offspring, the body remains as a cast-off envelope, whose future is but to die."

Thus, graphically, we may represent the body according to the following diagram. The fertilized ovum produces the whole individual organism, giving rise to germ cells and body cells. An individual germ cell when fertilised gives rise to another organism composed of germ cells and body cells, and so there has been a continuous line of germinal protoplasm, which, dividing and dividing, has nevertheless come to us from the beginning of things, or, as Weismann has put it, the germinal plasm is potentially eternal, the somatic plasm inevitably dies. Now, if an individual has his arm cut off, that does not influence his germ cells, or, at least, can only influence them to this extent, that possibly the individual being minus an arm has not the means of being quite so well nourished as other individuals, and so, the general nourishment of the body being poor, the germ cells may suffer alike with the other cells of the body. But by no conceivable means can we recognize that this largely independent germ cell, consisting largely of undifferentiated material, can be so acted upon by the loss of the arm of the parent that when it develops after fertilisation it shall show a similar loss of an arm. So also, we cannot imagine how, to use a

frequently-quoted example, if the parent has been a dancing master, and has developed the calves of his legs and the excitability of the nerve cells which control those leg muscles, until those legs dance in a way far superior to that in which ordinary people's legs dance—we cannot imagine, I say, that these acquired properties of the parents can pass to the offspring. As a matter of fact, we know that neither of these events happen—the man who has lost his arm has perfectly normal children, the dancing master's children do not naturally dance better than those of other people. A large number of acquired conditions are thus incapable of being inherited.



This, however, does not include every possibility in the matter of inheritance. We have so far struck out direct infection, acquired gross lesions of organs and acquirement of excessive development of one or other organ, but this does not exhaust the list of conditions telling upon the parental organism. There is yet another class of cases in which disturbances of the body tissues (as distinct from the germ cells) must affect these germ cells, and, influencing them, may, to a greater or less extent, influence the individuals developing from them. Although the germ cells are recognisable at the time of birth, and ap-

parently reach their full structural development early in life (this is more particularly true of the ovum) this does not mean that they remain absolutely inert for long years. For continued existence they, like all the other cells of the body, need nourishment, and that nourishment they, like the other cells, must obtain from the circulating blood. Hence diffusible substances circulating in the blood, or present in the lymph which bathes these cells, may pass into and be absorbed by the germ cells as by other body cells, and so it follows that disturbances of a chemical order affecting the tissues in general may also affect the germ cells.

Now we have positive evidence that this is the case. It may be familiar to you that workers in lead, and more especially in some of the more soluble salts of lead, painters using white lead, workers in potteries, more especially those having to deal with the glazing of porcelain and earthenware, are peculiarly liable to suffer from what is known as lead colic, lead palsy, saturnine poisoning or plumbism, the salts of lead absorbed into the system acting especially on the nervous system and certain of the glandular organs. So serious is the condition that, as you will have observed, for now several years past there has been a serious agitation about this matter in the English "Potteries." For long years also it has been observed that there is a terrible mortality among the children of such workers—where these are not still-born they tend to be puny and poorly developed, and when they do not easily succumb to one or other childish ailment they are liable to show nervous disturbances and various forms of mental instability and derangement. When it is the mother who suffers from plumbism, it is difficult to make sure of the exact cause of this weakness of the children. It may be urged that the lead salts absorbed by the maternal organism have diffused through the placenta during uterine life, and so, entering the foetal circulation, have poisoned the offspring and led to its premature death or imperfect development.

A study of cases in which the father alone has suffered from lead poisoning shows that this is far from being everything. Constantin Paul investigated a series of such cases, and his results are very remarkable.

Studying the history of 32 pregnancies in which the father suffered from lead poisoning (the mother was free from that condition), he obtained the following statistics:—

- 12 resulted in the death of the infants before term,
- 20 children born alive, and of these
- 8 died during the first year,

- 4 during the second year,
- 5 during the third year,
  - 1 died later in childhood.
- 2 alone found to be alive—one aged 20 years, the other only 21 months.

The only conclusion from these observations is that certain substances which lead to intoxication of the parental system act also deleteriously upon the germ cells, lower the vitality of the same, so that the individual resulting from the conjugation of one of these with a germ cell of the other healthy parent is incapable of perfect development, is of lowered vitality, and is liable to die prematurely.

This individual himself is in one respect the direct victim of the intoxication—inherited plumbism is lead poisoning acting initially upon one or both of the conjugating germ cells—but it must be clearly recognized that the mental and other disturbances which show themselves after birth are not the result of the action of lead salts still circulating in the system. Indeed, the lesions of inherited plumbism are of a totally different order to those of acquired plumbism; they are one and all lesions of incomplete development, and, if they show themselves particularly as conditions of imperfect organisation of the nervous system or of susceptibility to one or other infectious disease, that is in accordance with the great law of which we are constantly meeting evidences—the law, namely, that the characters which are the last to be acquired by the individual, the race, or the species are those which are the first to be lost. Thus in the evolution of man one of the last acquirements—the crowning acquirement whereby a man is distinguished from all other animals—has been that of the higher organisation of the nervous system. Another has been the development of relative insusceptibility to sundry infectious diseases. And the individual whose full development is arrested is thus particularly liable to manifest a greater or less degree of mental instability, the development of the higher nervous centres being incomplete, or a peculiar susceptibility to the infections liable to attack human beings.

I do not know of any equally exact series of figures bearing upon the influence of chronic alcoholic intoxication on the part of the father upon the offspring. I would suggest that a research among the magnificent material accumulated by the great insurance companies of this continent might lead to valuable results. Certainly we have indications that parental alcoholism has a deleterious effect, and that not necessarily in the direction of the offspring being especially prone to alcoholism, but in that of imperfect development, more especially



of the higher nervous centres. If in certain cases the children are found specially liable to be drunkards, or, as would seem not infrequently to be the case, are affected by amounts of alcohol which are without effect upon those of sound parentage and constitution, this, I would point out, is not direct proof of a direct alcoholic inheritance, of inheritance of a craving for strong drink—it is explicable as an indirect result of parental alcoholism—as due to deterioration of the germ cell—to imperfect development of the higher nervous system—as a result of mental instability, in consequence of which the offspring has inadequate self-control, succumbs to alcoholism just as he is liable to succumb to other vicious habits, and from the unstable condition of his nerve cells those are more easily thrown out of gear by alcohol as by other toxic substances. For the time being, that is, in the absence of positive proof, I am willing to concede the non-inheritance of specific alcoholic tendencies.

Continuing this train of thought, we recognise that, while tuberculosis and syphilis as such are not inherited, even where not congenitally acquired by the offspring, the parental disease may have definite effects upon that offspring. If the study of bacteriology has accomplished nothing else, it has shown us this, that the symptoms of infectious disease are not due to the mere presence of microbes in the system, but to the action of the toxins or toxic substances developed by the bacteria in the course of their growth within the organism, and, that so, infection is but one form of intoxication.

If, therefore, one or other parent, at the time of conception and preceding this, suffers from an infectious disease in active progress, the circulating toxins are liable to influence deleteriously the offspring. Thus, while denying the direct inheritance of infectious disease, we have to recognise what may be termed "indirect inheritance" where, for example, the father suffers from syphilis and the mother is free from the disease, the frequent abortions and miscarriages are not necessarily an indication that the foetus is directly infected, but, judging from the absence in many cases of clear indications of syphilitic lesions, either in the placenta or the dead foetus, death has been due to the deleterious effects of the syphilitic virus upon the spermatozoon.

This leads us to another series of considerations. We seem to see—I put it guardedly—that the offspring of syphilitic parentage has a tendency to show a series of disturbances and imperfect developments differing from those of the offspring of tuberculous parentage, and we refer to these as "parasyphilitic" and "paratubercular" lesions respectively. The syphilitic progeny is mentally dull and of delayed development, the teeth tend to be notched, and so on; the

progeny of tuberculous parents, on the contrary, is often precocious in development and mentally peculiarly bright and alert, of good, suspiciously good, complexion, but with poorly-developed chest. Not to discuss the other conditions, it would seem that the parasymphilitic mental condition is one of dullness of the nerves, the paratubercular, that grade of mental instability which renders the higher centres more easily stimulated. It is very generally held also that the children of tubercular parentage are more prone to subsequent infection by tuberculosis. The most brilliant man it has been my fortune to know was himself the son of a tuberculous mother, and succumbed to tuberculosis in middle age.

Is it, therefore, that different poisons act differently upon the germ cells, and that thus different parental intoxications lead to the inheritance of different orders of disturbances? Time forbids that I should enter into the full discussion of this subject, for it is most complex and, for a full comprehension, requires a discussion and analysis of the various theories of inheritance. Those who hold Weismann's theory, with its complicated series of imagined "ids," "idants," and the like, deny its possibility. As I pointed out in 1901 in an address which I gave before the Brooklyn Medical Club,\* that theory is of proved incompetency; it cannot stand. The ultimate theory of inheritance must not be morphological but chemical or physical in its terms. We must regard the idioplasm, or controlling living matter of the germ and body cells as a chemical substance, which grows by taking up non-living matter and converting it into matter like unto itself, and possessing like properties. In thus taking up other matters, it must be subject to continual modification. If we accept this as the basal conception and the foundation of our theory, then it becomes possible to recognise that this or that substance absorbed into the cells may permanently modify the constitution of their most complex idioplasm, and, that so, the idioplasm of the germ cell, modified in one or other direction by the action of a definite toxic substance upon it, when it fuses with the idioplasm of the conjugating germ cell, may modify the growth and properties of the resulting individual in one or other direction.

More than this time forbids me to say. I can but ask you to accept as possible that infectious diseases in the parent influence the offspring in one or other direction, and to accept as my belief that parental tuberculosis, for example, has a definite specific influence upon the offspring. These same considerations, however, lead to further complications. If the germ cells are acted upon by toxins, just as are

\* *New York Medical Journal*, Jan. 1st, 1901; *British Medical Journal*, Jan. 1st, 1901.

the body cells, then we have to recognise two possibilities. Infection may lead to one or other effect upon the body cells. Either it may weaken and eventually destroy those cells, or, if the constitution be strong and the virus not too potent, the cells eventually gain an increased power of neutralising the toxine, whereby immunity is developed. The individual, for example, is either killed by small-pox, or, if he survives, is protected against another attack, and what happens to the individual is the resultant of what happens to the cells composing that individual.

If, therefore, in these matters the germ cells are affected like the rest, then, to take a concrete example, tuberculosis in the parent must affect the offspring in one of two directions. If there is severe and progressive parental intoxication, the germ cells may be regarded as being weakened, and the offspring weakened also and rendered more susceptible to tuberculous infection in particular; if, on the other hand, the parental economy has reacted successfully and by the production of increased antitoxic substances has arrested the advance of the disease, then the germ cells may also be regarded as participating in the acquired power of increased resistance to the tuberculous toxins, and the offspring as showing greater refractoriness towards the disease. In other words, it becomes possible that we have to deal with two sets of individuals the offspring of tuberculous parents (1) those who are weakened and whose lives are likely to be shortened, and (2) those who have gained an increased immunity to the disease, whose lives to this extent tend to be lengthened above the normal. Indeed, there are those already who urge that parental tuberculosis confers increased immunity. At the meeting of the British Congress of Tuberculosis in London in 1901, a paper was contributed, in which the author showed, by a careful statistical examination of several families, that such increased resistance is recognisable, and the same has been suggested by more than one German observer.

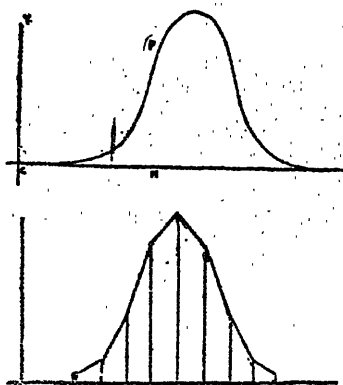
In confronting you with this dilemma, you will, I fear, gentlemen, regard me as a very Balaam, and will return to me, with compound interest, the compliment paid by the prophet to the Moabites, or rather not paid by him to the children of Israel.

There is, however, it would seem, a way opening out of this difficulty, and it may well be that, in showing you this way, I perform a greater service than I can do by merely discussing this subject of inheritance, if, indeed, the actuaries have not forestalled me.

Both those of us who are studying this matter from the standpoint of pure science, and those of you who are doing the same for its direct practical bearing in insurance matters, are anxious to have something

firmer upon which to stand than theoretical deductions. We desire a firm, unassailable foundation of facts; we desire statements that are mathematical in their accuracy. At last, I am rejoiced to point out, a beginning has been made, and that by Karl Pearson, the well-known Professor of Mathematics in University College, London. If it will not detain you too long, I desire to bring before you Karl Pearson's method, for it appears that, applied by the insurance actuaries to the data possessed by them, it will solve this question of the exact value to be placed upon parental disease as a factor in estimating the probability of life in the individual. You will find a very clear presentation of the method by Robert Worthington in the July number of the *Journal of Anatomy and Physiology* (vol. xxxv. pt. 4, p. 455 \*).

Karl Pearson's method consists in taking, say, 1,000 measurements of one organ, sorting these measurements into groups in such a way that those in any particular group differ only within a small specified range. For example, if the measurements be of stature, they might be sorted into groups differing by half an inch (if of life periods by groups of a year of age.) If now such a system of group measurements be plotted on paper with reference to two axes at right angles, so that the ordinates represent the number of measurements, and the abscissae their typical measurements, then on joining the points so obtained, we shall obtain a polygon somewhat of the form shown in this diagram:—



\* Pearson's most important papers on the subject are :  
 Contributions to the Mathematical Theory of Evolution, Phil. Trans. R.S., 185 A.  
 On Skew Variation in Homogeneous Material, Phil. Trans. R.S., Vol. 186 A.  
 Regression, Heredity and Panmixia, Phil. Trans. 187 A.  
 On the Inheritance of the Cephalic Index (Miss Fawcett and K. Pearson, Proc. R.S., 72, p. 413.)  
 A First Study of the Variability and Correlation of the Hand (Miss Whitely and K. Pearson, Proc. R.S., 75, p. 126.)

This is known as a "frequency polygon." If the number of measurements is large, it will not be difficult to draw a continuous curve through the angles of the polygon. Now, as a matter of fact, in the majority of cases of measurements of one detail, as, for instance, of the length of one or other organ or part of an organ in a homogeneous population, this curve of variation approaches curiously close to what has long been known to mathematicians as the curve of "probability of error." And if we venture to assume that these curves are identical, then we have an exact mathematical basis for our study of inheritance and its effects, for this curve of probability of error is a pure curve, and as such its various properties can be studied and determined. It is this assumption which Professor Pearson has made, and, starting from this, he has already obtained most valuable results. He is able to obtain such values as the probable error, probable deviation, the mean (or abscissa of the "centre of gravity" of the area enclosed by the frequency curve), the mode (or abscissa of the ordinate of maximum frequency), the standard variation (or index of variability)—and gains thus a valuable basis for discussing asymmetrical frequency or skewness.

For he finds that in biological statistics most frequency polygons are not symmetrical about the maxim ordinate. This skewness may be due to one of two sets of causes:

(a) The material dealt with may be heterogeneous and consist of a mixture of two or more homogeneous materials.

(b) The material may be homogeneous, but tend to deviate more to one side of the mean than to the other.

I will leave those of you who are interested in the matter to follow the mathematics of the subject, clearly set forth as they are, in Mr. Worthington's paper. What I wish to point out is that by the application of Karl Pearson's methods to the material in the hands of the great insurance companies, it will be possible to give a mathematical expression to the effects, if any, of parental disease upon the duration of life of the offspring by comparing the frequency curves of death of those of tuberculous ancestry with the frequency curves of the deaths of those of non-tuberculous ancestry. It will further be possible to determine whether there is such skewness or asymmetry in the first curve as can best be explained by assuming that we have a mixture of two or more homogeneous materials, *i.e.*, whether one group of the offspring are strengthened, and so afforded a longer period by parental tuberculosis, another definitely weakened and led to die at an earlier age by the same influence. It will also determine the value to be placed upon the influences of family tuberculosis when the parents themselves are not tuberculous.

I have of necessity been painfully brief in my references to Karl Pearson's remarkable work. I can only urge those interested in this matter to study his writings and deductions, for they seem to me to afford an opportunity to settle this question of the effect of parental tuberculosis and other diseases in a way which is not possible by any other means—by the ordinary method of striking averages, for example.

You will have observed that so far I have dealt wholly with but one form of inherited conditions, namely, with those direct or indirect inheritances due to diseased conditions which have been acquired by the parent or parents. There is yet another group where the morbid conditions are, or have been, in a longer or shorter line of progenitors, and here also it is to be recognised that some at least of these morbid conditions must have an influence upon the duration of life, though not all of them belong to this category. Cases, for example, of sex-digitism, of Daltonism (color blindness) and Albinism, do not necessarily interfere with the vitality, if I may so express it, of the individual. Other conditions like Hæmophilia, which has been traced through long generations in several families, when they show themselves in the individual, are liable to shorten life. A recognised "bleeder" is distinctly an unsafe individual, and must be shunned by insurance companies, for at any moment some trivial accident is liable to lead to a fatal hæmorrhage. What is more, we recognise that the liability to tuberculosis is peculiarly evident in certain families, that there is a tuberculous diathesis, as again there is a gouty diathesis, and we may be unable, and in fact generally are unable, to point definitely to the particular ancestor who acquired tuberculosis, gout, etc., from whom the predisposition to one or other disease has been inherited.

I cannot now take up the full consideration of this subject of racial or family inheritance, and must ask you to accept this, that in certain cases these orders of inheritances would seem to develop as what is known as "spontaneous variations" on the part of one or other individual. Certain fusions of the two germ cells lead from unknown causes to the production of "sports." As you know, no two individuals are alike, and just as in throwing three dice one may rarely throw three sixes or three ones, so in conjugation the result, instead of being, as is usually the case, something approximating the mean, may be an extreme variation. And once this extreme variation shows itself in a family, there is a peculiar liability that subsequent generations may inherit the extreme characters.

But this does not include all cases of family inheritance. We are, I think, bound to conclude that some cases at least have originated,

not as spontaneous but as definitely acquired conditions, and that, for example, a family predisposition to tuberculosis may have originated from one or more ancestors having acquired this disease, and through this acquirement having produced modified descendants showing certain imperfections in bodily development, and rendered more prone themselves to fall victims to the disease. Such cases are but of the same order as those about which I have mainly spoken this evening.

These, however, are relatively minor considerations, although, to give you a comprehensive grasp of the subject, it is right that I should refer to them. I shall be satisfied if I have given you some understanding of what are the problems which we have to deal with in discussing this subject of inheritance, and if by any chance I have indicated to you the lines along which a study of the subject may be productive of definite results capable of direct application to the problems which confront you in the matter of life insurance.

# AN ANALYSIS OF CASES OF GASTRIC ULCER OCCURRING IN THE ROYAL VICTORIA HOSPITAL DURING THE PAST EIGHT YEARS.

BY

F. P. L. CANTLIE, M.D.,  
Externe in Clinical Medicine.

Of the 20,596 cases admitted to the Royal Victoria Hospital during the last eight years there were 85 cases of gastric ulcer making a percentage of .004. Of these 85 cases, there were 3 males and 82 females; more than one half Canadians and more than one-quarter having been born in Great Britain; the other small proportion came from various places, chiefly from the United States, Ceylon, West Indies and Sweden.

The ages varied from 17 to 70, the average being 27½; there were 8 cases under 20 years of age, and 10 over 40; the most frequent time of all was the third decade, 49 out of the 75 cases in which the age was recorded being between 20 and 30 years old. It is interesting to note in this connection that all the perforations took place during this period, and the hæmorrhages were likewise more common. Only two patients were over 50 years of age.

**Etiology:** As regards the occupation, 34 cases were servants, 14 were housekeepers, and only two gave occupations definitely as cooks; the other cases were variously seamstresses, nurses, clerks, etc. In only three cases was trauma directly associated with the gastric ulcer—in the one case it having followed almost directly upon a kick in the side from a horse, and in another upon a fall. Anæmia was an associated condition in 42 cases.

**Complaints:** As regards the complaints: In 54 of the cases the symptoms were referable entirely to the stomach; in 19 there were other symptoms in addition, while in 5 the stomach itself was not taken into account. Of those cases in which there were complaints referable to other parts than the stomach, the chief indications were either those following upon or coincident with anæmia, such as headache, weakness, pain in the back, dyspnoea and palpitation, or again there were, precordial pain, complaints of sore throat, cough, sweats, sometimes chills and not infrequently signs in the pelvis.

As regards the more special complaints made by the patients pain was declared to be local in 44 cases; vomiting was complained of in 35; hæmatemesis in 20; weakness, headache or backache, respectively, in



about the same number. The record of complaints, however, is of not much importance, the data depending on the reliability of the patient's statements or the extent to which the clerk enquires from the patients as to their respective complaints.

The combinations of complaints, however, may be of some interest, and it was found that the most frequent combination of complaints was pain in the stomach and vomiting and weakness, of which there were 35 cases out of the total of 85 cases.

**Onset:** The onset was manifested in 78 cases by pain, in 67 cases by vomiting, and in 45 by hæmatemesis. There were also general weakness and malaise in more than 20 cases, while in a large number the minor signs of indigestion were superadded. Chills ushered in the symptoms in three cases, trauma in three, while in one the onset was associated with the symptoms of spinal curvature. This case is of especial interest:—

She was a girl æt. 33, born in Canada, and admitted to the Hospital in 1895 for hæmatemesis. The onset had been gradual, the patient having had for several years previously some pain in the back attributed then to spinal curvature, when a plaster jacket was applied for eight months. After removal of this she complained still of pain in the back and severe pains in the stomach and vomited at that time dark clotted blood. Since then she was quite well until two weeks before her present admission when she gradually became pale, manifested some shortness of breath, palpitation and again hæmatemesis. Examination of the patient showed no evidence whatever of spinal curvature, but all the typical signs of gastric ulcer.

This case is of special interest as corresponding to one recorded by Dreschfeld some years ago, in which the only sign at the time was tenderness over the spine, which was at first diagnosed as spinal disease, the true condition only being cleared up when a sudden and fatal hæmatemesis took place.

**Symptoms:** The three cardinal signs of gastric ulcer, viz: Pain, vomiting and hæmatemesis, existed in the following proportions:

Pain and hæmatemesis.....	44
Pain without hæmatemesis.....	30
Hæmatemesis without pain.....	5
Vomiting and hæmatemesis .....	52
Vomiting without hæmatemesis.....	26
Hæmatemesis and no other vomiting, in.....	4

**Pain:** This was described in 73 cases as local, in 5 as diffuse; the pain in 15 of these cases was referred to the back. As regards the time of occurrence and duration of the pain, in 67 it was after meals; 36 of these being immediately after meals, 10 one hour after, and in 6 two to

four hours after meals. The pain was continuous for hours in 37 cases, in 10 it occurred at night, and 2 early in the morning, and in 7 it was described as irrespective of meals. In four cases alteration of the position relieved the pain, but in only four. In two-thirds of the cases the pain was described as sharp and cutting or gnawing, and in 15 as being of a dull ache.

*Vomiting*: This occurred in 76 cases, 52 after meals. Of these, 19 occurred at once after meals, and in 12 one-half of one hour later. In only five cases did the vomiting come on three hours after meals. In 52 cases there was blood present with the vomitus; in 32 pain was relieved by the vomiting and in only four cases was vomiting absent. In 5 cases no record was made of the symptoms. There was melæna in 12 cases so far as the records show, though this seems an unusually small proportion of all the cases in which hæmatemesis likewise occurred.

*Diarrhœa* was described in only one case, and in 17 cases the records show the bowels to have been regular.

Some interest attaches to the sign of tenderness, and in only 28 cases has it been definitely described as well localised, whereas in 26 it is described as being more or less general over the gastric area. In 13 cases the tenderness was diffuse, in one case it was referred to the right hypochondrium only, and in about 10 cases there was tenderness anywhere in the abdomen.

As regards the appetite, there is some interest to be attached to this if one is to regard hyperacidity as being a frequent coincident symptom of gastric ulcer. Whereas, one usually finds in hyperacidity an increase in the appetite, we have found here in our cases 54 in which the appetite was described as distinctly poor, in 15 it was good, and in the others very variable.

The heart showed various conditions; in 51 it was described as normal, though this is probably not true; in 13 there was evidence of some dilatation from the anæmia, with regurgitation through the mitral valve; in 10 other cases there was simply a systolic murmur at the apex not transmitted. In 10 others there was hæmic murmur at the pulmonary cartilage, and in two there was concurrent mitral stenosis.

*Surgical Cases*: Of these all but one were admitted after perforation had occurred—the exception was transferred from the Medical Wards. Eight cases were operated upon, seven by Dr. Bell and one by Dr. Garrow. Of the eight cases seven recovered. The ages of these cases, as has already been referred to, varied from 20 to 30, the average age,

however, being 21. A word or two in detail about these surgical cases may be of some interest:—

*Case 1.* This case was operated on  $4\frac{1}{2}$  hours after admission,—hours after perforation had occurred. There was general peritonitis, but the patient made an uninterrupted recovery, sitting up on the 32nd day, and discharged on the 35th.

*Case 2.* The second case was operated on 12 hours after perforation; general peritonitis in this case also; sat up on the 37th day and was discharged on the 38th.

*Case 3.* In the third case the operation took place hours after perforation and two hours after admission. There was general peritonitis. In this case the recovery was slower, the patient being discharged only on the 72nd day.

*Case 4.* Here perforation had occurred  $8\frac{1}{2}$  hours previously; general peritonitis; but again the patient made an uninterrupted recovery being discharged on the 34th day.

*Case 5.* The fifth case was operated upon 20 hours after admission; general peritonitis present; and was discharged on the 59th day.

*Case 6.* In this case, which ended fatally, the perforation had occurred 58 hours before operation was performed, and the patient died 10 hours later.

*Case 7.* In this case the operation was performed 12 hours after perforation; general peritonitis was present; the patient was discharged on the 30th day.

*Case 8.* In this eighth case, the operation took place 8 hours after perforation, there was general peritonitis, but here, too, the patient made a rapid recovery, sitting up on the 24th day.

In all these cases the treatment was fairly uniform after operation; nutrient enemata were given for the first few days, and from three to five days liquid diet was given by the mouth, milk and lime water being the favorite food. Within the first week custard, arrowroot, or weak coffee was given and within two weeks more solid food, bread and butter, etc. This diet was maintained for another week or ten days, after which solids were given—solid food always being given within a month after operation had been performed.

Of the 83 cases of which records have been kept, 39 are recorded as cured, 34 as improved, one case is noted as unimproved, and 6 the result is unrecorded. Two patients died, the one of perforation and general peritonitis, and the other of hæmorrhage. In this last case multiple erosions were found post mortem.

It is a great pleasure here to acknowledge, with thanks, the constant interest taken and advice given me by Dr. C. F. Martin during the preparation of this analysis.

# REPORT ON CASES OF TYPHOID FEVER TREATED IN ROYAL VICTORIA HOSPITAL DURING YEAR 1902.

BY

COLIN K. RUSSEL, B.A., M.D.,  
Senior Resident Physician.

During the year 1902 there were treated in the wards of this hospital 90 cases of typhoid fever, 58 males and 32 females. Of these 75 were treated to a conclusion, and 15 are still under treatment. The latter are not included in the present report. The mortality was 5.4%, there being 4 deaths, two of which resulted from toxæmia and two from perforation.

The following data are the points of interest :

**Age:** The average age of all the patients was 23 years, the youngest being 3 years old and the oldest 63 years.

Arranged in decades, they are as follows:

Up to 10 years of age.....	6
Between 10 and 20.....	19
“ 20 “ 30.....	36
“ 30 “ 40.....	11
“ 40 “ 50.....	1
“ 50 “ 60.....	2

**Season:** The largest number of cases were admitted during August, there being 17 admissions during this month; no cases were admitted during April.

July, August and September.....	45.3 per cent.
October, November and December .....	29.3 “
January, February and March.....	16.1 “
April, May and June.....	9.3 “

The average day of disease on admission was 9.

The average number of days in the hospital was 38.5.

The average duration of fever after admission was 31.5 days.

The longest period of fever after admission was 42 days.

The shortest period of fever while in hospital was 7 days, of which there were two cases. Both being admitted on the 8th day of disease, one with a temperature of 103° and the other with a temperature of 103.

**Infection:** In four cases the patients had been nursing other members of their families suffering from typhoid.

One case was the medical ward orderly.

One case was an employee in a factory in which 18 other cases of typhoid developed.

In another case the drinking water was taken from a well in the cellar; there were 3 other cases of typhoid in the same house.

**Symptoms:** In 97 per cent. of the cases the onset was gradual, the most frequent symptoms being anorexia, general malaise, headache, chilly sensations and generalized pains.

In two cases the onset was sudden with chilly sensations. In another the onset is reported as abrupt, with weakness and headache, nausea, vomiting, and pain in abdomen, and definite chills and rigor.

Diarrhœa was present at the onset of the disease in 33.3%.

Constipation was present at the onset of the disease in 48%.

Vomiting was present at the onset in 32.2% of the cases.

Delirium was present during the onset or course in 20% of the cases. In all cases except one it was low and muttering. In that case it was noisy and violent.

Epistaxis occurred during the onset in 18.6% of the cases.

**Eruption:** An eruption was present in 81.2% of the cases. In every case it is noted as being of the character of "rose spots." In 70.5% of these cases the eruption was present on admission.

The earliest appearance of the rash was on 4th day of disease.

The latest appearance of the rash was on the 29th day of disease.

In two cases the rash appeared only during the relapse.

The shortest duration of the rash was 3 days.

The longest duration of the rash was 27 days.

The average duration of the rash was 15 days.

**Spleen:** The spleen was palpable in 62.6% of the cases. In 54.2 of these cases it was palpable on admission. In one case it was felt as early as the 4th day. In another it was not palpable until the 36th day of disease. On the average it remained palpable for 19.9 days. In one case it was palpable for only three days, while in another it was palpable for 53 days.

**Relapse:** A definite relapse occurred in 13 cases—17.2%

The longest duration of the relapse was 27 days.

The shortest " " " " 7 "

The average " " " " 15 "

In 2 cases the relapse was more severe than the original attack. In one of these cases it occurred on the 17th day of disease, when the temperature had been normal for 2 days. It came on after the child had eaten a part of an apple given her by her friends. The relapse lasted 27 days.

**Fever:** The highest temperature recorded was 105.8. The lowest maximum temperature was 101.8. The average maximum temperature was 103.9. The temperature reached 104 or over in 40% of the cases.

**Complications: Digestive System.** Cholecystitis developed in 2 cases, and later in one of these cases there was an intestinal hæmorrhage, amounting to about three ounces. This patient also had mitral endocarditis with regurgitation and a chronic interstitial nephritis, and a day or two after admission she developed Varicella. She made a good recovery from the typhoid. Another case was complicated by chronic appendicitis. There were 4 cases of intestinal hæmorrhage. Perforation occurred in two cases. One was operated on, but died; the second died without operation.

**Respiratory System:** Acute bronchitis was present at onset in 12.5% of the cases.

Pulmonary œdema was present in one case.

Pleurisy with effusion occurred in 2 cases.

Tuberculosis was present in one case.

Emphysema was present in one case.

**Other Systems:** Suppurative Keratitis developed in one case.

Purulent Ophthalmia developed in one case.

Otitis Media was present in 2 cases.

Multiple Abscesses in 2 cases.

Ischio Rectal Abscess in one case.

Periostitis developed during early convalescence in one case.

Acute Parenchymatous Nephritis developed in two cases, and Chronic Nephritis was present in two cases.

Febrile Albuminuria was present in 61.2% of the cases.

**Widal:** The test was tried in all cases. It was negative in 6, five of which had the usual symptoms and course of typhoid, and 4 of which had rose spots on abdomen and palpable spleens. One of these was an employee in a factory in which there were 18 other cases of Typhoid fever. The 5th case showed no rose spots while in the hospital, but the spleen was palpable, and the patient had a relapse, which occurred on the 27th day of disease and lasted 12 days. The 6th case is reported at length below. This case was diagnosed only at post mortem, and the Widal which was taken after death was negative.

The test was tried in 39 cases on discharge; it was found present in 35, absent in 3, and doubtful in 1.

In one case it appeared on the 5th day.

In another it was not present until the 24th day of disease.

It was present on the average on the 13th day of disease, but in 21 cases it was present on admission.

**Ehrlich's Reaction** was present in 42.3% of the cases in which it was tried. The average day of disease at which it appeared was the 13th. The average duration of its presence was 6 days.

**Synopsis of the four fatal cases:** Typhoid fever with perforation.  
Operation—death.

*Case 1.* F. F., aged 37, male. Case No. 7104. Patient was admitted to the hospital on August 1st, 1902, complaining of general malaise, headache, anorexia, weakness and diarrhœa of seven days' standing. On examination he was found to be a tall spare man, very poorly developed, both mentally and physically; skin, hot and dry; lips and finger nails somewhat cyanosed. Rose spots were present on abdomen. The spleen was not palpable, neither Ehrlich's nor Widal's reaction were present. Temperature 103°. Pulse 100. Respirations 24. Chest deformed and small.

Signs of consolidation in left apex and axilla.

Some displacement of heart to median line, otherwise the examination of heart was negative.

Subsequent events: General cold bath treatment was ordered for temperature 102° and over and well borne.

During the evening (10.30 p.m.) of the 12th day of disease, four days' after admission, he complained of slight abdominal pain, which, in the course of an hour, became very severe and cramp like, this was followed by chilly sensations. Examination of abdomen showed some rigidity in left iliac region and considerable tenderness over whole abdomen, especially over region of appendix. T. 101°. Pulse 96. R. 30. Pain was relieved by hot lead and opium fomentations.

One hour later (11.30 p.m.) T. 96°. P. 96. R. 30.

Four hours later (3.30 a.m.) abdomen was quite rigid and at this time there was a friction rub heard in left axilla for the first time. Throughout the morning the pain and rigidity increased and pulse became more rapid—124. There was no record of leucocyte count.

Operation performed at 3 p.m., August 6, 13th day of disease. On opening the abdomen, free pus was found in peritoneal cavity. A perforation was found in ilium, 18 inches from ilio-cæcal valve. The perforation was closed and abdomen flushed out with saline and the incision partly closed and drainage inserted. Patient stood the operation well and the next day was doing well.

The following day, Aug. 8, the abdomen became distended and the pulse was weaker, these symptoms became more marked and vomiting set in and he died Aug. 10. No. P. M. was granted.

**Typhoid fever—Perforation and death.**

*Case 2.* Act 29. M. R. Patient was admitted to hospital Dec. 8th, 1902, complaining of headache, nausea, and vomiting, diarrhœa, definite

chills with rigor of 8 days' standing. On examination he was found to be a well nourished, muscular man; mental condition dull and apathetic; spleen was palpable; rose spots present; Ehrlich's and Widal's reactions present. The urine was found to contain a gram and a half of albumen to the litre.

Subsequent events: General cold bath treatment was ordered for temperature of 102° and over.

On the 11th of December patient complained of pain low down in abdomen, and on examination it seemed to be situated over the middle of Poupart's ligament on both sides; there was no rigidity of abdomen, no distension, and pulse was not over 82. The pain disappeared very shortly, and the disease ran a favorable course until early in the morning of Dec. 31st, when he complained of severe abdominal pain and tenderness; pulse 112; rigidity not marked; no distension; liver dulness extends to  $\frac{1}{2}$  inch from costal margin; leucocyte count averaged 5,500.

At 8 a.m., pulse 120; fairly strong; some cyanosis; rigidity more marked; tenderness not so marked; some distension. There was not much change in pulse. Leucocyte count averaged 9,900. Pulse now rapidly became much weaker and patient sank rapidly and died at 9.30 a.m. without operation.

Post-mortem there was found to be a very extensive ulcerative process, beginning at the lower end of jejunum, extending through the ileum, appendix, caecum, colon and rectum to within 3 inches of the anus. The typhoidal appendicitis was extreme and the extreme tip of this organ was perforated, this seemed to be of some days' duration and was older than the perforation which had taken place in the ileum 8 c.m. above the valve. Kidneys showed definite parenchymatous nephritis.

Typhoid Fever, Toxæmia, Intestinal Hæmorrhage: Extreme Toxæmia and death.

*Case 3.* P. D., aet. 18. Patient entered hospital August 20th, on 7th day of disease complaining of general malaise, headache, anorexia, epistaxis and melana. On examination he was found to be a fairly well nourished young man, muscles flabby and soft. Abdominal distension marked with some tenderness in epigastrium and over splenic area. Spleen palpable. The following day patient was quite delirious, and wanted to get out of bed. Had severe epistaxis, involuntary micturition, and defæcation with melæna. Twitching of face and arms; pulse irregular and of low tension. These symptoms gradually became more marked, and patient died on the morning of the 26th August from extreme toxæmia.



## Typhoid Fever with Purpuric Eruption, Toxæmia and death.

*Case 4.* W. R., aet. 63. Admitted to hospital December 6, 1902, complaining of cough, dyspnœa and weakness. The onset 7 days previous was characterized by slight pain in stomach, followed by cough. There was a history of exposure two days later, followed by definite chills. He became worse, was delirious and had involuntary micturition. There was a previous history of chronic alcoholism. On examination the patient was found to be an old man in a semi-conscious condition. His respirations were rapid and stertorous, pulse irregular in volume and rhythm, and there was some cyanosis. There was a purpuric eruption over the body. Lungs were very emphysematous, with all the signs of consolidation at the right base posteriorly, and dry and moist rales all over the chest. No rose spots were present. Spleen was not palpable. In the course of the following day the delirium became more marked. On December 12 the temperature suddenly dropped to normal; the pulse became very much weaker; respirations were greatly accelerated, and patient sank and died.

P. M. Intestines showed 10 typhoid ulcers. Zenker's degeneration was remarked in rectus muscles, with hæmorrhage into right rectus. There was marked emphysema of the lungs, fatty degeneration of heart, and slight atheroma of the aortic valves. Inflammatory hyperplasia with liquefaction of mesenteric glands.

The Widal which was taken after death was negative.

# OBSTRUCTION OF THE BOWEL BY A LARGE GALL STONE. OPERATION—RECOVERY.\*

BY

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FRANCIS J. SHEPHERD, M.D.,

Professor of Anatomy, McGill University, and Surgeon to the Montreal General Hospital.

The following case is of sufficient interest, both on account of its rarity and importance, to bring before this Society.

*History:* Mrs. H., a widow, aet. 72, rather stout, has never been seriously ill and there is no history of gall-stone colic. Some days ago she slipped and felt something give way in her abdomen; she was fairly well afterwards but always felt as if there was something amiss in the abdomen. On Sunday, February 8th, 1903, after a hearty supper, she went to bed and was awakened Monday morning by an attack of diarrhoea, she had three stools. Soon vomiting came on but no nausea; this continued all day and was without effort, more like regurgitation of intestinal contents. Dr. Gordon Campbell saw her on Monday, purgatives were administered without avail; pulse and temperature normal; no flatus had passed since Sunday. Dr. Campbell, recognizing the case as one of obstruction, called me in Tuesday evening. All that day she had been vomiting and had suffered pain, probably from the purgatives administered. When I saw the patient her pulse was full, 76, temperature normal, no distension, but some tenderness about the umbilical region on pressure. Vomiting was continuous, without effort and was not preceded by nausea. Seeing that there was evidently obstruction due to some unknown cause, I advised an exploratory incision. She was removed to the Montreal General Hospital and operation was commenced at 10.30 p.m. The incision was below the umbilicus and of considerable length because of the stoutness of the patient. On opening the peritoneal cavity and introducing my hand I almost immediately came upon a hard substance within the bowel. The bowel was pulled out and it was found that a solid body was wedged into it like a cork. Immediately about it the bowel was dark colored. The contained substance would not be forced on but was easily pushed back, and as soon as healthy bowel was reached an incision was made in the long axis of the bowel, opposite the mesenteric attachment, and the stone removed.

The incision in the bowel was sutured in two layers with silk, first

\* Read before the Montreal Medico-Chirurgical Society, March 20, 1903.

the mucous membrane by a continuous suture, and then the outer coats with a continuous silk Lembert's suture. The abdominal wound was closed in layers, the deeper with cat-gut, and the skin brought together with silk-worm gut. The patient went on well and the bowels moved on the second day with an enema. She had no drawbacks and was discharged at the end of three weeks well. I saw her yesterday (March 19th) and she is going about as usual.

The gall-stone measured 10 cm. in its greatest circumference and about 5 cm. in its greatest length. It is of a dark brown color, sinks in water, and on section is made up of concentric layers of soft brown material. It appeared as if it had been pocketted somewhere and that its sharp end had protruded into the bowel, for this was covered by a comparatively fresh layer of faeces; there was a distinct ring where the protruded part apparently was held. It had not the ordinary appearance of a gall-stone. There never was any history of gall-stone colic. The mass had been arrested near the beginning of the ileum, which, as is well known, is smaller than the jejunum.

The fact that it was dislodged by a sudden movement is in favor of this body being a gall-stone; but there was never anything pointing to gall-stone, no colic, malaise, or any inflammatory attack at any time. Mr. Lund (London Lancet, 1896), reports a similar case of an impacted gall-stone without any history of gall-stone colic.

Obstruction from gall-stone is a very fatal affection. Kermisson and Richard, out of 105 collected cases, gave the mortality as 50% (Mayo Robson). Lobstein collected 92 cases, of the 62 cases not operated on 32 recovered and 29 died; of the 31 operated on 12 recovered. Many were moribund at the time of operation (Robson).

It is curious how small a stone has caused obstruction and how large a one has sometimes passed per rectum.

The remarkable thing about the present case is that so large a stone should have ulcerated through the gall bladder into the duodenum without producing any symptoms whatever, not even malaise.

Note.—Since the above was written Professor Ruttan has kindly examined the enterolith for me, and finds that it is undoubtedly a gall-stone, cholesterine being quite easily demonstrated.

## HYATID DISEASE.

BY

RIDLEY MACKENZIE, M.D.,

Demonstrator in Medicine, McGill University; Assistant Physician to the Montreal General Hospital.

The case I have to report is one rarely met with in this part of Canada. Iceland and Australia stand out pre-eminently as the home of hydatid disease, and there is a good deal of it amongst our Icelandic emigrants of the North-west. It is figured that 1-30th of the people of Iceland have the disease. Osler has collected reports of 85 cases in Canada and the United States. The commonest situation for *echinococcus* cysts is in the liver. Thomas compiles a table from 900 cases, 57 per cent. of which were found in that origin, and of the 85 cases collected by Osler the liver was the seat in 59.

Morris M. presented himself at my out-patient clinic, complaining of pain in the right side and shortness of breath. The patient is a Roumanian Jew, emigrant, and has been in this country about a month. He has always lived in Roumania, and is a teacher.

He states that his illness began two weeks ago when he first noticed a slight distension below his ribs on the right side; before this time he had no distress, but within the past few days, cramps and pains in this region have been severe and he has been short of breath.

His general health has been good, appetite fair, bowels regular, no jaundice or chills. His habits have been good, no syphilitic or alcoholic history. Temperature and pulse normal. One notices on the scalp areas of alopecia, probably from favus in childhood.

The nourishment is fair, muscles poorly developed. On deep respiration he supports his right side and gives evidence of pain. The hypogastric and epigastric regions project more than normally, and over the right hypogastric region the skin is reddened from the application of a blister.

On palpation over the right hypochondriac region a hard, smooth, somewhat elastic mass, with rounded edges, is felt, continuous with the liver and extending 2 1-2 inches below the costal margin, and 2 1-2 inches to the right of the sternum. There is no thrill on palpation.

On examination of the right chest, pulmonary resonance is lost in front below the 4th rib, in the axilla at the level of the 6th rib, and behind to the 8th rib. Breath sounds are much diminished over this

dull area. No râles. The area of hepatic dulness in the mamillary line is 5 1-2 inches. Circulatory, gastro-intestinal and genito-urinary systems negative. From the absence of any signs of abscess of the liver, disease of the gall bladder, or hydronephrosis, the diagnosis tended to ecchinococcus disease of the liver, and under a general anaesthetic in the ward, with relaxed abdominal muscles, the mass projected and was more especially easily palpated.

An aspirating syringe was entered at the most prominent part and at a depth of 2 inches, entered a cavity and 30 C.C. of a clear limpid fluid was withdrawn, relaxing the tension in the tumour.

The fluid examined was found to have a sp. gr. of 1005, a slight trace of albumen, no sugar, a large proportion of chlorides, and when centrifugated a few red blood cells were found but no hooklets. The albumen and blood got in during the needle's passage through the rectus muscle. Though not conclusive, due to the absence of hooklets, a diagnosis of ecchinococcus cyst was made, and the patient transferred for operation to the surgical wards.

# A RARE CASE OF CONGENITAL UMBILICAL HERNIA.\*

BY

J. M. ELDER, M.D.,

Surgeon to the Montreal General Hospital; Assistant Professor of Surgery,  
McGill University.

On Sept. 13th, 1902, a midwife, at whose house the confinement had taken place, brought a three day's old male infant to my clinic at the General Hospital. At birth the accoucheur noticed a cystic tumor at the umbilicus, apparently attached to the cord, whose tissues appeared to spread over it, and he was therefore obliged to ligate the cord at a point beyond the tumor (Fig. 1). The covering of this tumor was entirely serous; its size was about that of an orange, and palpation showed that its contents were continuous with those of the abdominal cavity. It was absolutely dull on percussion. The child had vomited once only, a few hours before admission to Hospital; had micturated normally and had several normal stools. The serous covering of this hernial protrusion (for so I judged it to be), had very naturally become infected, and the characteristic odor was well marked.

I at once decided that if general septic peritonitis was to be avoided, prompt attention was necessary, and therefore, under chloroform anaesthesia, excised the affected sac, cutting close to the muco-cutaneous junction at the umbilical opening, having previously freed and ligated the vessels of the umbilical cord below the tumor.

I found the contents of the sac to be the caecum (with its vermiform appendix), the ascending and transverse colon, and, so far as I could judge, about half of the small bowel. These viscera were collapsed and empty, but in no way strangulated. The infection of the parietal layer of the peritoneum which had formed the sac, had spread through to the visceral layer, and these coils of intestine, large and small, were much injected, adherent to one another and were covered with recent lymph which could be peeled off. Before making any effort to return them to the peritoneal cavity I separated the adhesions, under a stream of warm sterile saline solution, removed the lymph, and so far as I could, thoroughly cleansed the coils of intestine. I then enlarged the umbilical opening on a director and easily returned the viscera into the abdominal cavity through the opening. I had expected some difficulty here, because so far as I knew, these bowels had possibly never previously been in the abdomen, and certainly not since some time prior

\* This case was exhibited at the Surgical Clinic given at the Hospital during the meeting of Canadian Medical Association, Montreal, September, 1902.

to the child's birth; but the reduction was quite easy and it only remained to close the umbilical opening. This I did by suturing the peritoneum with a continuous fine cat-gut suture, and then closing the skin and muscles with through and through sutures of silk-worm gut. A carefully adjusted dry pad with abdominal binder completed the dressing, and as the mother was not in the hospital I gave the child over to the charge of the midwife again, with instructions to report daily.

The wound healed kindly, the sutures were removed on the 10th day, the line of incision coated with collodion and a pad and bandage ordered to be kept applied. As the child was an illegitimate one it was sent to a foundling institution on the 11th day and I have only heard of it once since, when it was about three weeks old. It had been thriving perfectly well and its digestion and intestinal functions appeared to be performed as well as though it had not entered life with this congenital handicap.

On looking into the literature of this rare and interesting condition I find that it corresponds with that form of umbilical hernia known as "Congenital Hernia of the Cord," an excellent description of which will be found in the International Textbook of Surgery (1900), Vol. II, p. 482. It is not a true hernia, as Malgaigne points out, "for it is concerned not with viscera which have escaped from a cavity, but with viscera that have entered it," and is due to a defect in the normal closure of the visceral plates which should take place in the umbilical cord during foetal life. If the tumor is small and its contents can be returned, operation (which as I have shown is not a difficult proceeding) should be done and done at once before infection takes place. Statistics show that out of 19 cases reported as operated upon, there were 17 recoveries and only two deaths; while of those which were treated by compression, 9 died and 3 recovered.

In this case owing to the presence of infection when I first saw it, there could be no question of any form of treatment other than immediate operation.

# RESUME OF RECENT LITERATURE ON THE TREATMENT OF CHRONIC SUPPURATION IN THE FRONTAL SINUS AND MAXILLARY ANTRUM.

BY

GEORGE K. GRIMMER, B.A., M.D., Ed., F.R.C.S., Ed.,  
Assistant Laryngologist, Montreal General Hospital.

The importance of suppuration in the accessory sinuses of the nose, seems to increase from year to year, and the careful study which rhinologists have of late devoted to this branch of their art has led to marked advance in the surgery of these sinuses and to a considerable measure of success in the treatment of diseases involving them.

The first essential in the treatment of chronic suppuration, in any of the nasal sinuses, is to obtain free, unhindered drainage; this alone will often give great relief and may effect a cure. Should it fail, the next step is to remove the thickened unhealthy mucous membrane lining the sinus, and in certain favorable cases, obliteration of the sinus.

TREATMENT OF CHRONIC SUPPURATION IN THE FRONTAL SINUS:—In frontal sinus disease much may be done to secure good drainage by removing the anterior end of the middle turbinate body and granulations and polypi from the middle meatus, which will free the fronto-nasal duct from obstruction.

To effect this the wire snare, the ring knife, cutting and punching forceps, are usually employed. Lock<sup>1</sup> lays stress upon the importance of removing the unciniate process, since its mucous membrane is often swollen, blocking the infundibulum.

Up to this point rhinologists pretty generally agree; but when these means have failed, there is much difference of opinion as to what next ought to be done: Should we try syringing the sinus through the fronto-nasal duct with some antiseptic solution, or should we proceed at once to radical operation from the exterior? In the Vienna Clinics the former method has been very largely followed. Lock, however claims it is only possible to reach the frontal sinus with a canula in about 50% of cases.

After polypi and the anterior end of the middle turbinate have been removed, he thinks an ethmoid cell is often entered by the canula, and mistaken for the frontal sinus.

Lermoyez<sup>2</sup> recommends syringing, but says it is possible in only about one in four cases. The statistics of many writers prove that syringing has frequently been followed by good results, especially when



the disease has been of short duration. In old standing cases where it is probable the mucous membrane of the sinus has become thickened and polypi have formed, syringing would be a waste of time.

The indications for syringing are shortly, as follows:—recent suppuration, where drainage alone has failed, where the canula can be easily passed into the sinus and where urgent symptoms are not present, and the patient objects to external operation.

The lotions most in favor for washing out the frontal sinus have been 10 grains to the ounce of boracic acid, 1 in 1000-2000 of formalin and dilute permanganate of potash solutions. When syringing is carried out it should be done daily for from 3 to 6 weeks and must be done by the surgeon himself; consequently this treatment is tedious, which is one of its chief drawbacks.

Schaefer's method of forcing an artificial passage from the nose into the frontal sinus is dangerous and must be strongly condemned.

THE RADICAL OPERATIONS:—Tilley<sup>3</sup> considers the following symptoms indicate external operation:—(1) Fever, headache and profuse discharge, continuing in spite of intra-nasal treatment. (2) Where a suppurating external fistula is present. (3) Where the purulent discharge is seriously damaging the patient's health, or the mucous membrane of the nose, pharynx or larynx. (4) In case the patient may be going where skilled help cannot be obtained should obstruction occur.

Lermoyez advises radical treatment because the brain, the orbit, the respiratory tract, and the general health are endangered.

METHODS OF EXTERNAL OPERATION:—The Ogston-Luc method which has been so largely followed, but which has of late fallen into disrepute, consists of making an external opening into the sinus through the lower inner portion of its anterior wall, curetting, and making a large opening into the nose along the fronto-nasal duct, which destroys the anterior ethmoidal cells; then inserting a funnel-shaped drainage tube from the sinus to or through the nose and with closure immediately of the external wound. This immediate complete closure of the external wound is the dangerous part of the operation; Tilley, Rudolff, Lermoyez and Lock, state they have each had cases of acute septic osteitis of the frontal bone, resulting in death, following this procedure; while where the wound has been allowed to remain open for external drainage, septic diploëtis has much more rarely occurred. After Luc's operation also, relapses have been more common than where the open method has been followed.

The advantages of this method are that it avoids disfigurement and that the anterior ethmoidal cells are opened.

Lock is especially strong in his condemnation of the method, and

says:—"The method of drainage provided by Luc's operation is neither safe nor curative." Lubet Barbon, however, claims brilliant results from its use.

**KUHNT'S OPERATION:**—This has for its object obliteration of the frontal sinus. Kuhnt resects the anterior wall of the sinus and sometimes a portion of the inferior wall, cures the sinus carefully but does not enlarge the fronto-nasal duct; he leaves the wound partly unstitched and drains by the external route. The soft parts fall back against the posterior wall of the sinus and cure is complete in from three to six weeks.

This method has marked disadvantages, 1st, marked external disfigurement (Holbrook Curtis<sup>4</sup> has suggested that the disfigurement might be overcome by subcutaneous injection of paraffin); 2nd, diplopia frequently follows owing to injury to the pulley of the superior oblique, and 3rd, the anterior ethmoidal cells which are greatly diseased with the frontal sinus are not opened.

Lermoyez advises what he calls the Kuhnt-Luc operation, a combination of the two preceding methods, namely:—Free movement of the anterior wall and careful curetting of the sinus free enlargement of the fronto-nasal duct, with destruction of the anterior ethmoidal cells for nasal drainage, and leaving the inner portion of the external wound unsutured for external drainage.

Tilley has recently recommended the following operation: Having removed the anterior end of the middle turbinate, the eyebrow having been shaved and made aseptic, an incision is made from one-fourth inch above the internal palpebral ligament upwards and outwards into the lower edge of the eyebrow to the junction of its inner and middle thirds (this incision frequently requires lengthening). Now raise the soft parts and periosteum, make a small opening into the sinus from a point vertically above the internal canthus with a gauge and mallet, and through this opening explore the sinus with a probe. If the sinus is small or of ordinary size and shallow he removes as much as possible of the anterior wall and cures thoroughly. If hæmorrhage is great it may be checked by pressure and gauze. Next the fronto-nasal duct is freely enlarged by burrs and curettes (Roe<sup>5</sup> has designed a special curved burr, guarded on one side, for this purpose).

Tilley lays great stress upon a point which is certainly of great importance if we are to obtain success in these cases, namely:—the necessity of a careful search for narrow extensions of the main sinus, and for ethmoidal cells running below the main cavity and over the roof of the orbit: the cavity is then made aseptic with carbolic acid, the outer part lightly packed with gauze and a rubber drainage tube in-

serted from the sinus into the nose; a single stitch is inserted to bring together the outer third of the wound, the rest is left open. At the first dressing the gauze and the rubber tube are removed, the latter may be replaced and subsequently the cavity is syringed thrice daily with boric lotion. (Many surgeons, among them McBride and Turner<sup>6</sup> prefer mopping out the sinus with moist gauze to syringing, and then repacking with gauze.—This method I have followed with success.) Granulations spring up in the sinus and will unite with those of the soft parts and so obliterate the sinus. The drainage tube to the nose should be kept in until all discharge has ceased.

Double frontal sinus disease should be treated by separate skin incisions.

If the sinus is large and deep obliteration will be out of the question—here efforts should be made to keep up free drainage. The general steps of the operation are as already described. Syringing must be kept up until discharge has ceased, then the tube is removed and the external wound allowed to close. When it has been impossible to obliterate the sinus its ultimate lining is evidently a thin cicatricial tissue formed from organized granulation tissue.

**TREATMENT OF CHRONIC SUPPURATION IN THE MAXILLARY ANTRUM:**—In empyema of the maxillary antrum, of recent dental origin, Lermoyez advises that the offending tooth be removed and also an alveolar sequestrum if present. If it is then found that the antrum has been opened it should be syringed out, but the opening must not be enlarged, and no attempt made at drainage through the alveolus by means of tubes. If a communication does not exist between the tooth socket and the antrum, we must carefully avoid establishing one, and the antral pus should be removed by puncturing the antrum from the outer wall of the inferior meatus, and by syringing through the puncture. Syringing should be repeated several times if necessary before undertaking more radical surgical treatment.

Lermoyez claims that by this method in from 3 to 12 syringings he has obtained a cure in 43% of his uncomplicated cases, no matter how old the lesion, and that twice he has succeeded in curing maxillary suppuration of a year's standing by a single syringing. He also claims that the percentage of cases of cure by this treatment is as high as by the old method of alveolar puncture, while by the former, cure is effected in a few days or weeks, in the latter it takes months and frequently from 1 to 2 years. Moreover, alveolar syringing is troublesome and uncomfortable to the patient and there is greater danger of the frontal sinus becoming involved; consequently in uncomplicated cases he urges alveolar puncture altogether.

When the previously mentioned conservative treatment has failed,

Lermoyez holds that either Desault's or Luc's operations are alone worthy of recognition.

Desault's operation consists in making a wide permanent opening into the antrum at the level of the canine fossa, curetting the sinus and stuffing with gauze. By this method the surgeon can watch the progress of healing, but cure is slow, the dressings are painful and unpleasant, and the results obtained are altogether inferior to those obtained by the Spicer-Luc method.

Luc or Spicer method: Here a wide temporary opening is made in the antrum at the level of the canine fossa, which allows of inspection and curetting; then a large permanent communication is made from the antrum to the inferior meatus of the nose. The buccal wound is at once closed and is united in eight days; the after treatment consists only of a few syringings which are not painful. Cure is rapid and certain, according to Lermoyez, who obtained 40 cures in 46 old chronic cases which had resisted other methods of treatment, and he claims his results are confirmed by those of Lubet Barbon, Furot, Moure and others.

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## CASE REPORTS.

### Cardiac Disease with Embolism.

BY

F. G. FINLEY, M.D.

Mitral stenosis is one of the cardiac lesions in which it is somewhat exceptional to find a prolonged entire absence of cardiac symptoms. Huchard refers to the malady in his crisp phrasology, as "une cardiopathie dyspnéisante, hémoptoisante, embolisante."

The two cases which I bring forward this evening illustrate the last named complication. The first is an example of embolism of the posterior tibial artery, and the second of hæmorrhagic infarct of the lung. Until the occurrence of these accidents both patients considered themselves in perfect health, and neither had suffered from cardiac symptoms.

Case 1. Mitral stenosis with embolism of the posterior tibial artery. Mmc. L., aged 71, a scrub woman, entered hospital on Jan. 20th, 1903, complaining of severe pain in the right foot, calf and thigh.

At the age of 21, she had a severe attack of acute articular rheumatism, being confined to bed for almost two months. She is temperate in habits, and has had no other illness.

Her father died of dropsy and her mother of heart disease.

On Jan. 15th, she was suddenly seized, when at her work, with severe pain in her foot, extending up the whole leg, and which obliged her to take to bed.

Examination. She is a well preserved spare woman. There are large patches of leucoderma on the trunk and limbs. The dorsum of the right foot is swollen, oedematous and slightly reddened. There is much pain in the limb, and marked tenderness over the dorsum of the foot, in the calf and in the muscles of the thigh. The sciatic nerve is, however, free from any tenderness. Pulsation is absent in the right posterior tibial artery, although it is distinctly felt on the other side. Both anterior tibial vessels are distinctly felt at the ankle.

The lungs present evidence of slight emphysema, but are otherwise normal. The cardiac impulse is felt just within the nipple, and on sitting up there is a distinct thrill. Dullness is within the normal limits; both sounds are heard at the apex, the first being loud and thumping. There is a rumbling presystolic murmur heard over an area two inches in diameter at the apex. Pulmonary accentuation is slightly

marked. The arteries are not thickened or tortuous, and are just palpable at the wrist, and the pulse is easily compressed and of fair volume.

Pain and tenderness gradually disappeared from above down, and a fortnight after admission there was only slight tenderness in the sole. The redness and swelling disappeared about the same time.

In this case the sudden onset of pain, with absence of pulsation in the posterior tibial artery, in a patient with mitral stenosis, fairly warrants the diagnosis of embolism. The diffuse character of both pain and tenderness in the limb seem remarkable, and formed a somewhat puzzling feature in the diagnosis.

Another feature of interest in this case was the long period of latent cardiac disease. If we assume, as we fairly may, that the cardiac lesion began with the attack of acute rheumatism at 21, we find a latent period of fifty years.

In a case of malignant endocarditis which I reported to the Society (Montreal Med. Journ.), Dr. McCrae confirmed the diagnosis of embolism of the posterior tibial artery, by dissecting out the vessel. In this case the pain and tenderness were much less marked and were confined to the foot.

Case 2. Rheumatic heart disease with pulmonary infarction as the first symptom. Venous Thrombosis.

Mary C., act. 39, was admitted on Jan. 13th, for pain in the right side, cough and dyspnoea. She has had two attacks of acute rheumatism, at 14 and at 24. The second attack involved principally the hands and feet, and has left a deformity in the hands. Up to the present illness she has enjoyed good health, and has had no cardiac symptoms. On Dec. 24th, 1902, she began to cough and became somewhat short of breath. Two days later severe pain came on in the right side of the chest, accompanied by spitting of blood and severe dyspnoea. She took to bed, and since then has suffered from orthopnoea, almost incessant cough, and slight swelling of the lower extremities. There was diarrhoea for the first few days and subsequently constipation.

Examination reveals a rather poorly nourished woman, with slight oedema of the lower extremities, and cyanosis of the lips and cheeks.

Both hands are greatly deformed, the phalanges being flexed at the first and extended at the two terminal joints. There is marked ulnar deflection of the fingers; the little finger is almost at a right angle to its metacarpal bone, and the phalanx articulates with its lateral surface. The metacarpo-phalangeal joints are unduly mobile, but there

are no bony deformities. There is a subcutaneous fibroid nodule above the left elbow.

The respirations are 42, laboured, and accompanied with dilatation of the *alæ nasi*. She lies on her back, but asks to be propped up. There is a rough friction in the lower right axilla with a catching pain, and at the right base there are two finger breadths of dullness. She coughs a great deal, and expectorates a good deal of mucus, tinged with a little bright blood.

The apex impulse is outside the nipple and diffuse, there is no thrill. Dullness laterally extends  $1\frac{1}{2}$  inches to the right and 4 inches to the left of the median line. There is a faint systolic murmur at the apex and both sounds are clearly heard. In the fourth interspace, three inches from the median line, over an area covered by the end of the stethoscope is a harsh presystolic murmur, a booming first sound, and reduplicated second sound. Along the lower left sternal border is a soft diastolic murmur. There is no pulmonary accentuation. The pulse is small, soft and compressible, 140. The liver dullness extends one finger's breadth below the costal border, but its border is not palpable.

The urine is acid, S.G. 1018, a small amount of albumen, and a few granular and hyaline casts. The temperature is 100.

Jan. 20. Under the influence of stropanthus and rest the pulse became slower, and its quality larger and somewhat collapsing, whilst the dyspnœa lessened.

Jan. 22. The right hand and arm became œdematous and swollen, to-day the swelling beginning sharply three inches below the fold of the axilla. Over the clavicle there is distinct fulness, but no tenderness. The pulse 78, very irregular and occurring in threes. Stropanthus stopped.

Jan. 25. Swelling in the right hand and arm have much diminished, œdema being limited to the elbow.

Jan. 30. Pain in left side of chest for some days past. A loud pleuritic friction in the left lower axilla, much cough and some bloody expectoration (infarction). An erythematous papular rash over the left wrist. Both arms œdematous at the elbows.

Feb. 9. Much œdema over the right foot, very slight on the left.

Feb. 18. Twelve oz. of fluid removed from the left pleura, slightly turbid and containing a few polynuclear leucocytes.

Feb. 21. A noisy delirium has developed with restlessness and Cheyne-Stokes breathing. This continued to the time of her death, with occasional severe headache and vomiting on a few occasions; also incontinence of urine and fæces, and free sweating. The urine con-

stantly contained albumen, as much as three grams of albumen to the litre, S. G. 1010 to 1024, and a few granular and hyaline casts. The quantity was much diminished, being usually under fifteen oz. daily.

Feb. 26. A large indurated and hæmorrhagic patch developed over the right side of the neck, extending from below the clavicle backwards to the supraspinous region, the pulse became small and rapid, marked cyanosis set in, and death occurred on the following day.

Diagnosis. Chronic rheumatic endocarditis with mitral insufficiency and stenosis, and aortic incompetence. Pulmonary infarction. Chronic nephritis. Arthritis deformans.

Anatomical diagnosis furnished by Dr. McCrae, who performed the autopsy. Acute verrucose aortic and mitral endocarditis. Chronic sclerotic aortic, mitral and tricuspid endocarditis. Tricuspid and mitral stenosis. Aortic incompetence. Dilatation and hypertrophy of the heart. Adhesions of the pericardium with calcareous plates. Right hydrothorax. Collapse and infarction of the lungs. Chronic mucopurulent bronchitis. Cirrhosis of the liver. Induration, with parenchymatous degeneration of renal epithelium, and slight cirrhotic changes of the Malpighian tufts. Thrombosis of the right jugular, femoral and iliac veins.

The cause of the unilateral œdema of the arm, and later of the leg, both on the right side, was somewhat obscure. It was regarded at its first occurrence as a venous thrombosis, but the absence of any cord in the veins, and of tenderness, rendered this view somewhat doubtful. The great preponderance of venous thrombosis on the left side also threw some doubt on this view. In the cases reported by Welch (*Trans. Am. Phys.*, Vol. 15), 22 out of 24 cases were on the left side.

The marked delirium, restlessness and incontinence, occurring after considerable improvement in the cardiac condition, was attributed to uræmia.

Although, judging from the history of acute rheumatism, the patient must have suffered from serious cardiac disease for at least 15 years and probably for 25 years, no symptoms were present until the onset of pulmonary infarction, producing a fatal cardiac break-down, and not as is usually the case, occurring as a late symptom after definite cardiac symptoms have been present for a longer or shorter time.

Deformity of the hands, as a result of acute rheumatism must be a decidedly rare event. In this case the deformity resembled rheumatoid arthritis in the ulnar deflection of the fingers, but differed from it in the mobility of the joints, the absence of bony enlargements, and in not having a progressive character.



## CASE REPORTS.\*

BY

GEO. H. MATHEWSON, B.A., M.D.

### 1. Aponia due to the Presence of a Foreign Body in the External Auditory Meatus.

In February, 1898, a healthy looking young man of nineteen years of age consulted me on account of extreme hoarseness and deafness. He was so hoarse that he could scarcely whisper, and stated that he had suddenly become deaf, and at the same time lost the use of his voice. I thought the condition might be due to luetic infection, so looked into the mouth and cesophagus, but could see nothing beyond a little congestion of the mucous membrane. (I regret in the light of the after history of the case, that I did not examine the larynx). I then examined the ears and found the meatus nearly filled with cerumen, while the other contained a smaller amount of the same material.

A large plug of hard cerumen was removed by syringing from the more completely filled ear, and fixed to the inner end of the plug was a large piece of the lead from a carpenter's pencil. The proximal end of the piece of lead was free and presented many sharp angles.

Immediately after the removal of the body the patient recovered the use of his voice, and after the second ear had been cleansed the hearing also was restored. The patient remembered having got the lead into the ears many years previously. Apparently we have here an irritation which produced spasm of the abductors of the vocal cords, instead of cough or some of the more usual results.

I suppose the foreign body either impinged directly on the filaments of Arnold's nerve in the meatus, or forced the membrana tympani inwards, and pressed through it against the promotory, where Jacobson's nerve forms the tympanic plexus; the exact route of the reflex I leave to the physiologists and anatomists.

### 2. Keratosis Obturans or Laminated Epethelial Plug.

A moderate amount of lamination in masses of inspissated cerumen is very common, but it is rare to find it so marked as in the following case:—

In December, 1899, I was called by the family doctor to see a little girl of 13 years of age, who was complaining of extreme pain in the

\* Read before the Montreal Medico-Chirurgical Society.

right ear. The meatus was found to be filled with a brown mass looking like inspissated cerumen. After attempting to dislodge the mass by syringing and the gentle use of curettes and forceps, for some time with indifferent success, it was finally found necessary to anaesthetize the child, and even then it was only by pretty forcible use of the curette and forceps that the plug was removed. On examining the material it was found to consist of a series of conical casts of the meatus lying tightly packed one within the other, with the apices of the cones directed toward the tympanic membrane. When water was forced into this mass, the outer ends of these cones spread open and filled the meatus fuller than ever.

### 3. *Aspergillus Nigracans*, with Specimens.

As the occurrence of moulds in the external auditory meatus is not very common in Canada, I venture to present the following case:—

A gentlemen came to me last summer complaining of a slight discharge from the left ear.

On examining the meatus a blackish-brown mass was seen to cover the membrana tympani. On removing some of this material, it was found to be a mould of some sort, and the microscope showed it to be *aspergillus nigracans*. After careful removal, spirit drops were applied to the site of the growth. A specimen is under the microscope at the other end of the room.

### 4. Tinnitus Due to Ingrowing Hair.

A medical man consulted me a short time ago on account of a peculiar creaking noise in his right ear, especially noticeable when he moved his jaw in speaking or eating. On carefully examining the ear, a very stout hair was found to have grown inwards from about the middle of the meatus, until it had reached the membrana tympani and scratched against the latter, when the jaw movement was transmitted to the integument of the meatus. The symptoms disappeared promptly on pulling out the hair.

# RETROSPECT OF CURRENT LITERATURE.

## Surgery.

UNDER THE CHARGE OF GEORGE E. ARMSTRONG.

HARVEY CUSHING, Associate in Surgery, Johns Hopkins Hospital.  
On the Avoidance of Shock in Major Amputations by Cocainization of Large Nerve-Trunks, Preliminary to Their Division. With Observations on Blood-Pressure Changes in Surgical Cases *Annals of Surgery*, Vol. XXXVI, No. 3, 1902.

In this interesting article Harvey Cushing pleads for the cocainization of large nerve-trunks previous to their division during major amputations, under general narcosis, as a means of preventing possible shock. He begins by defining "Shock." It is a "peculiar state of depression of the normal activities of the central nervous system, brought about ordinarily by traumatism, of one sort or another, to peripheral afferent nerves." In order to produce shock "the impulses resulting from this traumatism must have acted reflexly upon the vaso-motor mechanism in the medulla in such a way as to cause a marked fall in blood-pressure. This diminution of arterial tension is the most characteristic symptom of shock."

In the next place it is well known that when extensive injuries are complicated by anæmia, primary or secondary, or by great loss of blood; or when anæsthesia is unduly prolonged, operative shock is especially prone to develop. In such cases Cushing seems to lay the blame largely upon the added insult to the nervous system occasioned by the cutting of the large sensory nerve-trunks. This he proposes to prevent by injecting cocaine into these nerves previous to dividing them, since Crile has shown that this procedure effectually blocks the transmission of all afferent impulses travelling by that nerve. In illustration he reports two cases of interscapulo-thoracic amputation for sarcoma. In the first, the pulse which had been steady at 110 for some time, suddenly shot up to 150 upon division of the brachial plexus, and remained at that level for 50 minutes. Upon a second division of the

plexus higher up in the neck, where it was stretched out over a secondary growth, the pulse suddenly became impalpable. It continued thready and almost imperceptible for nearly 24 hours; and during this period the general condition closely resembled that seen in cases of shock such as accompanies serious traumatic crushes of an extremity.

In the second case the plexus was cocaineized previous to division, and no evidence of shock appeared. Cushing refrains from pushing home his argument on the basis of two cases, and admits the possibility of individual physiological variation to identical stimuli; yet believes that the cases did stand sufficiently "on the same physiological level" to give point to the moral he wishes to convey. He adduces confirmatory evidence of a negative order in the regular absence of shock during an even more extensive operation, that of Halsted for breast cancer; in which, namely, no large sensory trunks are divided.

Naturally, amputations in which the main nerve trunks are to be cocaineized, must be done by the careful dry dissecting method; and Cushing takes the opportunity of putting out of existence—with a somewhat Podsnappian wave of the arm—the "time-honoured methods" of amputating with tourniquet and long knives, "relics of the days of spectacular surgery." If one is to apply the tourniquet at all, it would be more rational, he believes, to apply it distal to the site of operation in order to prevent loss of blood into the limb about to be amputated.

In the continuation of his article the author mentions a convenient apparatus for estimating blood-pressure, adapted from that described by Riva-Rocci, which has lately been put in use in the Johns Hopkins Hospital. This instrument enables the anæsthetist to keep an accurate record of the blood-pressure during anæsthesia: and the warnings of impending shock afforded by a rapidly sinking blood-pressure has, Cushing is convinced, saved life in a number of instances. Certainly such an innovation can be greeted with nothing but unstinted praise.

Several specimen charts, giving a parallel view of the pulse-rate, and the blood-pressure are reproduced from the collection of Dr. Briggs, and are very instructive. They represent three classes of major operation—cerebral, abdominal and peripheral. One shows the depressor effect brought about during a laparotomy for tuberculous peritonitis by exposure and handling of the viscera. A second shows the normal rise in blood-pressure following compression of the brain during the Gasserian ganglion operation, also the fall in pressure associated with clamping of the ganglion and its extraction. A third shows very graphically the extreme and sudden fall of blood-pressure, ending fatally from shock, in a second ganglion operation.

Cushing notes, by the way, that in his latest ganglion operations, he has carried out his principle of cocainization of the ganglion before its manipulation and extraction. Another chart shows a rise in blood-pressure during stretching of the sciatic nerve; and still another shows absence of any change of pressure in an extensive breast operation.

The article closes with a resume of modern ideas concerning the physiology of the question; in what way and under what circumstances stimulation or injury of a peripheral sensory nerve produces a pressor response, i.e., a rise in blood pressure; and in what a depressor response, or fall in blood-pressure. Unanimity on these points is not yet attained. "Yet so much is certain, that injuries of most diverse nature to peripheral nerves may, especially in some physical states, produce reflexly a fall in blood pressure; that this loss of vascular tone when it endures, is the most characteristic feature of shock; and that local anæsthetization of a nerve trunk will block the transmission of the centripetal impulses which otherwise might bring about the reflex loss of vascular tone."

If the reviewer be allowed to express one or two thoughts as to Cushing's conclusions, he would say that Cushing appears to attach an exaggerated importance to the reflex shock-producing effect of cutting the large nerves in amputations. Certainly the cases must be few where such division of nerves in a healthy subject can be accused of producing shock. In cases of severe accident purely psychical impressions, in the nature of fright or terror, play certainly a considerable role in shock-production. In any case, those dead of fright show nothing more than the pathological lesion which is considered to be the immediate cause of shock, viz., an excessive determination of blood to the splanchnic area. In anæmic cases, in such as have already undergone prolonged anæsthesia, or in severe crushes with shock; yet it is just in such cases that rapid operation and a minimum of anæsthetic are desirable; and neither of these is attainable if the slow dissecting method of amputation and of cocainization during general narcosis, recommended by Cushing, is to be carried out. In short, for cases in good condition, (e.g. amputation for tumor), cocainization of large nerves, during general narcosis seems unnecessary; for cases in bad condition undesirable.

There remains a class of cases, in which extensive operations under prolonged anæsthesia must be done by the slow dissecting method; and the Berger operations, cited by the author, are a fair type of such. It would seem that in such cases Cushing's proposal marks a decided advance. In operations which had already lasted over an hour (as

was the case in the two reported) upon individuals worn out by long sleeplessness and pain, it is easily conceivable that the normal pressor response following the cutting of large nerve-trunks should be replaced by a depressor response with its fall in blood-pressure and consequent danger of shock. The cocainization of these nerves before division would no doubt assist in preventing this danger.

Like all that Harvey Cushing writes, the article is decidedly suggestive and stimulating, and contains many subsidiary ideas relating to the subject of shock and blood pressure during operation, which render its perusal very much worth while.

JONES, ROBERT, F.R.C.S. Edin., Liverpool. An Address on certain Principles and Methods in the Surgery of the Paralysis of Children, *Lancet*, Feby. 14th, 1903.

The author here gives us, in a somewhat general way, those broad outlines of prognosis and treatment in the paralytic deformities of children which a lengthy experience has taught him. He discusses first the principles upon which prognosis should be based in cases of deformity arising from acute infantile paralysis. The sequence of reasoning is in brief as follows: Deformity in these cases is produced primarily, more by the effect of gravity, body-weight, and the shape of articular facets than by unbalanced muscular action. Because certain groups of muscles have barely responded to stimuli, and have remained inactive, it is too often assumed that this is due to cell destruction in the motor area;—an assumption which, if correct, would render useless any effort on the part of surgery. What we have to recollect, however, is that the cell-destruction is not so extensive as would appear; and that the affection, in so far as the majority of the cells are concerned, is a transient and recoverable one. Take, for example, paralytic wrist-drop. The whole arm perhaps in such a case was paralyzed to begin with; then the strong group of flexors recovered; later the extensors. The flexors, however, having first got well, overpowered the extensors, and, aided by gravity, became shortened or contracted, while the extensors were stretched out and lengthened. There followed prolonged disability. Why? Because a group of muscles placed and kept at mechanical disadvantage, had become impotent from desuetude, not (at least in many cases), from permanent paralysis. "There are thousands with crippled, useless hands, who have received neither hope nor help from whomsoever they may have consulted; and yet the majority of such deformities are most amenable to treatment." The great error has lain in mistaking muscles powerless from desuetude for muscles paralyzed from cell destruction.

How is one to distinguish these practically, and thus be able to give a confident prognosis?

"The test is simple. The surgeon asks the patient to move his fingers in the direction of extension. The patient says he cannot. The surgeon then grasps his wrist, and still further forcibly flexes it. The patient is then asked to extend his fingers from their new position. If he succeeds ever so little, a favorable prognosis may be given. Should he fail then treatment is of no avail."

"The treatment is based upon Thomas's theory of muscle shortening, and consists in a recognition of the mechanical principles governing the production of contractures. In the paralytic wrist one group of muscles is lengthened and another is shortened as the result of posture (the weight of the hand in pronation causing wrist-drop); and treatment must be directed to the reversal of these conditions. In other words we must slowly stretch and lengthen the flexors, and place the extensors in such a position that their structural shortening will ensue—give them an opportunity, that is, to take in their slack."

Mr. Jones does not go into the details of methods; but his simple statement that the wrist and fingers must be placed for many months in hyperextension, renders this principle of treatment (which he says has received but scant allegiance), easily comprehensible. The same principle, thus applied to wrist-drop governs the treatment of other deformities. The severity of the contractures and the duration of the disability, do not contra-indicate a favorable prognosis. In two cases, reported briefly, the onset of the paralysis is dated back, in one, 17 years, in the other 20 years; and the disability and contraction were extreme; yet the prognosis was confident and the result brilliant in both.

The author then goes on to resume his experience with tendon-transplantation, gathered from a series of over 50 cases. His "don't's" are especially interesting: "In analyzing my failures I ascribe perhaps the principal share to a want of success in preventing the reinforcing tendon from taking a tortuous route." Another cause of failure lies in "neglecting to completely correct—or better, even over-correct—a deformity before transplantation is performed." Again, "the operation should not be performed with the object of strengthening partially paralyzed muscles or muscles weakened by elongation. In such cases our opportunity comes of testing the value of what I have stated regarding the mechanism of shortened muscles. If any operation be called for, lengthening of the shortened tendons, and shortening of the lengthened ones, are chiefly indicated." Again, "in flail-like joints, tendon-splicing is of no avail, because superincumbent body-weight is

too fatal an antagonist." And the author is convinced that "wherever possible the tendon should be transplanted into periosteum."

He then proceeds to discuss the operation of arthrodesis, the revival and extension of which he had urged as far back as 1894. This operation he advocates strongly in paralytic patients whose joints are either hopelessly flail-like, or sufficiently so as to demand increasing mechanical attention. The advantage to be gained is tersely put: "Arthrodesis aims at transforming a flail limb into a member as rigid as the splint which it is desired to discard." In a large number of these cases the psoas and iliacus are the only muscles of progression left unaffected; and if these are asked to carry a heavy splint as well as the weight of the limb itself, they soon tire, and the patients thus lose the opportunity which presents to attain strength sufficient for progression. The operation consists in peeling the cartilage off the whole joint with a gouge. In the knee, the bone too must be gouged. In a series of 100 cases every wound but three healed *per primam*, and, "contrary to expectation, those cases where trophic changes were most marked healed as readily as those whose nutritive conditions were nearer normal." In the ankle, he has lately practiced removing the upper half of the astragalus together with the internal malleolus, in order that the tibia may fall with greater stability on a good square surface.

The address concludes with a discussion of the cerebral paralysis of the spastic type. The reviewer, however, must refer those interested, to the original, since here the matter is too concentrated for any extract to give it justice. Suffice it to say that Mr. Jones is convinced "that a large proportion of children suffering from severe spastic paralysis may be transformed into useful members of the community, improved both in body and mind by surgical efforts, enabled to walk with comparatively little deformity, and generally only requiring the aid to be derived from one or two sticks." Nevertheless, the necessity of careful selection of cases is imperative, and "operations not followed up by careful and prolonged after-care give rise to disappointment and discredit. Merely dividing tendons, and trusting to massage and electricity, is futile and discouraging."

*Edward Archibald.*



# Gynaecology.

UNDER THE CHARGE OF WILLIAM GARDNER.

## Uterine Displacements.

DAVENTPORT, F. H. "Retro-displacements of the Uterus. Non-Operative Treatment." *American Gynecology*, July, 1902.

The treatment of this condition by means of pessaries is the only method which can be advocated, but others must receive some consideration. For instance, massage has many advocates but its methods are difficult to learn, the results are uncertain and slow and the prolonged manipulation of the parts is extremely objectionable. Again when retroversion accompanies neurasthenia some say that nerve tonics will relieve the condition, but other than a symptomatic cure is impossible of attainment by this means. The permanent effect of electricity is doubtful.

As surgical technique advanced pessaries were employed less, although twenty-five years ago they were the only method used. This neglect of the pessary has gone too far, as this instrument undoubtedly has its uses in properly selected cases. The pessary is indicated where,

1st. The retroverted uterus is the sole pathological factor; where the organ is not enlarged or prolapsed.

2nd. Where retroversion follows each labour and retards recovery.

3rd. Where the faulty position is the result, not the cause, of a general break-down in health.

## The Alexander Operation.

CLEVELAND CLEMENT. "The Alexander Operation," *American Gynecology*, July, 1902.

In properly selected cases, this is the operation for retro-displacements of the uterus and even anterior displacements of this organ will often be benefitted by it. The process of selection, however, should be carried out with the greatest care and the operation ought only to be advised in patients where the uterus is perfectly mobile and can be replaced and retained in place by a pessary. Indeed, it is well not to perform the Alexander Operation until the uterus has been replaced and the patient worn a pessary with comfort for some time. Even after operation this instrument should be used for several months.

## The Advantages, Disadvantages and Results of Suspension of the Uterus.

ROBB, HUNTER, M.D. "The Advantages, Disadvantages and Results of Suspension of the Uterus." *American Gynecology*, August, 1902.

The term "suspension of the uterus" does not include any operation by which the uterus is fixed to the anterior abdominal wall, but means the method of holding the uterus forward in mobile equilibrium by intra-abdominal pressure and a false ligament. It may be done where,

- 1st, the uterus is displaced and causes symptoms without the presence of any complications;

- 2nd, where the displacement is the chief cause of symptoms, although complications are present, and

- 3rd, where other conditions call for an abdominal section and the suspension is simply a supplementary measure.

The review of over two hundred cases of this operation shows it to be the best method which we at present possess of dealing with obstinate displacements.

### Heart Disease and Fibroids.

DORAN, ALBAN. "Fibroids, Heart Disease, Syncope and Pulse." *Journ. of Obstet. & Gynecol. of the British Empire*, Jan., 1903.

Wilson of Birmingham noted three cases of heart disease accompanying uterine fibroids and quoted Spiegelberg & Money as having observed a special form of enlargement of the heart in cases of pregnancy. Here the size of the heart diminished after labour, but as the pelvic disease steadily increases rather than diminishes, cardiac disease tends to become serious when complicating fibroids of the uterus. One of Wilson's patients having died from perforation of a duodenal ulcer, the heart was found to be dilated as a result of hypertrophy with fatty and fibroid degeneration. He goes on to show that venous thrombosis is especially liable to occur where fibroids and heart disease are synchronous, in which case also the administration of ergot is inadvisable.

Sudden deaths after the removal of large fibroids have frequently been traced to cardiac disease, but many such fatalities are rather due to the relief of intra-abdominal pressure by removal of the large mass than to an actual diseased condition of the heart. To counteract heart failure in these cases sparteine or strychnine may be used with benefit, especially the former.

Haemorrhage is not necessary in order to have circulatory disturbances. One patient was seen who had a large fibroid and whose monthly periods lasted for a week, but were not excessive, although she

had suffered from frequent fainting attacks during the two years previous to operation; these attacks fail to return after the removal of the fibroid as well as both ovaries.

One may conclude that operation is not contraindicated by syncopal attacks or irregular pulse. Where there is no failure of compensation, common valvular diseases of the heart do not militate against myomectomy or hysterectomy but may be rather benefitted than otherwise by the operation. But the presence of chronic Bright's disease with a dilated heart greatly increases the gravity of any extensive surgical interference.

#### **A Case of Transplanted Uterine Fibroid giving rise to Intestinal Obstruction.**

PATON, E. P. "A Case of Transplanted Uterine Fibroid Giving Rise to Intestinal Obstruction." *British Medical Journal*, Jan. 17th, 1903.

The patient was a single woman, 48 years of age. Two weeks before admission to hospital she was seized with abdominal pain, vomiting and constipation. Purgatives were given but with a negative result and four days later the vomited material became faecal in character. This vomiting continued, the abdominal distension increased and the patient showed signs of collapse. She had suffered from myxœdema for four years, for which she had taken thyroid extract. In October, 1901, she had an attack similar to the present, but not so severe. Since then her health had been poor and she had lost some strength. There was no history of uterine disease.

When first seen she had the usual signs and symptoms of acute intestinal obstruction, but the abdomen, although distended, was not very tense. On the right side was a tumour which extended from the groin almost up to the umbilicus. It was oval, hard, mobile and gave no evidence of pelvic attachment. Rectal examination revealed the presence of several small fibroids in the uterus but no connection between that organ and the tumor could be discovered. On opening the abdomen the tumor was found to be too densely adherent to the coils of the small intestine to be removed. The patient died a few hours later and at the necropsy the tumor was seen to be a fibroid of the uterus. The tumor had originally been attached to the posterior surface of the uterus by a thin pedicle which had ruptured, allowing the mass freedom to become attached to the coils of the bowel.

#### **Urinary Function and Ovarian Tumour.**

PITTS, BERNARD. "Suppression of Urine in a Case of Ovarian Tumor." *British Medical Journal*, Jan. 17th, 1903.

Three years before Mr. Pitts saw this patient she first noticed the

presence of a tumor in the abdomen. When she presented herself finally for examination she was found to be pregnant and was suffering from a hard fluctuating ovarian tumor. The urine had become albuminous and so scanty that but one ounce was secreted in the twenty-four hours. Uræmic symptoms supervened and complete anuria for sixteen hours followed. On removal of a large multilocular cyst of the ovary, the greater part of which was solid, a free secretion of urine together with complete recovery took place.

*F. A. L. Lockhart.*

# Ophthalmology.

UNDER THE CHARGE OF FRANK BULLER

## Toxic Amblyopia.

F. SCHIECK. "Toxic Amblyopia." *Graefe's Archiv. Band. LIV., Heft. 3, 1902.*

Schieck publishes the results of his clinical and pathological investigations in a case of recent toxic amblyopia. He found active connective tissue proliferation, new septa sprouting from the preexisting septa of the optic nerve, dividing the funiculi up into smaller bundles, but nowhere compressing the nerve fibres, as they merely projected into spaces left by degenerated nerve fibres. In these septa numerous vessels developed. The walls of the original vessels as well as many of these branches were markedly atheromatous and in many cases the lumen was obliterated. In the macula fibre bundles, were many spaces and clefts left by degenerated fibres. Schieck considers the vascular changes to be the primary cause of the disease, these changes being due to toxic action of the alcohol or tobacco. With the blocking of the vessels the nutritive supply is shut off and degeneration of the nerve fibres ensues.

The macula bundle shortly after its entry at the optic disc runs through the centre of the nerve, a most unfavourable position from a nutritive standpoint, for whereas the peripheral fibres of the nerve are next the intervaginal space, they are bathed by the lymph in this space and can hence resist the diminution of the vascular supply, while the more centrally placed fibres soon degenerate. The new vessel formation in the septa is simply a collateral circulation, the connective tissue being its carrier, bringing blood to the assistance of the degenerating fibres. If the toxic cause is withdrawn regeneration or recovery of function may occur, but if the alcohol or tobacco is persisted in, these vessels degenerate, and atrophy of the nerve fibres ensues. The existence of the central scotoma can thus be readily explained.

## Infection from the Conjunctival Sac.

ROEMER. *Transactions of the Hessian Society of Natural Science and Medicine, Vol. 31, 1902.*

Roemer's experiments are worthy of note. He shows that in animals whose lachrymal ducts have been ligated or destroyed, the

intact conjunctiva is impermeable for pyogenic organisms. Only when germs enter the nose does infection occur. Experiments with anthrax, septicæmia of mice, chicken cholera, Fränkel and Weichselbaum's diplococci proved, that with patent tear ducts, the conjunctival sac forms an extraordinarily favourable entrance for micro-organisms into the lymphatics. This mode of infection merits attention in the genesis of cerebro-spinal meningitis.

### Dionin.

DARIER. *La Clinique Ophthalmologique*, Jan. 10, 1902.

TERSON. *Ibid.*, May, 1902.

WINJENROTH. *Ibid.*, June 25, 1902.

LUNIEWSKI. *Die Heilkunde*, 1902.

GOTTSCHALK. *Wochenschrift f. Therapie und Hygiene des Auges*. No. 48, 1902.

F. R. VON ARLT. *Ibid.*, No. 35, 1902.

A good deal of attention has been drawn to the therapeutic action of dionin in ocular lesions during the past year. It is a derivative of morphine acting both centrally and locally. Introduced subconjunctivally it acts as a sedative through the periocular lymph spaces, this effect not being produced by its absorption elsewhere.

Locally in the eye it is an antiseptic, analgesic and lymphagogue. To the derivative action as a lymphagogue, is due its power upon inflammatory conditions, and in hastening the absorption of the post-inflammatory debris of cataract. Darier employs dionin to allay pain where local anæsthetics fail, also to hasten absorption of pupillary exudates and to favour mydriasis. The strength of the solution used is two per cent.

Terson employs it in temporal injections to allay pain in ocular affections. One centigram of a one-half to one per cent. solution is sufficient. The analgesic action is more lasting than that of morphine, and is not accompanied by the unpleasant effects of the morphine.

Wingenroth reports favourably on the antiseptic action of dionin in a case of conjunctival blenorrhœa. He instilled a solution of one part of cyanide of mercury and twenty parts of dionin to a thousand parts of water, six times daily, producing a cure in three days. The blenorrhœa was due to a mixed infection of staphylococci, streptococci and pneumococci, and other methods of treatment had failed.

Luniewski considers dionin as indicated when it is desired to bring about a quick absorption of inflammatory products or serous exudates, and also when prolonged anæsthesia of the eye is desired. It is contra-

indicated in old people with arterio-sclerosis. It has a very favourable action in detached retina due to serous effusion.

Gottschalk reports favourably on its action in retrobulbar neuritis, considering the results as due to the stimulation of the lymph circulation. The dionin was employed as an instillation of two per cent. strength.

Von Arlt employed dionin in pannus scars after trachoma, applying it twice weekly, five milligrams of the drug being put into the lower conjunctival sac and gentle massage kept up for several minutes. There was very marked success in two cases.

### Absence of the Visual System in an Adult.

W. G. SPILLER. "Absence of the Visual System in an Adult." *Brain*. 1902, page 631.

The patient was a helpless idiot regarded as a case of cerebral spastic paraplegia of the lower limbs with absence of the eyeballs. The palpebral fissures were very small and the orbits contained only a small amount of fibrous tissue. The optic foramina were nonexistent, merely slight depressions occupying their site in the skull. There was no sign of optic nerves, chiasm or tracts, nor was there any external geniculate body on either side. The thalamus had nothing resembling an optic tract passing from it, and the posterior part of each thalamus was rounded and larger possibly than one would expect to find in such a case of agenesis of the visual system.

The following are Spiller's conclusions:—

- (1) The chief primary optic centre is in the external geniculate body.
- (2) The prelocinas is also an important primary optic centre.
- (3) The anterior canaliculus of the quadrigeminal body in man bears an important relation to vision.
- (4) The subthalamic body, the habendula and the geniculate body are probably not part of the visual system.
- (5) The cortex of the calcarine fissure may contain nearly the normal number of cell bodies, even though the visual system be absent.
- (6) The nerves of the ocular muscles and their nuclei may be developed, even though the visual system may be absent.
- (7) Congenital spastic paraplegia may be the result of deficient formation as regards number or size of the neurones of the central motor system, even though such a deficiency may be difficult to detect with the microscope.

J. W. Stirling.

# Society Proceedings.

## MONTREAL MEDICO-CHIRURGICAL SOCIETY.

*Stated Meeting, February 20, 1903.*

H. S. BIRKETT, M.D., PRESIDENT, IN THE CHAIR.

### **A Case of Hour Glass Contraction of the Stomach.**

DR. J. M. ELDER reported this case, which he considered of more than usual interest, on account of his having been able to make a diagnosis before operation. Twelve years previously, he had treated the same patient for severe gastric hemorrhage from ulceration of the stomach. Five years later an attack of indigestion was relieved by lavage with the stomach tube, and the patient continued to make use of daily lavage passing the tube herself for a year. From that time she had no symptoms until two months before her entrance into hospital she began to occasionally notice a swelling on the left side of the upper part of the abdomen under the left rectus muscle and when the swelling appeared there was always great pain. Three weeks previous to admission, after a hard day's work, she was seized with severe pain in the region of the stomach and vomited, and from that time until admission to hospital she could take nothing but milk and soda water without vomiting. On examination after one of these attacks of pain the abdomen was found tympanitic, but there was nothing to indicate inflammation. The case was watched for a week, the swelling appearing and disappearing. There was considerable emaciation, weight  $90\frac{1}{2}$  pounds. The diagnosis had been indicated by experience with a previous case in which there was a similar history and operation had shown instead of the expected cancer an hour glass stomach. Then on passing a stomach tube and dilating the organ with air, it was seen to assume a U shape.

The operation had disclosed a cicatricial contraction dividing the stomach, the pyloric being the larger end. At the upper end of the scar tissue was a mass of tissue just above the lesser omentum and feeling like a hardened gland. Pathological report on a small piece of this excised proved it to be fibrosed pancreas. The old ulcer had been on the posterior wall of the stomach and as it cicatrized, it had involved a portion of the pancreas as well. The pyloric orifice was found normal and several long adhesive bands between the stomach



and liver were divided. The stomach itself appeared healthy. A gastroplasty was performed and the wound closed by Lembert sutures. The after treatment gave little trouble, first rectal and then mouth feeding on the third day. She left the hospital on the 22nd day after her admission, having gained  $9\frac{1}{2}$  pounds since the operation. Seen again on February 5th, she was found well nourished and weighing 110 pounds.

DR. ARMSTRONG considered this a very satisfactory field of surgery, but doubtful if the diagnosis could always be made from the symptoms named by Dr. Elder. In the absence of a mass, one would merely be able to diagnose an obstructive condition with dilatation, which might be due to many things. The method of operation pursued by Dr. Elder was the most simple and satisfactory in his case, but he fancied that adhesions might prevent its adoption in others.

#### **Some Complications of Mitral Stenosis.**

DR. FINLEY reported two cases, the full report of which is published at page 276.

DR. HAMILTON said that Dr. Finley's two cases suggested two ways in which embolism or blocking of an artery might occur. He would like to know his views concerning the occurrence of the infarct in the lung and how one could contrast these two, in the tibial and pulmonary arteries, also what kind of fluid was withdrawn from the pleural cavity. It was stated on the highest authority that the character of the sputum in these cases was characteristic, that it differed altogether from pneumonic sputum, in that it was black.

DR. FINLEY, in reply, said that there seemed to be a divergence of opinion about the origin of pulmonary infarcts, but one was that they really were emboli of the lung and the embolus was derived from a plug of fibrin carried from the right heart. He had not seen the sputum in the early stages, but the patient had stated that she spat up blood, and when she came into hospital she spat a good deal of mucus tinged with bright blood. The fluid withdrawn from the pleura was clear and on centrifugisation a few cells were obtained, which proved on staining to be chiefly polynuclear leucocytes.

#### **Exogenous Ulceration of the Intestines.**

DR. ADAMI read a paper with the above title.

DR. ARMSTRONG was much interested in the paper, which must throw a good deal of light on such conditions. He had been trying to recall similar cases, but had been unable to do so. He knew one medical man who had passed faeces and gas through the urethra, and there was Flint's case of a soldier who went through the American war dis-

charging faeces and gas through the urethra and at the autopsy the appendix was found attached to the bladder.

DR. LAPTHORN SMITH said that in pelvic surgery there were many cases in which a pus tube ulcerated through into the bowel or bladder and that might perhaps be classed as exogenous ulceration.

#### **Relative Aortic Incompetency.**

DR. W. F. HAMILTON and DR. J. R. BYERS communicated this paper.

DR. ADAMI said that in the first case alluded to by Dr. Hamilton, there was a point which he had not pointed out, namely, the comparison between the size of the pulmonary and aortic rings. While the pulmonary was of normal size, the aortic was very large and gave a good idea of the conditions which led to incompetence of the valve, by stretching of the orifice. He would like to ask whether, in the second case, there was distinct evidence of giving way of the upper part of the ventricle through softening.

DR. HAMILTON, in reply, stated that there was no positive evidence of giving way of that portion of the auriculo-ventricular ring, or of the muscle which encircled the lower first portion of the aorta and went over the auricle into the ventricle, as MacCallum had pointed out. His conclusions had been rather by inference than observation. The heart was exceedingly flabby, light coloured and fatty, and he had concluded that it was muscular rather than vascular dilatation.

H. S. BIRKETT, M.D., PRESIDENT, IN THE CHAIR.

*Stated Meeting, March 6, 1903.*

Drs. W. C. Mills and Philip Burnett of Montreal were elected Resident Members of the Society.

#### **Tumour of the Cerebellum.**

DR. D. A. SHIRRES exhibited this specimen, the brain of a child six years of age, who had been brought to Dr. Evans in November last, with a complaint of gastric disturbance and more or less constant vomiting. There had been no evidence of a cerebral condition, except that the patient on walking, exhibited a tendency to limp. Dr. Fry on examination found a marked neuritis in the eyes, and the patient was then seen by the speaker, who made out the following condition on examination. There was distinct weakness of the left side, with increased knee jerks, ankle clonus, Babinski's sign, etc., and he had diagnosed probable cerebral tumour. The paralysis had been of very little extent, the boy had been out of condition for more than a month. Dr. Shirres had recommended a surgical operation to relieve the symp-

toms of pressure, but it had not been allowed. After treatment with iodides, there had been some improvement until one week before, when the child had complained of considerable headache and slight difficulty in swallowing and died that night. During the last few hours there had been the characteristic cerebro-cephalic cry.

At the autopsy two distinct cerebellar tumours, probably tuberculous, had been found.

DR. EVANS had first seen the patient when he had walked into his office one evening with his father, and he had been struck with the peculiar gait, a sort of swinging of the right foot. There was a history of measles in June or July, and failing health in the latter part of October, with vomiting and headache. On making an examination he had found the condition as already reported by Dr. Shirres.

DR. SHIRRES stated that recently Dr. C. K. Mills, Peterson, and quite a number of observers had recommended that in these cases of supposed malignant growths in the cerebrum or cerebellum, trephining should be undertaken with the hope of saving the eyes and quite a number of such cases had been reported where the growth itself had become quiescent, not only in tuberculosis and syphilis, but even in malignant disease.

#### **Brief Notes on Cases of Ear Disease.**

DR. MATHEWSON furnished brief reports of the following cases:—Aphonia, due to ‘foreign body’ in the External Ausirory Meatus,” “Keratosi Obturans,” “Aspergillus Nigricans” and “Tinnitus, due to ingrowing hair touching tympanic membrane.” See page 280.

DR. GORDON BYERS stated that cases of keratosis obturans had been extremely common in the Royal Victoria Hospital Clinic during the past year, no less than six or eight having been seen. He had seen a case of tinnitus, due to ingrowing hair within a couple of weeks.

DR. H. S. BIRKETT thought a good deal of interest in the case of aphonia, was lost by the want of a report on the pharyngeal condition. Purely functional cases, with more or less alteration in the voice, were often met with, and it would have been better here to have tried the effect of irritation of the pharynx, so as to test whether the removal of the foreign body and alteration of the voice were dependant upon one another, or merely a coincidence. He also asked if the aspergillus growth had recurred.

DR. MILLS considered that the fact that the path of the reflex was not determinable in the last case referred to by Dr. Birkett, was no evidence of its not being a reflex condition.

DR. MATHEWSON, in reply, stated that there had been no recurrence

of the growth. With regard to the neurosis theory of the case of aphonia, the patient was a young working man, nineteen years of age, and not the kind of man that one would expect to have hysteria, and the relief had been immediate. He had not told the man anything about the condition present in the ear.

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*Stated Meeting, March 20, 1903.*

H. S. BIRKETT, M.D., PRESIDENT, IN THE CHAIR.

**Two Cases of Myelo-Sarcoma of the Long Bones.**

DR. JAMES BELL reported these cases, the first a growth occurring in the upper end of the humerus in a young man aged 26, admitted to the Royal Victoria Hospital in December, 1902. He was a tall, healthy looking man, with an excellent family and personal history. In June, he had noticed pain in the left shoulder joint, and in September enlargement. On the night of December 14th, while assisting a lady to mount the steps of a car, he felt something give way in his arm and the following morning had consulted the speaker. On examination there was a possible exostosis and the skiagraph did not make the diagnosis any clearer, showing only a prominence of a growth posteriorly and anteriorly. The arm was amputated at the shoulder on December 20th and the patient discharged well on January 5th.

The other case was a young woman aged 24 years, admitted to the hospital on February 20, 1903. A year before she had noticed some lameness and soreness about the right knee, but there had been little trouble until June, when the soreness returned and the joint became swollen. In November, she fell and injured the knee and had not been able to walk since. Incision had been advised, as tuberculosis was expected, but on getting out of bed in order to have the joint skiagraphed she felt something give way and the skiagraph showed spontaneous fracture just above the condyles. The occurrence of this spontaneous fracture made the diagnosis clear and the limb was amputated. She made an uninterrupted recovery and was discharged on the 17th of March, perfectly well.

DR. KEENAN reported upon the pathological conditions found.

**A Case of Acromegaly.**

DR. R. A. KERRY gave the report of this case, which will be published in full later.

**Some Pathological Eye Conditions.**

DR. J. W. STIRLING presented some interesting pathological conditions of the eye, mounted in the usual way in gelatine.

The first two were cases of sarcoma of the uveal tract, occurring in the two typical positions, one in the choroid, external to the optic nerve entrance, and the other in the ciliary body. In the latter, which had been done four years before, symptoms had been present for five months, vision was considerably reduced and could see small black fungating points. There had been no metastatic growths and were not likely to be, as they were rare with this form of growth.

The next specimen was a coloboma of the choroid, ciliary body and iris in the right eye, a congenital condition which occurs at the site of the foetal cleft, another a specimen of detached retina which showed the detachment well, the pigmented layer lying behind the exudation. An atrophied eye which had been lost many years before and showing an ossified mass in the centre was also exhibited.

DR. BYERS said it was a great pity that such beautiful specimens as these would not keep permanently when mounted in this medium. The gelatine in time was liable to melt and completely destroy the specimen. The speaker had lately been trying a method of adding one part in thirty of formalin to the gelatine, which it was claimed so altered it, that even the heat of a Bunsen burner would not melt it.

One statement made by Dr. Stirling he thought might be challenged, both Lawford, Collins and Marshall all had found that recurrences were liable to take place as late as six or seven years after sarcoma, and in one instance thirteen years after.

#### **Intestinal Obstruction caused by an Enterolith.**

DR. F. J. SHEPHERD reported this case. See page 265.

DR. JAMES BELL recalled the case of a stone at present in the Museum at McGill University exhibited before this Society some years ago. A woman 58 years of age had symptoms of obstruction for which operation was advised, but refused, and six or seven days later the stone was passed. It was thought to be a gall stone. The interesting feature about the case was that there was no previous history of biliary colic.

DR. ARMSTRONG said that sometimes a small stone produced complete obstruction and very large ones passed externally. He did not think it was safe to wait for such stones to pass, and cited a case in which an enterolith had ulcerated through into the abdominal cavity.

DR. ADAMI said that anyone who did a large number of autopsies was struck by the variation in the diameter of the intestines.

#### **Unruptured Early Tubal Pregnancy,**

DR. CHIPMAN reported this case.

DR. LAPHORN SMITH had shown a case five years before which had

not been ruptured, but hæmorrhage had taken place and turned the tube into a fusiform body about the size of the middle finger. He discussed the theories as to the causation of the condition and criticized Dr. Chipman for not removing the other tube, remarking that he would probably have to do so later for another tubal gestation.

DR. EVANS said that Dr. Smith had made the same prophecy with regard to a case shown by Dr. Springle, but that the patient had since been delivered of two healthy children.

DR. ARMSTRONG also related a case in which a woman after having one tube removed for this cause had since given birth to two healthy children with normal gestation and normal confinements.

DR. W. GARDNER pointed out the advance that had been made in the matter of diagnosis in ectopic gestation by comparing the diagnosis here, before rupture, with Tait's statement at the Brighton meeting of the British Medical Association in 1896, that a diagnosis was impossible before rupture. Dr. Gardner also brought to mind the fact that in many of these cases rupture took place and the ovum escaped into the peritoneum.

DR. LOCKHART thought the principal point from a practical standpoint was the question of diagnosis previous to rupture. He related the particulars of a case of his own.

DR. MILLS showed a dog which he had brought before the Society one year ago, having nine months previously had a portion of a lobe of the brain removed, at that time the dog had completely recovered with the exception of a slight ataxic gait as was shown on walking, by the high stepping of the front limbs, etc. This improved altogether and on Jan. 6th, the dog had puppies and the result has been to bring on partially a return of the ataxic condition, similar to that shown before the Society one year ago, though already some signs of improvement were evident.

The other dog was one in which there was transverse section of the spinal cord. On holding it up one notices the pendulum-like motion of the hind legs, a contracting in and out of first one limb and then the other in regular time. Immediately after section the superficial reflexes were completely abolished, but are now returning, even after the first day the superficial reflexes in the tail were fairly active. The muscles are atrophied at present and the knee jerks are not so much accelerated, but even now they are readily elicited.

Dr. Gordon demonstrated the reaction of the reflexes.

DR. SHIRRES: In starting his paper Dr. Mills remarked that the knee jerk was not a true reflex. I do not think any text-book on diseases of the nervous system holds the opinion that the knee jerk in

man is a true reflex. Late editions of text-books of any importance, such as Church & Peterson, Oppenheim, Gowers and Osler, state that complete division or transverse section of the spinal cord, say in the lower part of the dorsal region, is followed by complete and permanent loss of the reflexes with flaccidity, spastic condition of the limbs never appearing.

Within the last three or four years two cases have come to my hand in the Pathological laboratory, of patients who had been suffering from what was supposed to be complete transverse myelitis of the lower dorsal region. Clinically the following conditions were present:—Complete motor and sensory paralysis of the lower extremities, and also of the bladder and rectum, reflexes, knee jerk, increased ankle clonus and spastic conditions being well pronounced. At autopsy, held a few hours after death, the cord in both cases was seen, in the region of the lower dorsal, to be swollen, the pia mater red and vascular and the consistency of the cord substance was greatly diminished, the inflammation being so great that the affected part was diffuent like cream. I think most pathologists, without a microscopical examination would have stated that there was complete destruction of the cord substance on account of the softened, diffuent state present at the autopsy. I carefully and rapidly hardened the cord, handling it as little as possible, and upon examination with the more recent stains I was able to make out clearly a few fibres which were healthy and apparently unaffected in the centre of the affected region, their presence being quite sufficient to explain the cause of the exaggerated reflexes and spastic conditions of the lower limbs in the two cases. There are, no doubt, cases frequently recorded in our journals of complete destruction of the cord at a certain segment in the dorsal region where the reflexes and spastic condition were present during life, and I am inclined to think that in those cases the macroscopical examination was all that was made and depended upon, but when a microscope was used and stains applied, they were not of the most recent and valuable order (Weigert, Pal Weigert and their modifications), and for those reasons may, I think, account in part for the variability of symptoms described by different observers in transverse lesion of the cord.

Three weeks ago I examined the cord of a live patient in the General Hospital who was suffering from complete transverse division of the lower dorsal region, the result of an accident which occurred some 13 months ago. At that time when brought into hospital, he had complete loss of the reflexes, also motor and sensory paralysis of the lower extremities, as well as paralysis of the bladder and rectum. He was operated upon shortly after by Dr. Armstrong and there was found

to be a complete transverse division of the cord, a separation of about  $1\frac{1}{2}$  inches existing between the two ends was to be made out. At the end of the year there had been no return of the reflexes or of motor or sensory power, or of spasticity. Faradic irritability of the muscles of the lower extremities was hard or impossible to obtain on account of the œdema present. Three weeks ago, while the patient was under an anæsthetic for another operation to be performed by Dr. Armstrong, I applied a mild current to the anterior roots of the cord below the lesion (lower segment) and got at once a contraction of different muscles in the legs. I then applied the electrodes to the posterior roots and again elicited distinct contractions, and in that way was able to demonstrate the exact segments corresponding to certain muscles that contracted. This also proved that in this case the lower motor and sensory neurones below the lesion were still healthy 13 months after the date of the accident, although faradic irritability was unable to be obtained in the lower limbs on account of the œdema, and also that the abolition of the knee jerk was not due to destruction of any of the motor neurones below the lesion, the result of accident, which is often described as present by believers who hold that the reflexes are increased in transverse lesion, and if they are not so it is due to hæmorrhage or inflammation of the motor neurones below the seat of division at or soon after time of accident.

Professor Ferrier two years ago emphatically stated that one should never compare the monkey or the lower animals in comparison with man, especially with reference to the etiology of the reflexes. In the lower animals and even with the monkeys each segment of the spinal cord is more or less independent and separate units as shown. I think very well by the dog that Prof. Mills has exhibited to us to-night. In man each segment of the spinal cord is dependent upon the other segments and also on the cerebrum before any true reflexes can take place.

Dr. Mills stated that there was some doubt as to the presence of a distinct tract coming from the cerebellum to the spinal cord. This is new to me, as I understood that there were well-known and distinct tracts traceable from the cerebellum to the cord by way either of the inferior or superior cerebellar penduncles— one called after Beale, described by L. K. Barker in his book of anatomy and physiology and one after Marchi and Ferrier, the descending cerebellar tracts. I had a case of my own where there was a marked atrophy of the right cerebellum, with a distinct atrophy and sclerosis in the cord in the situation described by Beale for his cerebellar descending tract.



DR. GILDAY: I had a child of 5 with Pott's disease of the 4th dorsal, who had paraplegia for a year or two and within the last six months there has been a return of power to the legs, could flex and extend them; there was absence of reflex, sensation present, but had an ataxic walk. This condition has been present for some time and there has been very slight improvement and a marked kyphosis about the 4th dorsal vertebra. The child is in good condition, but has this absence of knee reflexes and the ataxic condition.

DR. MILLS: I think you will find that the great difference between the clinicians, including the neurologists, and the physiologists, is that the former are in that happy condition in which they are not troubled so much by doubts as the physiologists, a skeptical state of mind is not a happy one, but I cannot help thinking that it conduces to truth. I would be delighted to think that things are so well settled as Dr. Shirres seems to think. The purpose of this communication was to draw the attention of the members towards the subject so that it might be settled. It requires a good many cases to settle a point and I can believe that the reflexes may be lost in 50 human beings and not lost in the 51st. As to that path from the cerebellum, or any path from the cerebellum. I took care to say was "incontrovertibly" established. We know paths towards the cerebellum very well and I think it is very likely that there are paths from the cerebellum, but to say that there have been paths well demonstrated is more than I can say, so that I would suggest that a healthy state of mind is one of enquiry rather than confident belief on the subject.

DR. MILLS: This is an extremely interesting paper because it is just what occurs normally in nature, that is, all animals do not get old in all their parts equally, or as Foster said, death is with the animal not a gradual or harmonious decay, but like the breaking down of an axle of a vehicle and it seems that the parts which break down are those which are last built up. Speaking for the physiologists who are not here, Sherrington and Greenbaum, I think Dr. Shirres has credited them with more than they would claim, namely, of applying their experiments to the human being. The results of Sherrington and Greenbaum's experiments applied to man, may seem to imply that such experiments are not perhaps exactly reliable, I would, therefore, remind you that these experiments were done on apes and those two authorities have enormous experience and I must say that I have implicit confidence in these experiments by which he seems to establish that the motor areas are in the prefrontal region and not the sulcus, and I do not see exactly that even Dr. Shirres's case, goes against that. With regard to the so-called knee reflexes, the theory was established by

physiologists and not by neurologists, and so far as I can see it never could have been established, except by actual physiological experiments with measurements.

DR. SHIRRES: I think the knee jerk was first systematically studied by Erb and Westphal, and was called by them the knee phenomenon. I still adhere to my opinion with the neurologists of to-day, Gowers, Church, Bastian, Osler and others, who state that with transverse section of the cord, there is absolute and permanent abolition of the reflexes without flaccidity.

Concerning Sherrington and Grunbaum's experiments on the monkey and ape, I must have been misunderstood, if I inferred that the motor centres as shown by them to be situated in the pre-frontal convolution could not be relied upon if applied to man, for in my case of amaurotic family idiocy where the upper motor neurones were completely degenerated, marked atrophy of the post-central convolutions was present, but little change in the pre-frontal. That points fairly strongly to the old idea that the motor centres are situated in the post-central convolution.

THE

# Montreal Medical Journal.

*A Monthly Record of the Progress of Medical and Surgical Science.*

EDITED BY

JAMES STEWART,  
A. D. BLACKADER,  
G. GORDON CAMPBELL,  
FRANK BULLER,  
H. A. LAFLEUR,

GEO. E. ARMSTRONG,  
J. GEORGE ADAMI,  
WILLIAM GARDNER,  
F. G. FINLEY,  
F. J. SHEPHERD,

WITH THE COLLABORATION OF

C. F. MARTIN,  
J. M. ELDER,  
D. J. EVANS,  
A. E. GARROW.  
T. J. W. BURGESS,

J. W. STIRLING,  
F. A. L. LOCKHART,  
W. F. HAMILTON,  
E. J. SEMPLE,  
H. S. BIRKETT,

KENNETH CAMERON,  
C. W. WILSON.  
A. G. NICHOLLS,  
W. W. CHIPMAN:

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## ADMISSION TO PRACTICE BY GRACE OF LEGISLATURE.

The President and Council of the College of Physicians and Surgeons of Quebec possess the respect and confidence of the medical profession of the Province to a degree unequalled for many long years. It is felt that the Executive is truly representative and that it has the best interests of the profession at heart. Indeed, as at present situated, it may freely be said that the profession would be glad to see it endowed with yet further powers. As a matter of fact, however, we find ourselves in face of a subtle movement on the part of the Legislature to take from it or to nullify the powers already granted to it. By its Charter it is made the custodian and the guardian of the professional interests of the Province, to it is given the power to determine who is and who is not to be regarded as worthy to receive the license to practise in the Province; it has been accorded the right to determine the curriculum, which all should have undergone prior to obtaining the license in question.

But what regard does the Provincial Legislature pay to these rights conferred upon the college? A given individual has only to be refused

a licence by the college upon any grounds, either his curriculum may have been inadequate or his examination unsatisfactory,—it does not matter what is the cause—and that individual need only have a private act drafted at the cost of some hundred dollars or so,—need only, in addition, obtain the interest of one or two members; it does not matter how he obtains that interest,—whether from previous personal acquaintance, or from absence of previous acquaintance, but the possession of some spare dollars,—and that private act is passed by the Legislature, in spite of the protests of the College of Physicians and Surgeons, indeed, the stronger and more forcible those protests, the greater the likelihood that the private bill will be passed and that one considered incompetent by the elected representatives of the profession is admitted to practise within the limits of the Province.

Such a condition of affairs is intolerable and, unfortunately, complete redress would not seem possible, at least, until that millennium when the people of this Province as a body elect as members of the Provincial Legislature those who, as a body, are worthy of respect and worthy of such responsible positions. Such a millennium seems, if anything, to be coming year by year more distant rather than nearer. The most that we can do is to recognize ourselves how intolerable a condition of affairs this is, and to educate public opinion, in season and out of season, until for very shame our Legislature hesitates to pass bills of this nature.

The Quebec Legislature reminds us of His Grace the Archbishop of Canterbury. From the Middle Ages the distinguished occupants of this position, the Primates of the Church of England, have had the right to confer, at their own will and pleasure, the degree of Doctor in Medicine and, degrees so conferred are registrable. Fortunately, for now many generations, the Archbishops of Canterbury have rarely used their privilege, nor have they employed it in the case of those not already qualified to practise by the possession of other diplomas. How ridiculous it seems that an individual theologian should possess these powers! Yet that theologian is a man of high culture and, as a man, above reproach. But if absurd in his case, is it not yet more absurd that equal powers are, not only possessed, but acted upon without the advice of the profession being sought, by that heterogeneous rabble which constitutes our Provincial Parliament at Quebec?

Let it not, however, be thought that we consider that the blame rests wholly with the Provincial Parliament. We feel convinced that there would not be so many private bills to grant the privilege of practising within the Province, if the regulations of the college were

conceived upon a wiser and a more broad-minded plan. Those regulations are distinctly provincial. Why is it necessary to demand that a medical graduate who desires to practise in this Province should have passed the Provincial Entrance Examination and should have undergone a regulation course of medical instruction within the Province? Let us admit that it is to the advantage of our Provincial Schools that students be incited to undergo a course of medical instruction in this Province (which is not the same thing as admitting that it is always to the advantage of the student), it nevertheless seems to us possible to arrange so that those obviously of good standing, but who have not fulfilled the regulations, be recognized by the college and permitted to practise in the Province without going before the Legislative body at Quebec. A special committee to determine the merits of each individual case and to recommend those found fit to be admitted to the final examination, would accomplish all that is necessary. Let the College, that is, admit obviously good, well trained men to practise in the Province without interposing excessive conditions. If it does this, then those only will apply for admission by private bill, who are discredited. In this way admission by this portal will come to be regarded as discreditable by all parties concerned and thereby reduced to a minimum.

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#### SIR WILLIAM BANKS.

The Profession in Canada will join that of England in congratulating Sir William Banks upon his election as Consulting Surgeon to the Liverpool Royal Infirmary with charge of ten beds. "This allocation was made," as stated in the British Medical Journal, "in appreciation of the work which he has done for the Institution, and as an indication of the desire of the Governors that his working connexion with the Infirmary should continue."

It is also a handsome compliment from his colleagues on the Medical Board, a fitting tribute to a very successful teacher and public spirited man, whose learning and general spirit have contributed largely to the success of the Royal Infirmary, and to the Medical Faculty of the Liverpool School of Medicine.

The incident is also gratifying as an indication of the good relations which exist between the Committee of the Infirmary and the Medical Staff.

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Dr. G. Gordon Campbell has been appointed Professor of Dermatology in the Medical Department of the University of Vermont at Burlington.

From a number of isolated districts in Nova Scotia a very mild form of small-pox is reported. At Thorburn, near New Glasgow, some thirty cases have developed, all of a very light nature.

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The Samuel D. Gross prize of twelve hundred dollars will be awarded on January 1, 1905. The prize is awarded every five years for the best essay on some subject in Surgical Pathology or Practise, founded on original investigations. The candidates must be American citizens.

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The Council of Physicians and Surgeons of New Brunswick, acting for the New Brunswick Medical Society, has sent to the Provincial Legislature a bill with the object of securing a limit of one year to the time in which an action may be brought for injuries resulting from alleged malpractice.

# Proceedings of the McGill Medical Society of Undergraduates.

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## ARTIFICIAL FEEDING OF CHILDREN.

BY

W. G. CAMPBELL, '03.

INTRODUCTION. The importance of this branch to the medical profession is self-evident. With the advances of civilization, and the increase of population, the number of infants requiring to be fed artificially is rapidly increasing. Among the rich, luxurious habits of life, and among the poor, improper hygienic surroundings, poor food and various moral evils are all contributing to the gradual loss of the function of lactation. And as a result, a sequel, I might say, of the gradually increasing difficulties of pregnancy and parturition, the physiological function of lactation is becoming less and less.

The problem of rectifying this defect must be mastered by the family physician. This is certainly a great barrier, a problem very difficult to solve, but it is surmountable if proper precautions are taken.

This question of rational infant feeding is yet quite in the experimental stage, although very valuable results have been obtained by various investigators.

Prior to 1882 very little attention was directed to this part of the medical man's work. At this date Meigs (Boston), through his study of the composition of human milk, the natural and best food for infants, laid the foundation for the rational feeding of the new-born.

In 1890 Dr. Rotch (Boston), who had worked very extensively on the subject, simplified and perfected the problem so that it was now possible to write a prescription for a definite food composition, to be put up in a laboratory, the same as any physician would give a prescription to a patient to be filled by an apothecary.

In this paper, my remarks will be confined to what I wish to call infancy proper. This comprises the first thirty months of life or ends with the completion of primary dentition, and for convenience of description and plainness, I shall divide the period into two divisions, namely, the first nutritive period comprising the first ten or twelve months, and the second nutritive period, from this age to the end of infancy.

The first is undoubtedly the most difficult, and at the same time the

most important period, during which time the infant thrives best on an appropriate combination of fat, carbohydrate in the form of sugar, proteid, salts and water.

The second period is a transitional one, commencing with the development of the amylolytic function about the eleventh or twelfth month, and ending quite abruptly at the thirtieth month.

With the development of this functional period, the digestion requires to be so regulated that the functions will be utilized, but shall not be over-taxed. Towards the end of the first year the digestive tract should be used for the conversion of amylaceous elements of food into sugar, and by so doing, the infant enters upon the second nutritive period.

Reasons for adopting artificial feeding:—

The first and foremost reason for introducing artificial feeding is to reduce infantile mortality.

The death rate of infants will always be relatively high as compared to that of adults. This is a universal law which always has, and undoubtedly always will exist. To alter such a condition is beyond human power, but much can be accomplished in lessening the causes of this calamity.

The earliest months of life present the greatest difficulties, which gradually become less pronounced with each succeeding week, month and year, until infancy expires.

The child may refuse to take the breast, when suffering from such affections as stomatitis, thrush or the like, or it may suckle with difficulty due to cleft palate, hare-lip, tongue-tie and such causes. There may be dyspnoea, or difficult breathing due to some malformation of the nasal passages, resulting in impeded nursing. The mother's milk may disagree with the infant, causing dyspepsia or diarrhoea, or the quantity of the milk may be sufficient while the quality is deficient.

Persistence or recurrence of colostrum corpuscles, or other abnormal constituents in milk, particularly proteids, due to whatever causes, demands a discontinuance of the use of such nourishment.

Artificial feeding is almost invariably called for in premature infants as they are unable to suckle.

In reference to the mother, many causes necessitate some artificial means of sustaining the child. Certain malformations, retraction, ulceration, fissure, or abscess of the breast or nipple will make weaning imperative. Any infectious malady, or such diseases as syphilis, tuberculosis, cancer and the like demand the discontinuance of breast feeding. Weakness or debility on the mother's part calls for the cessation of lactation.



Weaning of the child is often necessary on the return of menstruation, or of another pregnancy. After a lactation period of nine or ten months the drain on the mother's system is often very marked, and a normal child ought never be suckled past this age, unless during hot weather, and it be the wish of the mother to continue nursing through the summer months.

Lastly, death of the mother will demand that the child be fed artificially.

**Foods:**—All mammalian offspring are carnivora, the human, being no exception, hence the food should essentially be animal and not vegetable in character. The milk of each species is the real physiological food for its progeny.

From preceding paragraphs, the many instances cited requiring artificial feeding, naturally raises the question of what food is to be substituted. Wet nursing might be suggested and at first sight appears to approach Nature's method very closely. But the many disadvantages experienced places this method in a doubtful category. Under certain circumstances mixed feeding may be very satisfactorily carried out. But in a great many cases complete artificial feeding is the only alternative.

The food to be used has now to be determined.

A great number of patent preparations are available, but these are chiefly farinaceous and constitute a foreign body in the infant's stomach. Besides, when used, they are prescribed empirically and this cannot be too strongly condemned. Mare's milk, ass's milk, goat's milk and the like have all been used, chiefly experimentally. Ass's milk has been largely used in Paris, but is now completely discarded. Cow's milk is now the form universally used. It is cheap, easily obtainable, and contains chemically the same constituents as human milk, although their composition varies widely.

Prof. Czerny (Breslau), maintains that none of these other milks possess any intrinsic value which should establish their preference over wholesome cow's milk.

**FOOD MODIFICATION:** Granted that a pure milk supply is obtainable, the problem of modifying this milk to suit the patient, confronts the physician. The object of modification of milk is to alter the constituents so as to imitate as nearly as possible mother's milk, to infringe on Nature's diet, and so adapt the supplemental food to the child. No hard and fast rule can be laid down, but each case must be studied individually. The great difficulty is proteid adaptation. It will be remembered that the proteids of cow's milk are of much higher per-

centage than in mother's milk. The fats and sugar are not so widely divergent, and may quite easily be regulated. But the proteids are what almost invariably give rise to gastric and intestinal disturbances in artificial feeding. Dilution of the milk with water easily reduces the percentage of proteid to correspond with the same constituent in human milk. This, however, only partially solves the problem.

Clinical experience teaches that although the proteids are reduced, perhaps, far below the amount in mother's milk, still there may be trouble with the digestive function.

Chemical analysis shows cow's milk to contain a larger amount of caseinogen than mother's milk, while the lact-albumen is about the same proportion in each.

The result is the formation from the former of very large tough curds, whereas, the proteids from human milk forms small flocculent curds. Consequently, the digestibility of cow's milk is much more difficult, even though the amount of proteids is reduced much below the standard. Added to this there appears to be a different atomic structure of the proteid matter of cow's milk, which the infant stomach is unable to properly and satisfactorily manage.

But, while diluting the milk, say six times, to reduce the proteid to suit the infant's digestion, the sugar and fats have also been proportionately lowered. These may again be raised to any percentage desirable, the sugar by the addition of either cane or milk sugar solution of known strength, and the fats by adding cream of a known richness.

These constituents rarely give rise to gastric disturbances, and if they do, the source of error can be easily rectified.

The fat of cow's milk is in the form of an emulsion quite similar to that of human milk, and although the chemical composition is somewhat different the variation is so slight as to cause no appreciable disturbance. If there is excess of fat, the food will be regurgitated in small quantities an hour or so after taken, or else by increasing peristalsis, frequent loose stools will be passed containing globules or curds of fat. Colic may be evidenced.

Hence, if a child suffers from constipation, increase of fat in the food is indicated, and will immediately relieve the bowels.

On the other hand, fat poverty in the food is evidenced by failure of increase in weight, constipation and emaciation, a very serious condition if allowed to continue.

The foregoing applies only to the addition of cream obtained by the gravity method. Cream obtained by centrifugal processes has the fat emulsion destroyed, the fat cells are broken down so that they now become aggregated into a conglomerate mass, and appear on the surface

as globules of butter. This is non-assimilable to the infant and signs of mal-nutrition are sure to appear.

The question of freshness and purity of centrifugal cream coupled with its uniformity are strongly in favor of its use, it being known that gravity cream, unless special precautions are taken, forms a hot-bed for bacteria.

But if the fat from this cream cannot be assimilated what is to be gained by using it. Whatever form of cream is used it is seldom that the fat of the food should be raised over 4%, although under certain circumstances it may advantageously be increased to 5% or even 6%.

The desired proportion of sugar in the food is obtained by the addition of either milk sugar (lactose), or cane-sugar (saccharose). Many authorities recommend the use of cane sugar only, but by so doing we are adding what is not normally present in the physiological infant food.

Jacobi is a strong advocate of the use of cane sugar for the following reasons:—

(a) Because the composition is known and it cannot be adulterated, whereas milk sugar can.

(b) Commercial milk-sugar is obtained from cow's milk, and this is not indetical with the sugar of mother's milk.

(c) Milk-sugar contains the crystallisable inorganic constituents of the milk from which it is derived.

(d) Milk-sugar is laxative in its action and where purgation is going on there can be practically no absorption.

Czerny and several other pediatricists maintain that sugar of any form is uninjurious, indifferent and produces no symptoms, and recommend the use of saccharine for the new-born babe. But clinical experience proves that excess of sugar in the milk produces eructation of gas from the stomach, regurgitation of food in small quantities, colic may be present, and the stools are thin, green and very acid, often causing severe irritation of the buttocks.

Deficiency of sugar results in the failure of the normal gain of weight and there may be actual loss of flesh. According to the caloric theory sugar is supposed to replace fat, but this is more a laboratory result than a physiological proof. If sugar is to be utilized in replacing fat, it is done so to the detriment of the bowels. It has been proven conclusively that inordinate feeding of sugar, and particularly commercial milk-sugar, produces an excess of lactic acid, thus a detriment to nutrition and a probable factor towards the production of rachitis (since this disease has been attributed to an excess of lactic acid). The

consensus of opinion appears to be that sugar should rarely be less than 5% or exceed 7% of the diet.

What methods are to be adopted to obtain the best results in proteid digestion?

Excess of this ingredient causes frequent regurgitation shortly after feeding, the vomit containing curds of various sizes. The child cries considerably on account of colic pains. Constipation may be present or else there may be short attacks of diarrhoea, the stools containing masses of proteid curds. Imperfect digestion of proteid matter may give rise to the same disturbances and demands just as immediate reduction in the amount of albuminoids in the food.

The practice of peptonising the food has been largely followed, the idea being that the child's stomach will be able to continue the process of digestion and get the benefit of complete assimilation of the proteid matter. This certainly does not resemble mother's milk, which contains no peptone whatever. If this method is utilized at all, it should not be continued over a very long period, else the natural means of digestion will become altered.

Diluting milk with various gruels has been tried with the hope that this would facilitate proteid digestion. But here again foreign material is added to the food and no particularly marked adaptability to assist digestion, and the result has been anything but satisfactory. Pure water dilution gives fairly satisfactory results.

The best results, and they are undoubtedly very gratifying, have been obtained by using whey as the diluent of milk. This does not produce a proportion of casein and soluble albumin exactly similar to that of mother's milk, but is infinitely superior to using any other known diluent; it results in less casein and more soluble albumin, consisting of lactalbumin and lactoglobulin. Whey is a natural sugar of milk solution and hence is a good means of assisting in raising the sugar standard, therefore requiring less of the commercial article.

Apparently the only disadvantage in the use of whey, is that it contains all the mineral constituents of the milk, but since they are to a great extent inert, this one weak point is easily off-set by the counter beneficial results.

At the Montreal Foundling Institute whey has recently been used, and since its adoption very satisfactory results have been obtained, many children having a couple of weeks breast feeding showing practically a continual gain when abruptly changed from natural to artificial feeding, while others, which have never been breast-fed at all show very little loss of weight.

But whatever method of modification is practiced, special care must

be exercised in obtaining a sufficiently weak preparation that the patient's digestive functions may not be deranged.

It is much safer to commence on an insufficient diet and gradually increase the strength up to a point of tolerance, than it is to be forced, from a refractory gastric disturbance, to lessen the strength of the food, perhaps far below what the child ought to manage. The same rule also applies to the amount the child should receive. It is infinitely better for the child to receive a teaspoonful of adapted milk and retain it, than for it to have four or five ounces of perhaps a stronger solution and vomit it.

The quality and quantity of food the child should receive are extremely important matters and many times a person will be provoked by the mother, because she thinks you are giving the infant too little nourishment.

After carefully starting the patient on an adaptable diet, the next problem is to increase the nutriment to the point of tolerance, so as to obtain the limit of success. This requires close observation. The child may not be able to utilise a stronger food, but it may satisfactorily take an increased quantity, while on the other hand the quantity cannot be increased, but the quality may.

Under any condition the increase of either must be very gradual, as the infant's stomach will not tolerate sudden or marked changes in its diet.

The amount of food required by the child should be regulated more by the age than the weight.

Both mothers and physicians are prone to give too large quantities, especially when beginning the artificial feeding. From 500 (20 oz.) to 600 (25 oz.) grammes daily during the first few months is sufficient, if the gain in body weight is normal. Too frequent feeding should also be strongly guarded against. It should be urged upon all mothers and nurses to feed the child at regular stated intervals.

Prof. Czerny maintains that a child should be fed six times in 24 hours during the first week and after that only five times. He says further, that the stomach of a healthy child is usually empty about 1½ hours after feeding and the fact that the child sleeps past this length of time shows:

(a) That the stomach may be empty without causing hunger distress.

(b) That where in cases of disease, digestion is delayed, and hence the next feeding should be delayed, for nature empties the stomach of one meal long before it should receive another.

Excess in the amount of food is evidenced by very much the same.

symptoms, as when the individual constituents are superabundant plus a regurgitation immediately after feeding.

Holt's summary of the indications for milk modification is as follows, namely:—

(1) If the child is not gaining in weight without special signs of indigestion, increase the proportions of all the ingredients.

(2) If habitual colic is present reduce the proteids.

(3) If vomiting occurs soon after feeding reduce the quantity of food given.

(4) Regurgitation of sour masses demands the reduction of fats and perhaps proteids.

(5) For obstinate constipation increase both fats and proteids.

The feeding of premature infants demands even greater caution than when dealing with full term children. The quantity of food is an extremely important question, and distention of the stomach must be avoided, else a fatal result may follow.

The capacity of the premature stomach has been obtained by the same methods as that in the fully developed organ. Investigations show that it is much safer to begin with a very small amount, about 5 c.c. and increase very gradually until the organ is thought to be sufficiently filled. Like all other organs at this time, the stomach is also undeveloped and may be easily over-taxed.

For instance, the capacity of fat digestion at full term may be 3%, whereas in a premature infant, say at seven months, it may be only 1%, or even less.

In this respect clinical experience also teaches, that while mother's milk is nature's food for the child, yet it is wholly unsatisfactory for the premature infant.

The human lacteal glands are practically passive as regards the constituents of the milk and many premature infants perish when put to the breast, on account of the concentrated food. In such instances, properly adapted cow's milk offers the most favorable chances for maintaining the life of the patient in which it may be necessary to commence with a .5% of fat and the other constituents in a similarly low proportion.

**PASTEURIZING AND STERILIZING:** Regarding pasteurizing and sterilizing of milk, a few remarks may be here in order. Any milk containing pathogenic organisms is not a very desirable commodity, but since all commercial milk, unless treated by the above methods, is more or less contaminated, the question to be decided is, shall it be treated, or shall it be allowed to be used in its raw state.

Sterilization coagulates the albumin, alters the fat and so changes

the food that the child cannot digest it. If the milk has been seriously contaminated, not only the bacteria are present, but also their toxins. Sterilization will destroy the organisms, but has no effect whatever on the toxins, hence there are often disastrous results, although sterilization has been properly performed.

Pasteurizing, while it is not such a positive guard against bacteria, is just as much so against their toxins and has the advantage of not markedly altering the constituents or the taste of the milk, and the digestibility is not impeded.

Milk is endowed with antiscrobutic properties, and Marfan claims to have established the presence of zymoses, particularly in human milk. He considers all milk, not as an inert substance, but rather as partaking of the nature of some tissue and certainly containing some special ferment. These properties are all destroyed, by either pasteurization or sterilization.

But notwithstanding all these changes, the advantages obtained by pasteurizing all city milk, especially during the summer months, is quite beyond dispute.

The matter of sterilization is more doubtful, as the changes are so radical that perhaps the end does not justify the means.

The question of the use of preservatives and antiseptics in milk, particularly for infant feeding, cannot be too strongly condemned. If milk was properly cared for, it should scarcely require any of the above mentioned corrections.

The second nutritive period commences with the age for weaning the child, which is between the 9th and 12th month. The amylolytic function has at this age almost reached full development and should be utilised in the conversion of starchy elements of food into sugar. Preparations of oats or barley should be employed to test this function, (oatmeal, gruel and barley broth being added to the milk diet).

The high percentage of sugar used should now be gradually reduced to that normally present in cow's milk, the starchy food becoming a substitute. (Oats possess a higher percentage of starch and fat than does barley).

The assimilation of proteids is also markedly increased and this constituent requires to be raised. Likewise also the fats, which is most easily accomplished by the use of oats. Wheat may be used, but is not so satisfactory as either oats or barley. By this means a new regime is established, the digestive functions of the age are satisfied and abundant nutrition is provided.

From the 12th to the 20 months, the articles of diet may be gradually increased, caution being taken to always keep the patient under close

observation, since some children may be able to digest and assimilate a large proportion of starch, while others may require a larger amount of proteids. Bread in the form of dried crusts should be given daily. A peach or a baked apple may occasionally be added to the fare, but very few other fruits are permissible, as they are unnecessary and are apt to give rise to trouble. Chicken and mutton broths should now be given.

Such articles as cake and candy should be excluded completely, not that an occasional use may in itself do any particular harm, but that it perverts the child's taste from the articles of food necessary for its proper nutrition.

A child that has been breast fed, until it has reached this second period, demands close attention in changing to an artificial diet. This generally requires five or six weeks to accomplish properly. The first week the child may have artificial feeding once a day; the second week a morning and evening feeding; a third week alternately with the breast; the fourth week the breast twice a day; the fifth week only once; and by the sixth week artificial feeding is completely in vogue.

If for any reasons weaning requires to be carried out abruptly, the matter of a proper food is imperative and the rules laid down in preceding paragraphs must be followed.

Infants, under suitable hygienic surroundings, if properly fed, although on an artificial diet, should show and do show good development, firm flesh, average strength, good bony growth, normal dentition, and healthy digestive functions, either at the commencement or the end of this second nutritive period.

**CONCLUSION:** The profession is yet unable to state which is the best modification of milk to be adopted in the manifold instances where artificial feeding is indicated, but it has learned that some such preparation of milk is a valuable adjunct in the case of infants. As in other branches of medicine, each individual under our care requires separate considerations based on the facts of the case. No hard and fast rule can be laid down to be followed explicitly, but rather each patient is a problem by itself.

Some one may argue that milk modification and proper artificial feeding of infants may easily be carried out where one has means and is in touch with a laboratory. I grant you that the uniformity and reliability of laboratory preparations are much to be preferred to home modification, and just as office prescribing of drugs is becoming a practice of the past, so is home modification of milk being replaced by properly equipped institutions, in the larger cities at least. But with an intelligent person, a proper equipment, and a certain amount



of care, there is no reason why, even in the remotest districts, satisfactory results should not be obtained by home modification.

Regarding the matter of expense, always an important consideration, an objection is raised to the extra cost of good milk, so necessary, if the best results are to be obtained, and physicians who demand a cheap milk, do more harm to scientific and adaptable feeding than any other class of citizens. In other branches of medicine expense is not considered if assistance is forthcoming. In diphtheria, who would consider for a moment the withholding of antitoxin, or in appendicitis, if an operation is deemed necessary, the surgeon's fee is not given a second thought. Why then should the helpless infant be improperly nourished during the critical period of its life, at a time when so much depends on its future health and vitality. Charity spends millions of dollars annually on the treatment of diseases. Is it not quite possible, that if a portion of this amount were expended prophylactically in rearing healthy, vigorous children, to obtain much better results?

Improper nourishment during the early years of life leads to poor physique, improper development and a delicate constitution, so that when the child reaches the second critical age, namely, puberty, he may become practically a wreck.

The same child, if the foundation had been properly laid, might have developed a tower of strength, and throughout life enjoyed the most cherished and coveted gift to mankind, namely, a strong, healthy, robust body and a sound mind.