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PREVENTIVE MEDICINE.

GENTLEMEN.—I again desire to express my appreciation of the honor this Society has done me in electing me as its president, and when I realize that I am occupying this same chair which has been occupied by so many distinguished members of our profession, not only am I deeply grateful for this distinction but I feel oppressed with the weight of my responsibility. While I may fall far short of my predecessors in the results which may follow my labors, I will be behind none in my efforts to make the meetings of this season a success. Before I begin my short paper and before beginning this year's work, I think it a fitting time to refer to the great loss this Society has suffered since we last met, in the death of one of our oldest, most distinguished and most beloved members. The death of Dr. J. E. Graham deprived this Society not only of an active and honored member, but its members of a wise counsellor and faithful friend. We will miss him sadly. We mourn with the bereaved family and I would suggest that now as we meet as a Society for the first time, since our great loss, we would pass a resolution expressing our sympathy for Mrs. Graham and her family and have sent to them a copy of the same.

The members of this Society have often had the privilege of listening to many valuable papers dealing with important and difficult subjects and of hearing many interesting discussions, and of seeing cases both medical and surgical exhibiting not only a keenness in diagnosis, but a skill in treatment and a brilliancy of handiwork which have been to its members valuable sources of information, as well as an incentive to better work.

This evening I have ventured to ask your attention for but a short time to a subject, which, considering the great strides made in this department, has not received from us, I venture to think, the thought it deserves. I refer to the subject of "preventive medicine." In the very early times, even so far back as the days of Moses, the laws laid down (though from the lack of scientific knowledge they were necessarily empirical) for the prevention of infection was most complete, in fact,

an English time-table giving statistics in districts apart from London, I quote as follows :

(1)	Where the population to one square mile was 166	the death rate was 16.75
(2)	“ “ “ 379	“ 21.88
(3)	“ “ “ 4,449	“ 28.03
(3)	“ “ “ 65,823	“ 38.62

From a Glasgow table I take the following :

Death rate in 100,000, living in 1 or 2 rooms,	3 and 4 rooms,	4 and 5 rooms.
Zymotic disease	478	246
Acute lung disease includ-		
ing Consumption	985	689
Nervous and diseases of		
nutrition in children ..	480	235
		91

The chemical and physical exciting causes of disease I will not refer to, for they do not concern us quite so directly in the consideration of prevention. That other division of exciting causes, namely the vital causes, I will consider a little more fully. Our attention should be directed, first, to the particular micro-organism which caused the disease, the most common channel of entrance into the human body, the means by which it can be prevented, or the means by which the individual may gain an immunity against it. We must, also, consider if that immunity is a real protection, and also if it is at all lasting. Some of the articles written of late on this subject, would lead us to believe that the pendulum has been swinging too far, in attributing so large a portion to the bacterial causation of disease, and in the value of inoculation against it.

It would be well to remember that many of the bacteria are our friends rather than our enemies. By their influence CO₂ is produced for the growth of plants. They are therefore necessary for agriculture.

We are also indebted to them for the production of many of the organic acids. But what concerns us most is the rôle many of them play in the production of disease. Diseases which depend for their existence on the presence of bacteria in the tissue are known as infectious diseases.

In general use, infectious and contagious are synonymous, although correctly speaking, a contagious disease is one transmitted from one individual to another by direct contact, while the term infectious is broader. Here the morbid agent gains access to the body in some more round-about way, through such means as water, food or soil. It will almost be necessary therefore that there should be in this latter case a predisposing cause. Typhoid fever, therefore, would be an infectious, non-contagious disease. Erysipelas, tuberculosis, and pneumonia, usually non-contagious, might be contagious. Smallpox, measles, and scarlet fever, are notably contagious. Successful prophylaxis, therefore, against any particular disease would necessitate a knowledge of the morbid agent causing the disease, its means of dissemination and the disinfectant to which it is especially susceptible. For example, in typhoid, the milk and water supplies should be thoroughly guarded, sick-room infection should be carefully prevented. For example, the thorough and separate disinfection of the bed linen, towels or napkins, or any garments coming into contact with the patient. An exclusive set of eating utensils should be

used by the patient, and the prohibition of the nurse from doing other work, at least, without the most careful disinfection of her hands.

In this connection a summary of the cause of typhoid in 206 cases given by Herbert Peck, Medical Health Officer of Chesterfield is interesting:

SUMMARY OF CASES.

Soil infection	9 cases equal to	4.37 of the whole.
Drain effluvia	21 " "	10.20 " "
Pollution of watercourse	9 " "	4.37 " "
Manure	6 " "	2.91 " "
Water	1 case	0.50 " "
Importation	25 cases	12.13 " "
Sick-room infection	28 " "	13.50 " "
Several possible causes	69 " "	33.50 " "
No ascertainable cause	38 " "	18.44 " "
Total	206 cases.	

I think a good deal more than we do, could be done in the prevention of disease by enforcing more rigidly prophylactic measures in such diseases as tuberculosis typhoid and pneumonia. If this be true in these diseases it is equally true with the venereal diseases. The sooner the profession wakes up to the fact that a person infected with a venereal disease is a menace to society the better for the community. Why should not a person so infected be a subject for State control as much as a person infected with typhoid? Is it because he is not likely to do the same amount of evil, or is the evil not so far reaching? The appalling sequellae, especially in women, the result of gonorrhoeal infection; the awful consequences of syphilitic infection would have stirred up medical men to do more to lessen these scourges except that they have been opposed by interests so many and so diverse.

Do we thoroughly appreciate the importance of syphilis as an etiological factor in disease. Alfred W. Campbell of the Rainhill Asylum in the *British Medical* of last month shows clearly that syphilis is the cause of general paralysis. He speaks of general paralysis as one of the terrible scourges of England, and declares it would disappear if syphilis could be stamped out. Gowers and Erb make similar statements concerning tabes dorsalis. What part of the body does not suffer in this way? The mortality among children born of syphilitic parents is very high. Of children born of syphilitic fathers 38 per cent die, while if both are infected, 78 per cent die. From 30 per cent to 40 per cent of syphilitic women abort. It may not be possible to deal with venereal diseases as with other infectious diseases, but something should be done to protect, not only the guilty, but the many mothers and children whose lives are blighted, more by this disease than by all other infectious diseases put together. Can nothing be done by us except by the license and inspection system? If so, then let us have that, for one thing is certain that while the contagious disease Act was in operation in England between the years 1864 and 1883, the amount of syphilis was markedly diminished. But since the repeal of this Act in 1884, syphilis reverted, in the army at least, in its original severity and extent to what it was before the Act was passed. It seems to me that much could be done by

us by prophylaxis and isolation in these cases as well as by firmness in prevention of marriage in syphilitic patients.

Nature has provided the animal body with means of protecting itself, the micro-organism of disease are no doubt combated by some opposing force. Some antitoxine in the blood serum. An army of phagocytes, perhaps, or probably by agencies we know nothing of. The artificial induction of this resistance or in other words, the procuring of an induced immunity has opened to medical science the door of a well-filled store house. In 1898 Jenerer produced immunity against smallpox. In 1880, Pasteur did the same with chicken cholera. About the same time Pasteur and Koch showed that animals treated with an attenuated culture of the anthrax bacillus, Not only did not take the disease in its virulent forms but were afterwards immune to the disease. So progress has been made. Virulent organisms have been treated under conditions unfavorable to their growth and development, and cultures have thus been produced which render a protection against the disease. So it is possible to increase the antitoxic value of the blood in susceptible animals to a greater extent than that found in an acquired immunity. So were worked out our antitoxic serums which we, at least, may dare to hope may be of use as immunizers as well as healers. The great advantage of course of an immunity gained in this way is that the protection is immediate. The protective material being simply transferred from one animal to another. How long this protection can be made to last in the person receiving it, we cannot now say. Just what this protecting agent is we cannot say. Nature generates it, places it where it can be used, namely, in the blood. And thus may man by its use prevent what nature is making preparations to cure. The field widens before us. If an immunity can be acquired by a mother, what can she do to transmit it? Certainly she can transmit to her unborn child immunity against smallpox. Can that immunity be transmitted without actually giving the disease. In support of that theory I would point out that the tendency in specific diseases is to is diminution of their virulency. Is there in sight an antituberculine which will render mankind immune to this scourge. This wholesale production of a natural immunity can as yet give only the satisfaction we gain from castle building and that disinfection has done much and is doing much to prevent the spread of disease we all believe, but one cannot help wondering if a great deal of the benefit is not gained by the cleanliness necessarily produced rather than the destruction of the dreaded and much abused microbe. I think we have come to that point where we may consider if there has not been and is not still a great deal of most valuable energy wasted in the war against microbes, just because they are microbes. Is there a chance of their being our friends as often as our enemies. We wonder if the attempts of the surgeon of to-day will not furnish amusement to the surgeon of to-morrow as he scrubs and scalds and stains and soaks his own hands and the body of his patient in the vain attempt to free them from all these dreaded microbes. Are microbes as guilty as we believe in the causation of disease, or are they rather the result of disease, as Bantock has recently claimed. If so their removal will not prevent disease. The remarkable paragraph with which

this distinguished surgeon concluded a paper read before the British gynaecological society in March last was certainly not in line with modern scientific teaching. It read as follows, and with it I am sure few of us will agree.

"I claim, then, to have shown that the poisons of variola, vaccinia, and syphilis are not and cannot be the product of a bacillus; that Loeffler's bacillus is not a constant, and therefore cannot be the essential element for the production of an attack of diphtheria; that the essential element in the case of gonorrhoea is not the gonococcus; that the essential element in the case of typhoid fever is not the bacillus typhosus; that the bacillus cannot live but a few hours in ordinary sewage; that not a single specimen of this bacillus has ever been discovered in sewer air, and hence that typhoid fever cannot be attributed to it, because of its contained germs; that, in the cases of the epidemics at Maidstone and King's Lynn there exists no proof of the contamination of the water by typhoidal matter, as indicated by the presence of the bacillus typhosus; that there is no evidence worthy of the name that tuberculosis is due to the ravages of the tubercle bacillus; that the comma bacillus cannot be regarded as the essential element in the production of an attack of cholera, and that the same can be said of the plague and its special bacillus; that the so-called pathogenic micro-organisms are constantly found under conditions consistent with perfect health, and that in more than one notable instance they not only appear to, but actually do, exert a beneficent influence.

"All these things—which are facts, not opinions, capable of demonstration and proof—go to show that the modern doctrine of bacteriology is a gigantic mistake; that we are already at the parting of the ways, and that it is safe to predict that, ere long, it will come to be recognized that these various bacilli play a beneficent *role* in the economy of Nature."

The wonderful strides made in this department of Medicine in the last two years fill us with wonder and admiration. Full well we know that the truth so eagerly sought will eventually be found, and no soldiers ever lived who will idolize and revere more the general who led them to a score of victories, than will we of the Medical profession, even though serving, perhaps, among the most humble of the rank and file, our noble leaders, who in the van of the fight are giving their mighty intellect, their fortunes and their lives in the great struggle, and none ever followed or will follow with more pride, a Napoleon or a Nelson, a Buller or a Dewey, than will we a Pasteur or a Haffkine, a Koch or a Behring as in the fight against the grim monster year after year they add victory to victory.

An ointment of sixty grains of oleate of tin to one ounce of ointment of rose water is an elegant and efficient application to the finger nails when brittle or marked with spots and ridges.

A CASE OF MALE PSEUDO HERMAPHRODITISM.BY ERNEST HALL, M.D.,
Victoria, B.C.

The occurrence of abnormalities of the genital organs, especially that condition commonly known as hermaphroditism, is of sufficient frequency to warrant our attention being occasionally directed to this subject. The additional, far-reaching social, and legal questions involved, give exceptional interest to this matter, and demand the careful attention of the practitioner. As to the frequency of such malformation it is very difficult to state, as comparatively few cases have been reported, but the conditions under which these cases are occasionally found would lead us to conclude that the abnormality is more frequent than the reports would have us believe.

True hermaphroditism implies the presence of the essential organs of generation of both sexes in the same individual. It does not exist to the extent of enabling a human being to perform the complete functions of both sexes, although an apparently rudimentary ovary and testicle have been found in the same body.

Pseudo-hermaphroditism is of two varieties: male, which I shall describe, and female. The latter is a deformity of the vulvae simulating the male organs; the clitoris is enlarged and the labia united resembling the scrotum; the ovaries may have descended into the labia, thus giving greater resemblance to a scrotum in which there is complete hypospadias with fissure of urethra and scrotum, and undescended testes. "Transverse hermaphroditism" is also described in which the external organs are male and the internal female.

Although the majority of hermaphrodites are males they are usually considered as females, and receive the training and education of girls, mistake only being discovered at puberty. Dr. Cushing says this condition is of sufficient frequency to make the examination of the infant with a view to determine the sex, a very important matter. It is not easy to distinguish between a hypospadiac male, and a female infant; the little cleft penis may easily pass for a large clitoris, the position of the urethra, the appearance of the labia minora and majora are identical, as the testicles in hypospadiacs usually do not descend into the split scrotum until late in life. In those cases also there may be an opening simulating a vagina. It must not be forgotten, however, that the vagina may be absent in females. In short there are cases where the diagnosis can only be made post-mortem.

The following cases are cited:—

Homan's case was one of an apparently female individual, who was such on one side and male on the other. He lived in sexual relations for twenty years as a woman and when menstruation ceased at about forty decided that he was a man, married a woman and was still living at date of writing in such relation.

Professor Main-Salin cites a case of a girl, so-called, of twenty-three. It was not until she complained of amenorrhoea that an examination was insisted on. The result showed that she had strong masculine character-

istics, strong growth of beard on chin and cheeks; masculine, heavy voice, no developed mammal, pads being used to simulate female figure; small pelvis and well defined lips, absence of knee convergence usual in females. The genitals closely resembled female organs, but no vagina could be detected, and an examination per rectum revealed neither uterus, ovaries, nor rudiments of either. All the male organs, except the prostate were easily located. The labia majora covered with hair, revealed on palpation the presence of an egg-shaped body the size of a walnut in each, which was the testis with the epididymus. The clitoris closely resembled a penis, covered with freely moving skin, and save the glans, was capable of erection and elongation, with downward curves. In every feature the case was masculine save the long hair. The man complained of strange feelings with great difficulty suppressed. A complete change of dress was ordered which resulted in contentment, with the full appearance and habits of a man.

Professor Pozzi of Paris speaks of two cases. In one a man twenty-seven years old clothed as a woman. While standing the organs resembled those of a male; testicles descended into the labia: upon reclining they retired and gave female resemblance. The penis was two inches long and the prepuce divided. Sexual desire for females existed, but when attempted, only imperfect copulation occurred, and semen contained no spermatozoa. There was never any menstruation.

In case two, a young woman, nineteen years of age was suffering from gonorrhoea and syphilis. She had a perfect hymen, but no vagina nor ovaries, although the breasts developed and other bodily changes occurred at puberty. She never menstruated.

*Matthews reports a case of pseudo-male hermaphroditism. At the age of twelve he removed a testis from a supposed girl, being just below the external abdominal ring, under the skin of the left thigh. At nineteen she was tall, slim and pale. The external genitals were those of a normal female. The face and pubes were free from hair. The vagina was one and three-fourths of an inch long. No trace existed of uterus or prostate gland, nor any trace of another testis.

The following case recently came under my observation:—

Miss O. P., age 14, a healthy looking and apparently well developed child, was brought to my office by her mother for examination of her throat, as for some months she had complained of hoarseness. Inter-laryngeal examination revealed nothing abnormal; nares and pharynx also normal. I was unable to account for her peculiar hoarseness of tone and requested her to call again. On the next visit the mother stated she was ruptured and had worn a truss for some time, and expressed a desire for medical treatment. On asking patient to stand, and placing the hand over the pubic region, I found a distinct bulging over both inguinal canals, with decided impulse upon coughing. On this hasty and imperfect examination I diagnosed hernia, probably ovarian, into the canal of Nuck and sent her to the hospital for operation. I did not see the patient again until she was brought into the operating room, when we discovered

*(Medical Record, vol 55, No. 21.)

the following conditions: pubes slightly covered with hair, both canals open and containing round bodies the size of an almond, freely movable. Labia majora were fully developed, and clitoris enormously hypertrophied with well formed glans, which was continuous with labia minora. A slight groove with elevations on either side was continuous from the frænum for three-quarters of an inch to the meatus urinarius which was well formed and normal in appearance; directly below this was the opening of the vagina with well formed carunculae. The vagina was but an inch and one half deep, ending in a blind cul-de-sac. Upon the examination of the pelvis, neither uterus, tubes nor ovaries could be determined. The body was of the masculine type, the thighs alone bearing some resemblance to the female; hands were large but the feet small; breast undeveloped.

We were now confronted with the question which rarely falls to our lot to decide, that of determining future sex of an individual. I called for her mother to consult with her but she had left the hospital. Nature had evidently given to this individual a preponderance of the masculine. We had before us a complete case of hypospadias, with complete division of the urethra and scrotum; but having been reared and educated as a girl the question was whether to perpetuate the mistake which had already been made, or to disturb the domestic and social relations upon anatomical grounds. After brief consultation with physicians present, it was decided since it was practically impossible to obtain functionable male organs, that social and domestic conditions be allowed precedence. I therefore opened the canal on either side and removed the testicles, and treated as in an ordinary case of hernia; the clitoris was not disturbed. Three weeks later, with the full consent of her mother who had also entirely agreed with the result of our previous consultation, I removed the clitoris and united the upper part of labia minora giving the parts a distinctly feminine appearance. When the child was born the mother noticed an irregularity in the parts and called the attention of the attending physician, but upon his assurance that everything was normal, she gave it no further thought. At the age of four years, according to the mother's account, the child became ruptured, and the family physician was called who administered chloroform and reduced it. For several years the hernia gave the patient much trouble frequently coming down several times a day. The mother had detected no peculiarity in the child with regard to her preference for either sex, but when brought face to face with the facts said she could not be bothered with 'fellows.'

The questions which naturally arises from the recital of this case are: (1) that of embryological development (2) the influence upon the organism of the early removal of the testicles (3) the proper management of such cases.

The first question I will very briefly discuss, and the third question—that of treatment—I shall leave an open question for the discussion of members of this society, reserving my opinion until a later period.

Regarding the Embryological Development.

At about the end of the fifth week of embryonic life a small opening may be seen externally which receives the termination of the

intestinal canal, the ureters and the different ducts of the sexual organs. At the beginning of the eleventh week the dual aperture is separated from that of the genito-urinary canal by the development of a transverse band. The genito-urinary canal is likewise separated by a similar process of division into a urinary and a genital part, the former of which becomes the urinary bladder. At the external opening of this canal is soon observed two folds of skin, the rudiments of the labia majoria in the female, and the two valves of the scrotum in the male. Between and in front of these an erectile body appears surmounted by a gland, and furrowed along its under surface. This body in the female is retracted into the genito-urinary canal and becomes the clitoris, while the margins of the furrow are converted into the labia minora.

In the male this sinus is nearly closed in at a very early period by adhesion of the two folds of integument which bound it, forming the upper part of the urethra. The erectile body increases and becomes the penis, while the margins of the furrow at its under surface unite to form the spongy portion of the urethra.

The condition of hypospadias arises from incompleteness of the closure of the edges of the original furrow. The so called vagina is the enclosed urogenital sinus.

The Proper Treatment of Such Cases.

Admitting that this case was essentially male, we must not overlook the bearing that education and society have upon determining the place of this individual. Incapacitated from the complete functions of either sex and possibly unable to exhibit even to a limited degree the primary office of either, the position is somewhat unique. Where the condition is detected very early there can be no question as to the course to pursue, but when a mistake has been made and the child has grown to maturity the nominal alteration of sex is a matter of no little moment. In this case where the education and environment had been that of the female, it would have meant social chaos, and ridicule, or the removal to a distant part where the family would be unknown. As the latter was impossible we had to decide between a perpetuation and intensification of the mistake or social ostracism.

The question of means of livelihood also has a bearing here. How could the individual best provide for necessities? Is the economic problem more complicated upon the male side or upon the female? Probably the latter, but as this was a matter of the future it did not have a direct bearing upon the case, as at that time the patient would be able to determine and select the sex, and act accordingly.

We might have replaced the testicles within the abdominal cavity instead of removing them. This would only have given atrophied organs and the difference between absence of glands and atrophied glands cannot be very great. Or we could have with difficulty closed the inguinal canal behind the testes and brought them further down, and freed the clitoris, and afterwards attempted a plastic operation for restoration of urethra. The girl, we call her now, since there are no testicles, is intelligent and ambitious, and as she has a desire for teaching will be educated with that end in view. If male characteristics develop con-

spicuously she can easily find congenial employment in the placer regions to the north.

I am not prepared to say that a mistake was not made in the treatment of this case.

ASTHMA.

Symptoms.

Sidney Martin* states that spasmodic asthma, whether primary or secondary, is a disease essentially due to some nervous change. Its partial heredity, its occurrence largely in "neurotic" subjects, its occurrence in families subject to migraine, as well as the characteristic attacks of the disease, bring it into relation with nerve-storms, such as epilepsy. The typical uncomplicated asthmatic attack as is seen in children and in some adults, is sudden in its onset, and occurs in the early hours of the morning, between 2 and 4 a.m. It is characterized by intense dyspnoea, in which the patient is unable to assume the recumbent position, but is obliged to hold on to a chair or the bed-railing firmly in order to get purchase for the accessory muscles of respiration. The shoulders are raised and both the natural and the accessory muscles of respiration are contracting vigorously, although the chest moves but little in expansion. The dusky face shows the embarrassment of the circulation and the deficient oxygenation of the blood; the sweating skin shows the great muscular exertion, as well as the effect of deficient oxygenation of the blood. The lungs are, as a rule, actually enlarged during the paroxysm, but auscultation shows that little or no air is entering into them. The respiratory murmur is absent or whistling, and sonorous rhonchi alone are heard. The attack lasts a variable time and may be over by morning, or it may last for twenty-four hours or longer. After the attack expulsion of mucus from the lungs occurs, but there is no continued cough or expectoration.

Etiology.

Kissell† had five cases of asthma in childhood under his care in the Olga Children's Hospital, Moscow. The ages of the children varied between 9 and 10 years. There was a strong neurotic family history in most of the cases. The attacks of asthma occurred only in the winter months. They usually began with a copious expectoration of mucus, and rhonchi could be heard all over the chest during a paroxysm. There was no sign of rickets or any malformation of the chest-wall. All the viscera appeared to be normal, and between the attacks the children appeared to be perfectly well. Kissel maintains that true nervous asthma exists in children as well as in adults, but it is rare.

In the various children's hospitals, among 21,528 patients there were found 6 cases of asthma; among 214,712 out-patients there were 7 cases.

Samuel Gee‡ says that in asthma there is no doubt that the chest is in a state of inspiratory distension, dilated to its utmost capacity and fixed in this position. But it is more likely that this state of things is

*Gaillard's Med. Jour., Mar., '99.

†Archiv f. Kinderheilk., vol. xxiv, Parts III and IV, '98.

‡Brit. Med. Jour., Mar. 25, '99.

due not to the inspiratory spasm, but to expiratory debility. Air is imprisoned in the lungs, and no amount of forced expiration can empty them. If the sufferer could empty his lungs, he could fill them again; it is the deflation which is at fault, and the extreme inflation is due to incessant forced inspiratory efforts to make the most of what little room for fresh air can be provided by forced expiration. Contraction of the bronchial muscular fibres or of the respiratory muscles, if it play any part in the asthmatic paroxysm, may doubtless be due to irritation of appropriate nerves, but the muscular contraction itself has not been proved to occur, and this must be done before we need discuss its causes. The influence exerted by the nervous system upon secretion, nutrition, and the blood-supply is well known as a general fact, but any particular application of this fact to explain the pathology of asthma is at present beyond our power. Thus, we have no evidence to show that asthma takes its origin from the nerves or brain.

The doctrine of a spasmodic asthma is very imperfectly supported by facts, but we are led to believe that all asthma is merely a peculiar form of bronchitis, and that there is no need for any hypothesis of spasm in order to explain the phenomena of the disease. Which element of the catarrh, defluxion or swelling, obstructs the tubes is a question which naturally rises. The interesting observations of Lefèvre, published more than 60 years ago, upon the expectoration of peculiar mucus cylinders, which he compared to cooked vermicelli, toward the end of an asthmatic attack render it very probable that both secretion and swelling concur to obstruct the bronchia. But there remains another and much deeper question which concerns the asthmatic tendency; in what does it consist? Why are some persons prone to asthmatic catarrh and others not? Why does the disposition run in families? What is the bond which in so many cases connects the several diatheses of asthma, eczema and gout?

Von Leyden* considers that the bronchitis found in so many asthma cases is not specific, and that the disease is not necessarily primary in the lungs, but is a reflex neurosis, the *primum movens* of which may be situated almost anywhere in the body. While asthma is almost always accompanied by a fibrinous bronchiolitis, fibrinous bronchiolitis may be, and often is, uncomplicated by asthmatic attacks.

Frankel† relates the case of a man with arthritis urica, emphysema, and chronic bronchitis, who suffered from severe attacks of asthma, in one of which he finally died. Post-mortem examination disclosed the presence of an extremely severe desquamative catarrh of the small bronchi. The collections of epithelial cells were so great as to fill the lumen of the bronchi completely, acting like tight corks. Hence it is personally believed that, in at least a large number of cases of asthma, whatever change may take place subsequently to obstruction of the bronchi, the epithelial cells are first lost. He suggests that the force of the nervous spasm of the bronchi may be capable of loosening the epithelial cells, and he thinks a nervous element present in practically all cases.

* Med. News, June 25, '98.

† Zeit. f. klin. Med. B. 35, H. 5, 6, '98.

L. H. Watson* thinks there is little doubt that asthma represents the effect of uric acid on the circulation in the thorax, and that it is paroxysmal for the same reason that epilepsy and migraine are paroxysmal, in accordance with the natural fluctuation of the uric acid, and the amount of that substance passing through the blood. Possibly not all cases of asthma are caused by uric acid, but almost all cases are benefited by attention to the elimination of uric acid, and many cases are absolutely cured when the proper methods are adopted and certain dietary plans are accepted which shall prevent its accumulation. There is no doubt also that uricacidæmia, when it contracts the arterioles will certainly suspend gastro-intestinal digestion and absorption, and allow putrefactive processes to take place, which shall furnish toxins that will find their way into the circulation, and thus, again, act as irritants while producing high arterial tension. An asthmatic attack represents the thoracic effect of this tension. Two confirmatory facts would seem to favor Haig's hypothesis: the first is that most attacks of asthma occur at from 2 to 4 o'clock in the morning, when the uric acid flood is at its height, and the other is that after an attack of asthma, as after a uric-acid storm, there is a flow, of limpid, pale urine in great abundance.

J. Pawinski† states that there exists a particular form of asthma due to auto-intoxication resulting from the chronic retention of urine. At times there may be present cardiac symptoms resembling those of cardiac asthma, which may be accompanied by sensations of pain in the præcordial region. At other times the respiration assumes a Cheyne-Stokes character. Or there may be present a purely subjective dyspnœa. Whatever character, however, the respiratory troubles of the vesical origin assume, they never assume a type of a bronchial asthma. They never yield to narcotic or cardiac remedies, but disappear, or at least diminish greatly, if care be taken to empty the bladder.

Treatment.

As a result of the clinical observations, Talma‡ has reached the following conclusions:—

1. The spasm of the respiratory passages may be produced voluntarily by the majority of the asthmatic patients and by many normal persons.
2. Almost all asthmatics can control the spasms even during an attack, but certainly during the periods of remission.
3. The muscles of the respiratory passages are either under the control of the will or may be brought under such control.

As a consequence of these conclusions the importance of respiratory gymnastics for asthmatic patients is patent. The number of respirations per minute must be reduced and expirations performed slower and more completely. The spasm of the muscles will thus be controlled. The speech must be regulated, and while speaking the patient must inspire slowly and deeply. The asthmatic must learn to maintain the proper tension of the muscles of the neck, chest and abdomen.

*Southern Med. Rec., Feb., '99.

†Sem. Méd., xxiii, p. 142.

‡ Berl. klin. Woch., No. 52, '98.

In four cases of asthma A. de Miranda* employed compression of pneumogastric nerve at the surface of the neck. The compression was accomplished by means of a finger, and yielded relief within a few minutes, even to complete disappearance of the attacks of dyspnoea.

J. C. Thorngood† says in cases of asthma with overdistended emphysematous lungs and dilated heart, the capillary vessels are gorged with venous blood, the extremities blue and cold, and the discomfort of the patient is very great. The treatment should be directed to the relief of the circulation and with this purpose in view a course of mercurial pills, Carlsbad salt, and hot water every morning is directed, with tincture of digitalis.

Kingscote's‡ methods of treatment in cases of asthma combined with cardiac dilatation consists in a modification of the Schott treatment with the inhalation twice daily of free oxygen-gas. The gas seems to relieve the paroxysms by supplying the oxygen of which the system is in need.

Boucheron§ states that, if the opinion of Landouzy—that true asthmatics not infrequently have an element of tuberculosis—is well founded, there is reason to think that other toxins also may promote the asthmatic symptom-complex, and especially the streptococic toxin. Hence an explanation of the cure of asthma in certain cases by antistreptococci serum.

Otto Frese|| has used iodipin (iodine addition product of sesame oil, containing 10 per cent. of iodine) in thirteen cases of asthmatic affections. Two to three spoonfuls were administered daily. Iodipin possesses special advantages over the iodides ordinarily employed. It never affects the stomach while it causes at times very desirable peristalsis of the intestines. Toxic symptoms were never observed to follow the exhibition of the preparation in the doses given, and even coryza was only once met with, and that transitorily. A further advantage possessed by iodipin is its sustained effective action, this being continued for some time even after the use of the remedy had been suspended.

S. Solis-Cohen¶ has successfully used the following formula in asthma:

R Morphine sulph., $\frac{1}{8}$ to $\frac{1}{4}$ grain.
 Strychnine sulph., $\frac{1}{60}$ to $\frac{1}{10}$ grain.
 Hyoscine hydrobrom., $\frac{1}{300}$ grain.
 M. Sig.: Give hypodermically at bed-time.

Sidney Martin,* in uncomplicated asthma, relies upon sedatives, such as the hypodermic injection of morphine ($\frac{1}{4}$ grain), the administration of chloral, or the inhalation of chloroform, to shorten the attack. The inhalation of the fumes of burning nitre-paper or specially-prepared powders, or of cigarettes, gives relief in many cases. The powders used at the Brompton Hospital contain 1 part each of anise and nitre, 2 parts of stramonium-leaves, and 5 grains of tobacco to the ounce; 1 teaspoonful is

* Sem. Méd., xviii., p. 110.

† Brit. Med. Jour., June 18, '98.

‡ Med. News, May 21, '98.

§ Tribune Méd., May 4, '98.

|| Münch. med. Woch., xlvi., p. 213.

¶ Med. Rec., Apr. 30, '98.

* Gaillard's Med. Jour., Mar., '99.

to be burnt on a plate and the fumes inhaled. A pill containing $\frac{1}{4}$ grain of morphine, with $\frac{1}{120}$ grain of atropine sulphate, given at bed-time, is sometimes useful. Extract of stramonium ($\frac{1}{8}$ grain) may be substituted for the atropine. The use, however, of sedatives, such as morphine and chloral, and of inhalations, constitutes no treatment of the disease, and must be limited as much as possible, especially in the uncomplicated form of asthma, while efforts are made to benefit the general condition of the patient. Of remedies which may be continuously administered to patients who have frequently recurring attacks, two are most constantly used, namely: iodide of potassium and arsenic. The iodide may be most conveniently given with stramonium, as in the mixture which consists of $\frac{1}{4}$ grain of extract of stramonium, 2 grains of extract of licorice, 3 grains of iodide of potassium, and 5 minims of chloral ether. This mixture may be given two or three times daily in cases of asthma. It possesses two disadvantages, however. The stramonium leads, in some cases, to paralysis of accommodation, but by diminishing the dose the patient soon ceases to experience discomfort from the remedy. If given alone, the iodide must be administered in 5-grain doses two or three times daily, the medicine being stopped from time to time. Arsenic by itself in doses of 3 minims of the liquor arsenicalis is a useful remedy for continuous administration in asthma, and it may be combined with iodide of potassium (3 to 5 grains) in a mixture. The insufflation of a solution of bicarbonate and chloride of sodium, if there is much nasal secretion, is frequently of service, and the application of cocaine in such cases to the nasal mucous membrane helps to relieve the attacks. In children with large tonsils or adenoids, in whom asthma supervenes, the surgical treatment of the local condition, although it may be necessary, does not of itself cure the asthmatic attacks, which may persist for months after the fauces and pharynx have been successfully treated. The removal of a nasal polypus may greatly relieve the attacks, but not a few cases persist after removal. The regulation of the diet of asthmatic patients is of great importance. Meals ought to consist only of digestible food, and that in moderate quantity, no heavy late meals being allowed. Remedies such as alkalies after meals given with the view of correcting the indigestion, combined with a proper diet, give great relief to cases of peptic asthma. Although the asthmatic ought to be careful as regards the food taken, it is wrong treatment to starve such a patient; only harm can come of it, inasmuch as the best chance of the patient's recovering is an improvement of his general health, and this cannot occur without a sufficiency of food. Cod-liver oil often causes great improvement.

Goldschmidt* divides the treatment of asthma into (1) purely medicinal, (2) the physical, and (3) the inhalation treatment. Morphine is of great value in some cases, especially where the attacks are infrequent, but pronounced. If morphine is not well borne, then chloral may be used in a dose of 30 grains, to be repeated in doses of $7\frac{1}{2}$ grains every quarter of an hour until sleep is induced. More than $7\frac{1}{2}$ grains should not be given in this way. In cases of prolonged asthma with expectoration, iodides combined with expectorants and opium are often useful. Amyl-hydrate

* Brit. Med. Jour., Jan. 7, '99.

also acts extremely well, but sulphonal and trional are useless. Occasionally antipyrine and quinine may be useful. In cases where expectoration is abundant, iodides may not only be useless, but harmful. The compressed-air cabinet is useful in some of the sequelæ of asthma, but not in the actual acute attack, which may be made worse by it. Hydrotherapeutic treatment succeeds in some cases of asthma. The patient should gradually be accustomed to colder baths of short duration with douches. Even when catarrhal symptoms are present the body may be vigorously sponged with water at 62° F. Warm drinks should be given at the same time. In case of an acute attack or an exacerbation the treatment is commenced with stramonium fumigation. If this fails, strong stimulation of the skin with hot water should be tried, and, if these measures have previously proved ineffective, morphine or chloral should be given.

In asthma S. Français* requires the patient to first sit down or take any instinctive position that suggests itself. The air of the room should be fresh and yet not cold enough to expose the patient. The room should be as light as possible. Hot foot-baths or sinapisms to the feet should be started; hot applications to the hands also. Then fumigations should be practised, at first steam, later medicaments. The most efficacious of the powders or papers are stramonium, prepared from the leaves, and potassium-nitrate papers, 12-per-cent solution in porous paper, and then thoroughly dried. Cigarettes consisting of the following herbs may be smoked:

R Belladonna-leaves, 5 grains.
 Stramonium-leaves, 2½ grains.
 Phellandrium-leaves, 1 grain.
 Extract of opium, ¼ grain.
 Cherry-laurel water, to flavor.

If these cigarettes are made with nitre-paper, the value is enhanced. Solanine in capsules of 1 grain each, taking three at half-hour intervals, is recommended. Pyridina, when inhaled, has a prompt sedative action. A few drops on a cloth usually suffice.

H. Rosahnsky† has successfully used the following prescriptions for about fifteen years in asthma and spasmodic affections:

R Tr. lobelia inflata,
 Ether. sulphuric.,
 Liq. ammon. acetat., of each, 2 drachms.
 M. Sig.: 15 or 20 drops every half-hour in water.

At night in asthma the following is very good:

R Camphor, ½ grain.
 Pulv. Dover's, 6 grains.
 Sacch. lact., 10 grains.
 M ft. pulv. d. t. b. No. 4.
 Sig.: One powder at night.

* Arch. Gén. de Méd., Jan., p. 1, '99

† West. Med. Review, Jan. 16, '99.

B. Van Sweringen* calls attention to a line of treatment in a very obstinate case of bronchial asthma, which was attended by remarkable results. The attack had lasted for two weeks, during which time all the antispasmodics had in turn been exhausted, and the patient had secured but a period of two hours' freedom at any one time. Finally, based on the theory that if asthma was reflex it must be under the control of Setchenow's inhibitory centre, and that anything which would stimulate the inhibitory centre would lessen the reflex-spasm, quinine and strychnine were at once exhibited, and with excellent results. The dose of the quinine was 7 grains. The extract of nux vomica was given in $\frac{3}{4}$ -grain doses, and to this was added $\frac{1}{4}$ grain of sulphate of codeine. In the interval the iodides were continued.—*Monthly Cyclopædia of Practical Medicine.*

THE TREATMENT OF DIPHTHERIA.

Being assured that even to-day there are many men of undoubted learning and experience in the profession who do not believe in, or are doubting Thomas's as to the efficacy of antitoxin in the treatment of diphtheria, we think that the perusal of the following article from the *British Medical Journal* may convert some, or at least persuade them to give a fair trial to this now well proven remedy. What are the chief causes of failure in the hands of the few of a remedy which has proved a grand success in those of the majority? Simply summed up—too late administration; too small doses, and too few injections. Taking for granted that the strength is uniform, Dr. Turner says he has given 12,000 units in some cases without any symptoms but favorable ones. Our experience has not been so large, but 4,000 units in 24 hours we believe can be given to a child, say four years of age, without fear, but with expectation of good results. We do not mean that this is to be continued long, but that for one or two days if the case should demand this quantity.

THE TREATMENT OF DIPHTHERIA.†

By A. JEFFERIS TURNER, M.D., LOND.,

Honorary Physician to the Hospital for Sick Children, Brisbane.

In the year 1891 a new era in the treatment of diphtheria was introduced by a remarkable series of investigations published by Professor Behring, now of Marburg University. Although, as Behring remarks, all the essential points in the antitoxin treatment of diphtheria had been by that time fully worked out in the laboratory, the subject did not at first attract very much attention. It was not until 1894, when the acquisition of serum from large animals, particularly horses, permitted the extension of the methods discovered in the pathological laboratory to the treatment

* *Indiana Med. Jour.*, Mar., '99.

† Read in the Section of Medicine of the Intercolonial Medical Congress, held in Brisbane.

of human beings that general interest was aroused. The treatment rapidly spread, and by the commencement of 1895 was on its trial throughout the whole civilized world. In the five years that have since elapsed the diminution in the hospital mortality of diphtheria has been nothing short of marvellous to all but the few who had made themselves acquainted with the thorough and unimpeachable experimental basis on which the new treatment had been established. The records of hospital experience have in this instance been in complete accord with the conclusions of the laboratory. In private practice also, in Australia at least, antitoxin has been very widely used with very gratifying results in the reduction of the mortality from this disease. Nevertheless, its use is not yet universal, and it is every now and then our sad experience to see children admitted into the hospital dying from diphtheria, to whom an injection of serum has never been administered, although they have been under medical treatment. In England this appears to be the case to a larger extent. One reads with astonishment that the reduction of the diphtheria mortality in London is almost entirely confined to cases treated in hospital, and that it appears very doubtful whether antitoxin is much used in general practice. Though the contrary statement is true in these colonies, I believe that the remedy, even by practitioners of repute, is not always administered in sufficient doses. In mild and early cases a small dose of 500 to 1,000 units is sufficient, but in advanced and desperate conditions many practitioners are satisfied with injecting 1,000 or 1,500 units, when 4,000, 6,000, or even 8,000 or more units are really needed. The treatment of diphtheria appears to be, therefore, still a proper subject for discussion, and I shall endeavour in the first place to lay before you as briefly as possible the facts on which my opinions are based.

The records of the Brisbane Children's Hospital have been very carefully kept for the past ten years, and the majority of the diphtheria cases during that time have come under my personal observation. I am, therefore, in a position to guarantee the similarity and continuity of the statistical material.

During the preantitoxin period of five and a half years the diagnosis was based solely on clinical observation. Doubtless a few cases not really diphtherial were included, and these would make the mortality appear lower than it really was. I do not think they made much difference in the totals.

The antitoxin period is divided into five sections, of which the results of the two first have been already published.² In them we have included no cases but such as were verified by bacteriological examination. The new treatment being on its trial, such a course seemed advisable. During the next two sections we have included only cases which were verified bacteriologically, or which on clinical grounds could be recognized as diphtheria beyond any reasonable doubt. In the last period we have had to rely on clinical evidence alone,³ but this has been interpreted with great strictness, much greater than in the preantitoxin period. In the absence of bacteriological examination the diagnosis of early and mild cases must often be doubtful, but in the severer cases, including the laryngeal cases, I am convinced that no appreciable fallacy has been introduced. All cases of possibly catarrhal laryngitis have been excluded.

The first division of the antitoxin period may be regarded as to some extent transitional. We used a serum of unknown but certainly very low antitoxin strength, of which 23 ccm. was usually injected. In the second division the same serum was mainly used in doses up to 100 c.cm., and much better results were obtained. Since then we have used a serum of known antitoxin strength, and severe cases have usually received 4,000 units. Latterly, we have increased this dose in some cases to 6,000, 8,000, or even 12,000 units, and we believe that the lowered mortality of the last division is partly attributable to this increase.

The following table gives the total mortality for both preantitoxin and antitoxin periods:

Cases of Diphtheria treated in the Children's Hospital, Brisbane.

Preantitoxin Period.	Admissions	Deaths.	Mortality.
			Per cent.
July, 1889, to June, 1891 (2 years)	73	34	46.6
July, 1891, to June, 1893 (2 years)	114	48	42.1
July, 1893, to January, 1895 (18 months)	116	46	39.7
Total	303	128	42.2

Antitoxin Period.	Admissions.	Deaths.	Mortality.
			Per cent.
Small doses :—			
January, 1895, to November, 1895 (11 months)	40	10	25.0
Large doses —			
November, 1895, to September, 1896 (19 months)	43	5	11.6
September, 1896, to December, 1897 (15 months)	83	8	9.8
January to December, 1898 (12 months)	45	7	15.6
January to August, 1899 (8 months)	106	10	9.4
Total	317	40	12.6

In presenting these statistics, I must not omit to acknowledge my indebtedness to the hospital residents, L. N. Ashworth, M.B., B.S., Melb., T. E. Green, M.B., B.S., Melb., Hugh Bell, F.R.C.S., Eng., and P. Dixon, M.B., Ch.M., Sydney, to whose assiduous care the good results are greatly attributable, and but for whose careful records I should be unable to write the present paper.

Although the whole number of cases is small as compared with other statistics that have been published, they have the advantage of having been treated in the same institution and under the same personal observation. Their lesson appears clear enough, but it is necessary, in order

to exclude any possible doubt, to consider objections that have been raised by various critics to other similar statistics.

It has been objected that the introduction of a new treatment is accompanied by greater attention to the cases, and more care on the part of the residents and nursing staff. As far as our hospital is concerned, I can testify that the greatest possible pains were taken over these cases during the preantitoxin period. It will be shown presently that nearly half of the cases were so severe as to necessitate intubation or tracheotomy, and, allowing for this, the results obtained compared favourably with other institutions at the same date.

Again it has been urged that the introduction of bacteriological methods of diagnosis has led to the inclusion of mild cases which would not formerly have been recognized as diphtheria, and so caused an apparent reduction of mortality. This certainly does not apply to our present figures. Cases not recognizable clinically as diphtheria, but in which diphtheria bacilli are present, have occurred with us very rarely; we have only record of three such cases (which came under observation in 1897), and these cases have been omitted from our statistics.

Lastly, it is asserted that the type of the disease has changed, and that as a whole it is of a milder character than formerly. For this assertion there is no foundation, in fact it is a pure assumption, which can be satisfactorily met. Some observers have attempted to meet it by classifying their cases as mild, severe, very severe, and so on. This is hardly satisfactory, as the classification depends too much on the individual opinion of the observer. There is, I think, a better way. All are agreed that diphtheria affecting the larynx is a serious disease. By including all cases with a distinct laryngeal stridor* it is possible to draw a sharp objective line including a large proportion of the cases, which may be known as laryngeal cases. These cases are always serious, and among them the mortality used to be very high. It has now been reduced more than two-thirds, as is shown by the following table:

Laryngeal Cases.

Preantitoxin Period.	Cases.	Deaths.	Mortality
July, 1891, to January, 1895*	147	87	Per Cent. 59.2
Antitoxin Period.			
Small doses :			
January, 1895, to November, 1895	22	9	40.9
Large doses :			
November, 1895, to September, 1896	30	4	13.3
September, 1896, to December, 1897	37	7	18.9
January to December, 1898	20	6	30.0
January to August, 1899	68	7	10.3
Total	177	33	18.6

*Record incomplete before July, 1891.

In the preantitoxin period very few cases recovered without operative interference, only about one case out of twelve. Now, although we never fail to intubate a laryngeal case as soon as it appears necessary, nearly half the cases recover without interference. No doubt with earlier treatment the proportion would be larger, for many of the hospital cases require operative interference immediately or very soon after admission.

Laryngeal Cases.

Preantitoxin Period.	Cases.	Recovered without Operation.	Proportion.
July, 1891, to January, 1895.....	147	12	Per Cent. 8.4
<i>Antitoxin Period.</i>			
Small doses :			
January, 1895, to November, 1895	22	3	13.5
Large doses :			
November, 1895, to September, 1896	30	12	40.0
September, 1896, to December, 1897	37	12	32.2
January to December, 1898	20	8	40.0
January to August, 1899.....	68	33	48.5
Total.....	177	68	38.4

Operative interference is still necessary in more than one-half of the hospital cases. In private practice it should be much less frequently necessary. But even in hospital cases requiring operation the mortality has been reduced from nearly two-thirds to about one-fourth of the cases operated on.

I regard the total results obtained in these laryngeal cases as of the greatest value, inasmuch as they deal with a sharply-defined group of cases of a very grave form of diphtheria, and are not liable to erroneous diagnosis in any appreciable proportion so long as cases of possible catarrhal laryngitis are excluded, as we have been careful to do. They are furthermore fairly comparable with the hospital returns of laryngeal cases in other parts of the world, which the total admissions are not, for these are affected by the proportion of a mild tonsillar cases admitted. The total results may be conveniently stated as follows:—Of 100 cases of diphtheria with affection of the larynx treated in the hospital in the preantitoxin period, eight recovered without operative interference, thirty-three recovered after either intubation or tracheotomy, and fifty-nine died. Of 100 similar cases treated with antitoxin in sufficiently-large doses, as many as forty now recover without operative interference, another forty-five after operation, and only fifteen die.

Operation Cases (Intubation or Tracheotomy or Both).

Preantitoxin Period.	Operation Cases.	Deaths.	Mortality
			Per Cent.
July 1889, to June, 1891 (2 years)	42	28	67.7
July, 1891, to June, 1895 (2 years)	60	41	68.3
July, 1893, to January, 1895 (18 months)	64	40	62.5
Total.....	166	109	65.7
Antitoxin Period.			
Small doses :			
January, 1895, to November, 1895 (11 months).....	19	9	47.4
Large doses :			
November, 1895, to September, 1896, (15 mos.).....	18	4	22.2
September, 1896, to December, 1897, (15 mos.).....	25	7	28.0
January to December, 1898 (12 months).....	12	4	33.3
January to August 1899 (8 months)	35	7	20.0
Total.....	109	31	28.4

The next table shows the difference in the mortality of all the diphtheria cases admitted under the old and new methods of treatment at each year of life.

Mortality of all Cases of Diphtheria at each Year of Life before and after the Introduction of Antitoxin.

Age Last Birthday.	Preantitoxin Period.			Antitoxin Period.		
	Cases.	Deaths.	Mortality.	Cases.	Deaths.	Mortality.
			Per Cent.			Per Cent.
Under 1 year..	11	9	81.8	7	2	28.6
1 year	44	32	72.7	35	10	28.6
2 years	56	37	48.2	48	10	20.8
3 "	44	49	43.1	44	6	13.6
4 "	53	14	26.4	47	3	6.0
5 "	38	9	23.7	54	4	7.4
6 "	23	10	38.6	42	4	8.2
7 "	16	5	38.5	19	1	8.2
8 "	6	1	16.7	8	..	0.0
9 "	7	..	16.7	6	..	0.0
10 " .....	..	..	16.7	5	..	0.0
11 "	1	1	16.7	2	..	0.0
12 "	3	..	16.7	..	..	0.0
13 "	1	1	16.7	..	..	0.0
Total.....	303	128	42.2	317	40	12.6

The decrease in mortality is striking at all ages, and is particularly well marked during the first two years of life, which had under old methods of treatment such a fearful death-rate.

To these statistics I might add others equally convincing from Australia, from America, from France, from Germany, from England. If hospital records can prove anything, the controversy regarding the efficacy of antitoxin in the treatment of diphtheria may be regarded as closed. But it yet remains to consider in what way the remedy should be used to obtain the best possible results in reducing the mortality of the disease. It will clear the way to the understanding of this problem if we consider it very briefly from the standpoint of recent pathology.

Diphtheria is known to be caused by a bacillus which secretes a powerful toxin. The local irritation produces a fibrinous exudation which forms the diphtheritic membrane, and the diphtheria bacilli are confined to this membrane and the fluid discharged from it. The inflammatory processes have a tendency to spread locally, especially into the air passages. In this way the toxic organism may reach the lungs, but it does not invade the other organs of the body, which contain no more than a few stray individuals, of no practical importance, who may happen to be washed there by the blood current. Apart from the mechanical obstruction of the breathing all the danger of the disease results from the absorption of diphtheria toxin from the local focus of disease. The antitoxin contained in the serum derived from artificially-immunised horses has no direct effect on the diphtheria bacilli, but neutralises the toxin produced by them. This it does by some form of chemical action, neutralising the toxin in a test tube in strictly equivalent proportions, the two behaving in this respect exactly like an acid and an alkali. As a matter of experience it is found that when their toxin is thus neutralised the diphtheria bacilli in the local lesions become harmless: they are dealt with by the tissues as ordinary saprophytic bacteria, and the case so treated makes a speedy recovery to the normal condition. When mixed in a test tube the proportion of antitoxin required to neutralise many times the lethal dose of toxin is very small. When the two are injected into an animal simultaneously or with only a short interval, the proportion is somewhat larger, but still remains small; for antitoxin and toxin behave to each other in the blood stream as they do in the test tube. But if a multiple of the lethal dose of toxin be injected twenty-four hours or more before the antitoxin, the proportion of the latter required to save life becomes enormously increased, and a thousandfold the dose sufficient in the former instance may now be inadequate. The explanation of this is that the toxin is no longer wholly contained in the blood stream. It has entered into some kind of combination with those tissue cells which it particularly affects. In the case of tetanus, for example, a minute dose of antitoxin may be sufficient if injected simultaneously, while the largest possible dose may be insufficient when the toxin has attached itself to the substance of the cerebro-spinal motor cells. That it does so attach itself is shown by the fact that if the toxin is mixed with an emulsion of cerebro-spinal tissue in sufficient proportion before injection, it becomes harmless. In tetanus, the combination once formed

is unfortunately very stable, but in the case of the diphtheria toxin it appears that by maintaining a very high degree of antitoxin strength in the blood, the toxin may be neutralised even after it has fixed itself in the tissues. But to do this, very large doses are necessary, and the longer the interval allowed before their use, the larger must they be.

Applying these considerations to practice, we should, in the first place, inject our remedy as early as possible, as soon as we have made our diagnosis, and frequently in doubtful cases before a positive diagnosis is possible. In very early cases an ordinary dose of from 600 to 1,000 units is quite enough. The course of the disease is rapidly arrested and convalescence is speedy and complete. But it is quite different with cases of long duration, presenting extensive membrane, extending, it may be, into the nose or larynx, or in cases showing symptoms of toxæmia. In these, the patient, in spite of appearances in some cases, is in a condition of imminent peril. The toxin is already fixed in his tissues, and death from implication of the central nervous system, heart, or kidneys will very likely occur. We may now be too late to avert the fatal result, but fortunately we may often do so by using very large and, if necessary, repeated doses. In a really bad case of this description I should administer from 6,000 units at once, and perhaps inject an additional 2,000 or 3,000 units or more within the next twenty-four or forty-eight hours. No time must be lost in producing a high degree of antitoxin strength in the patient's blood. According to my experience, about twenty-four or sometimes forty-eight hours elapse before improvement begins; it is then often rapid. The antitoxin appears to require this time to produce its effect, and in cases which die within twenty-four or forty-eight hours of administration the largest doses sometimes do not appear to have any effect. Notwithstanding this, the good effects of large doses in advanced cases have been well illustrated in our experience. During the first eleven months of antitoxin treatment our dosage was too small, and the mortality only showed a reduction of 17 per cent.; but, by using much larger doses, we immediately obtained a further reduction of 13 per cent., and this has been well maintained since. The following two cases will serve to illustrate recovery from grave toxæmia:

M. D., aged 4 years, admitted on the fifth day of illness. Membranous patches on tonsils and pharynx. Breathing with stridor and recession, colour dusky, 5,000 units injected. Intubation soon after admission. That evening, though breathing was easy, the child had a bad colour, lips were pale and dusky, pulse rapid and weak, and she was very restless. These symptoms pointed to grave toxæmia, and 3,000 additional units were injected. Prognosis unfavorable.

Second day, no improvement. Tube coughed up once, and replaced. *Râles* and *rhonchi* in chest.

Third day, condition still very grave. Urine with one-sixth albumen; 4,000 units injected. Tube was coughed up, and she had several attacks of dyspnoea, which were not relieved by reintubation. After a severe attack with cyanosis, Dr. Dixon performed tracheotomy, and extracted a large cast of membrane from the trachea. After operation pulse was extremely weak.

Fourth day, slight improvement, gradually leading to convalescence. The total amount of antitoxin administered was 12,000 units.

E. C., aged six years, admitted on the eighth day of illness. Membranous patches on tonsils and pharynx. Breathing with stridor and recession; 6,000 units injected. Second day, breathing worse. Intubated; during operation coughed up a large

piece of membrane. Another 3,000 units injected. Pulse poor. Urine scanty: 2 ounces since admission, one-third albumen. Ordered pilocarpin 1.20 gr. and hot-air bath, which caused free perspiration.

Third day, urine 3 ounces, about one-quarter albumen. Hot-air bath repeated. Another 3,000 units injected. Pulse still poor.

Fourth day, urine 3 ounces, one-sixth albumen. Hot-air bath repeated. Seems brighter. Intubation tube removed.

Fifth day, better. Perspiring freely. Urine 5 ounces, trace albumen. From this point steady improvement to convalescence. In all 12,000 units were administered.

There is much to be learnt from an analysis of the fatal cases. In 1897, 1898, and 1899 we have had 25 deaths; of these, sixteen occurred within forty-eight hours, and eight within twenty-four hours of admission. They may be classified according to the main cause of death as follows:

Primary toxæmia.....	6 cases
Bronchial membrane (in two cases combined with pneumonia).....	4 "
Pneumonia.....	9 "
Secondary toxæmia (with scanty urine or suppression).....	5 "
Accidental asphyxia (from coughing out tracheotomy tube during night).....	1 "
Total.....	25 cases

The first two headings caused 10 deaths, all of which occurred within forty eight hours of admission. One, an infant of 18 months, was admitted on the third day of illness. At this age the disease runs an exceptionally rapid course. Two were admitted on the fourth, the remainder on the fifth to seventh day of illness. In all the cases under this heading the disease was apparently too far advanced on admission to be combated. They died as most cases used to die before the anti-toxin treatment was introduced.

Pneumonia was responsible for 9 deaths, of which 7 occurred within forty-eight hours. Since the introduction of the new treatment this cause of death has come into much greater prominence; for while the antitoxin will neutralize the diphtheria poison, it has no effect on this complication, which is due to a secondary infection. In two cases examined by me this was found to be due to the pneumococcus, but other observers have found the streptococcus pyogenes to be frequently the excitant cause. Two of these cases, both children aged two years, were admitted according to parents' statements on the second day of illness. If the statements were correct, they show that even early treatment of the diphtheria by antitoxin will not always prevent a fatal issue from pneumonia. Clinically these cases may be recognised by their extremely rapid shallow breathing, with high temperature and rapid failing pulse. Physical signs are sometimes to be elicited. Several cases were verified *post mortem*. I have seen cases complicated with well-marked pneumonia recover, but it has more often proved fatal.

Under secondary toxæmia I have included a very important class of cases which I have observed before the introduction of serum treatment, but which has assumed a higher relative importance lately. They are nearly always cases of long duration on admission. The earliest was admitted on the fourth day of illness, but this is exceptional, one on the

fifth, the remainder had been ill a week or more. They have had extensive areas of membrane in nearly every instance. Some have at first appeared to be doing well, but after several days' treatment, the urine is observed to be scanty and loaded with albumen; sometimes there is complete anuria. At the same time the child develops a painfully-marked restlessness, is totally sleepless, but retains consciousness to the end, while the pulse fades away and often becomes imperceptible at the wrist for many hours before death. These are often classified as cases of heart failure, but they are not properly regarded as cases of simple heart failure.

That the condition of the kidneys is an important factor in the result I have no doubt; but they are not cases of uræmia in the usual acceptance of this term. Convulsions I have never observed, and coma is absent, being replaced by an exactly opposite condition. I have never seen a case in which these symptoms had developed recover under any form of treatment; but of late I have endeavored to anticipate their occurrence in cases with scanty albuminous urine by the injection of pilocarpin (gr. 1-20) and hot-air baths, as in the case of E. C. given above. I believe nasal cases are particularly liable to develop these symptoms, and such cases ought to receive a large initial dose of antitoxin, although their condition at the time may not appear serious.

If we classify our cases since the commencement of the antitoxin period according to the day of the illness on which antitoxin was first administered, we obtain the following:

	Cases.	Deaths.	Mortality.
Treatment commenced on 1st day.....	7	—	
“ “ 2nd “	39	2	
“ “ 3rd “	50	6	
“ “ 4th “	51	4	
Total.....	147	12	8.2percent.
“ “ 5th “ or later.	131	22	16.8 “
Cases of uncertain duration.....	39	6	15.4 “

The two cases fatal from pneumonia, although antitoxin was administered on the second day of illness, have already been mentioned. Of the six deaths among those admitted on the third day, one occurred during the first period of antitoxin treatment when the doses administered were too small. Of the remaining five, four died of pneumonia; the last case was an infant of 18 months, admitted moribund from toxæmia on the third day of illness, and has been already alluded to. It is the only case we have seen since 1895 in which death occurred from uncomplicated diphtheria treated with antitoxin during the first three days of the disease.

These results emphasize the importance of early treatment. Every medical practitioner ought to have a supply of diphtheria serum and a suitable syringe at hand. In the large towns there is no difficulty in obtaining a supply, and it is easy to keep a few bottles of the liquid serum and to replace them as needed. The liquid preparation is the easiest for use, and may be kept for six months or more without losing its efficacy. Practitioners in the bush townships should keep a supply of the dried serum, which can probably be relied on to retain its strength unimpaired for years. It is absurd that a practitioner several days' journey from the metropolis, meeting with a case of diphtheria, should have to telegraph for antitoxin. This is too often not of any use to him by the time he gets it.

All other forms of treatment are of very minor importance. Routine applications to the throat have been altogether abandoned in the Children's Hospital. We only use them when the membrane is sloughy and offensive. It has been argued on theoretical grounds that as antitoxin only neutralises the poison, something should be done to kill the bacilli. But I have found by bacteriological examination that in the majority of cases the bacilli disappear within a few weeks without any local treatment; and in those cases in which they persisted longer I have been unable to hasten their disappearance by such treatment. Local applications are, in nine cases out of ten, unnecessary; and unnecessary treatment is bad treatment. When, however, there is much nasal discharge, gentle syringing with salt and water (a teaspoonful to a pint) is advisable. Internal medication has also been abandoned as a routine measure. When the pulse is showing signs of failure, we have given digitalis, strychnine, and alcohol in moderate doses, and these may be of some service. When the urine is very scanty and albuminous, I have lately administered pilocarpin hypodermically (the dose should not exceed gr. 1-20), followed by a hot-air bath, administered by covering the child with a cradle and blankets, under which the moist hot air of a spirit lamp flame is conducted through a bent metal tube. In cases dying from bronchial membrane or pneumonia, inhalation of oxygen gas is of value in relieving distress and promoting euthanasia. I have not seen it save life.

To sum up the whole matter, the treatment of diphtheria consists in the administration of antitoxin early and in sufficient dose. A trustworthy preparation of known antitoxin strength should be employed. There need be no fear of administering an overdose; the only objection to giving an unnecessarily large dose is its cost. To give too little for this reason is a very poor economy. The saving in the number of doctor's visits, not to mention funeral expenses, much more than covers the cost of the serum. In the case of poor patients I have been accustomed to explain the danger of the disease, and have never found them object to the expense of the remedy. Those who cannot afford this are suitable cases for hospital treatment. I would certainly decline to take any responsibility, or to continue to attend a case, if the treatment were objected to, and I hope other practitioners would do likewise. I would appeal particularly to those engaged in club practice, who are more

bound to their patients, to explain to them the need for immediate injection of serum or immediate removal to hospital. Too many patients of this kind have been brought to us too late.

We may say that if patients and medical men did their duty, the former in calling assistance early, the latter in applying the remedy early and in sufficient dose, the death-rate from diphtheria might be reduced to a small fraction of what it is at present, although it has been materially lowered in this colony of late years. Indeed, with the necessary qualifications, we may say no child ought to die of diphtheria. There are no doubt some cases complicated by pneumonia a very early stage, some others at a distance from medical aid, some few in which the diagnosis in the early stages is extremely obscure. Cases sometimes occur of laryngeal diphtheria without any visible membrane, and these are sometimes very hard to distinguish from catarrhal laryngitis. In cases of doubt a full dose of antitoxin should be given. Sometimes an attack of diphtheria becomes engrafted on a previous catarrh or tonsillitis and is then very likely to be overlooked in the early stages. But these are all rare exceptions, for the most part death from this disease is avoidable and ought to be prevented.

NOTES AND REFERENCES.

¹ Goodall, *British Medical Journal*, 1899, vol. I., p. 197. ² *Intercolonial Medical Journal*, October, 1896. The figures given of the preantitoxin period contain a few unimportant errors which are here corrected. ³ Owing to pressure of other work, I ceased making these examinations, but I hope they will be soon resumed by the hospital residents, for which purpose a laboratory is being fitted up. ⁴ Cases showing merely hoarseness, croupy cough, or even visible membrane in the epiglottis are excluded. It is always possible to distinguish laryngeal stridor from pharyngeal stertorous breathing.

DIET IN INFANTILE DIARRHOEA.

Fotheringham, in a paper on "Infant Feeding and Infantile Diarrhea," prepared for the Toronto meeting of the Canadian Medical Association lays particular stress upon the value of prompt intervention in acute cases, and on the giving, for twenty-four hours at least, of nothing but from one to two ounces, every two hours or oftener, of sterilized water, to which a pinch of salt and a taste of sugar, preferably milk sugar, has been added, cannot be disputed. It is borne out clinically, says the author (*Dominion Medical Monthly*) by the fact noted by Booker that "none of the bacteria isolated (from the stools) were found to be capable of multiplying in ordinary hydrant water forty-eight hours after it had been inoculated; in all such cases negative results were obtained." After the first twenty-four hours or so are passed it may be well to attempt the use of some nutritive fluid—and at the outset one must decide whether to use albuminous or farinaceous materials. If the stools are not specially foul albumins may be given, and the best one is probably egg-water. White of eggs contains about 10 per cent of albumin, and should be diluted with about ten times its bulk of sterilized water, with a little salt and a taste of sugar, as it is stated by Biedert that a solution of albumin stronger than 1 per cent. cannot be digested as a rule by even the healthy

stomach, and it is found in practice that a "3-6-1 mixture," as it is called (3 per cent. fat, 6 per cent. carbohydrates, and 1 per cent. proteids) is a very generally useful form of modified milk, approximating closely an average breast-milk. Another good albuminous food is the red meat-juice in drachm doses added to the water or other fluids that may be in use. Liquid peptonoids, panopepton, and so forth, may be mentioned in this class. As to the farinaceous fluids, they are all of the same type, and may be equally well made from barley, rice, oatmeal, sago, tapioca, corn-starch, or arrowroot, so long as one bears certain points in mind. One point is that the more vegetable albuminoids there are the better, and that, other things being equal, the husk and the layers of the grain next it should be boiled as well as the starchy contents of the grain.

Another point is that very thorough boiling is necessary, three to four hours at least, to cause diastatic change and prevent trouble from the indigestible starch. Thorough straining, too, is important. The consistency of a farinaceous fluid should be that of thin to medium cream, such as will pass easily through an ordinary rubber nipple. And now that the nipple is mentioned, it is worth while remarking that if the stomach is irritable it is very often due to the fact that the hole in the nipple is too large, and the child swallows too rapidly.

One of the most useful of all the starchy preparations is likewise the oldest, the good old bag of flour the size of the lower half of the forearm boiled steadily for ten hours. The outer shell is thereafter removed, and the firm central part, like a piece of soft white bath-brick, grated down and slowly reboiled, as required, with water to make a gruel of a consistency varying with the age of the child. For children over six months, at any rate, this is a most useful food in diarrhael conditions.

One will often find whey very useful, made either with sherry, or what I think is better, essence of pepsin or junket powder. It makes an excellent vehicle for liquid peptonoids or red meat-juice.

Fischer, in a recent number of the *N. Y. Med. Record*, speaks highly of very weak cold tea especially when stimulation is desired, and of an acidulated drink made by adding to a tumblerful of plain boiled and cooled water five to ten drops of dilute hydrochloric or phosphoric acid, and sweetening with a little glycerine (a powerful antizymotic) or saccharin.

It is well on inaugurating the change of diet to try to strengthen the interval of feeding—always bearing in mind the urgent need of water to replace the fluids drained from the tissues by the diarrhael loss. Thus, if a child has been getting four ounces, two of milk and two of barley-water, every two and one-half hours, one should try to give, instead, say four ounces of barley-water with a drachm of red meat-juice every three to three and one-half hours. As regards temperature, either extreme seems to me bad, particularly in young infants. Some say the food should always be cold. This may apply to children of ten to twenty months, but in infants of, say, three months, it aggravates pain and has no counterbalancing advantage.

The return to milk should be very tentative. Casein should be allowed last, and fat first in the shape of small quantities of cream, say

half to one teaspoonful at each time of feeding, added to the barley-water or other farinaceous fluid, and slowly increased. The cream should never be bought as such, but obtained by removing the top two inches from the jar which has been left five or six hours on the ice.

Rachford goes so far as to say that "cream is theoretically never contra indicated, and can do no harm in any form of a disease, but will be found to serve the best purpose in chronic cases, and after the third or fourth day in acute cases." My own clinical experience will hardly tally with the statement that "cream can do no harm in any form of the disease." The same writer goes on to say that "meat broths contain so little albumen and carbohydrates that . . . they may be given at any time, in either acute or chronic cases; but they are specially indicated in a few cases after the first twelve or twenty-four hours' treatment." One danger in their use lies in the fact that they are very apt to be kept far too long after making, for they very promptly turn stale. A contra-indication to their use would be foulness of stools or great frequency and copiousness. If the morbid process be mainly a colitis they can be given more freely.—*The Dietetic & Hygienic Gazette.*

THE INFLUENZA PEST.

This dreaded disease has not only disappointed all hopes of its disappearance but has returned with greater vehemence than ever. It may be doubted whether any previous outbreak has attacked so many persons as the present, although, happily, the mortality has not been nearly so high as that met with in some of the earlier epidemics. Christmas Day all over the United Kingdom was more or less blighted by the advent of this unwelcome visitor, and in many cases both guests and hosts rose from bed to keep their dinner engagements. The unwisdom of such a proceeding, especially in such inclement weather as that which characterised Christmas Day, cannot be too strongly insisted upon. Yet we doubt if many of the foremost offenders have not been medical men, whose disregard of influenza is not a little remarkable, considering their knowledge of the course of the disease. As everyone should know by this time, a slight attack of influenza is just as dangerous as a sharp one. The average individual is absolutely safe if he stay warm abed, but if he go about his condition is at once shifted from security to danger. These facts have been demonstrated again and again until they are mere household maxims in ordinary medical practice. The infectiousness of the disease was well illustrated by the remark of a chemist, who said that when he got one prescription from a large household he knew that sooner or later he should send physic to every one else in the house, including the servants. There has been a famine of nurses, greater perhaps than has been experienced in any previous outbreak. Another feature has been the number of members of hospital staffs attacked by the malady, so that many institutions have been for a time almost entirely deprived of the services of their resident and visiting medical staff. In one case the popular surgeon of a London hospital was married to a lady who actually left the sick-

room, where she had been kept by a sharp attack of influenza. to attend the church. What between the "flue" and the war at the Cape, the Christmas season has been anything but festive.—*Medical Press and Circular.*

THERAPEUTICS.

Antitoxin in the Light of Scientific Investigation.

Int. Med. Magazine, October, 1899.—Dr. Robin, pathologist and bacteriologist to the Delaware State Board of Health, Newark, Delaware, wrote this paper to refute the statement made by Dr. Herman in the *Medical Record*. He says that Herman's only evidence was clinical statistics covering a comparatively short period, and himself gave statistics from the hospitals of Berlin and Budapest, and quotes Church, Rouchfuss, Dolinski, Kossel, Behring and others to the effect that the mortality from diphtheria has greatly lessened during the antitoxin period. The author says that the decrease in mortality from diphtheria cannot possibly be due to sanitary improvement, as there has been little, if any, in the condition of the poorer classes. "Most of the diphtheria bacilli, as well as the streptococci are in the pseudo-membrane, and the advisability of its early removal, either by means of antitoxin or local application is apparent." If death is produced by the antitoxin it is the result of idiosyncrasy, as may happen with many drugs. Paralysis, albuminuria, pneumonia and other complications are less frequent with the antitoxin than without it. The toxin of diphtheria is a chemical product of the bacteria, having definite properties and chemical composition. Antitoxin is also a chemical product of cells, and is practically an antidote to the toxin. "One molecule of toxin," says Ehrlich, "combines with a definite and constant quantity of antitoxin. If antitoxin does not cure a case of diphtheria it is due to one of the three following reasons. (1) It is not used early enough, streptococci having had time to produce their virulent effect. (2) It is not used energetically enough, too small quantities, or at too rare intervals, being administered. (3) There is a proportion of patients so susceptible to the disease that antitoxin cannot cure them, just as there are patients suffering from malaria who cannot be cured by quinine, or syphilitics who are not cured by mercurials and iodides."—*Medical Fortnightly.*

For the chronic ulcers of tertiary syphilis, Professor Hearn finds acid nitrate in mercury, one part to sixteen parts of water, applied every third day, the best stimulating caustic. It not only destroys the hopelessly diseased tissue, but seems to exert a distinct alternative influence in the less diseased area.

Colic Cure.

R. Chloroform	1 drachm
Tinct. belladon	1 drachm
Tinct. camphor	1 drachm
Spts. ammon. aromat	1 drachm
Listerine	1 drachm

M. Sig. One-half teaspoonful, *in water*, every twenty minutes until relieved.—*Ashby.*

PROPHYLAXIS OF GONORRHEA.

In a study of the modern views of gonorrhoea and its treatment, Dr. Frederic Bierhoff (*Philadelphia Monthly Medical Journal*, July, '99), writes as follows :

"The suggestion of Frank that the female be compelled to thoroughly cleanse the genitals before coitus by the use of irrigations of protargol solution, and that the male be compelled to undergo an examination, seems to me to be by far too Utopian. We cannot devise means to compel the carrying out of the order by either, nor can we punish the female for the acquisition of disease otherwise than by attempting to make her harmless to the community. The most we can do, in such a direction, is to recommend the use of such a cleansing after coitus, and of the instillation into the urethra, by both male and female, of a few drops of a 20 per cent. solution of protargol in glycerine, as proposed by him. This latter procedure he proved, by a series of conclusive experiments, to be an absolute preventitive of infection, if used timely. He demonstrated that the gonococci were killed in five seconds. In his article he also mentions the favorable results obtained by Welander of Stockholm, and by Blokusewski, who both employed protargol instillations. Therefore, the measure proposed seems to offer a safe-guard against gonorrhoeal infection when intelligently carried out." The formula recommended by Dr. Frank consists of protargol 20 parts, glycerine 20 parts, and water 60 parts. This solution is completely unirritating and can be applied immediately after coitus, two or three drops being introduced into the meatus and another drop upon the frenum. In cases of tight prepuce it is advisable to wash out the preputial cavity with a protargol solution.

SLEEP IN THE TREATMENT OF DISEASE.

Dr. Wm. Ewart (*British Med. Journal*) discussed this subject at a recent meeting of the Harveian Medical Society. He said :—

"Sleep has two offices, both fulfilled in the long sleep of the night, which it is our usual endeavor to secure for our patients—namely, that of favoring the slow changes of repair, and that of interrupting consciousness by uncoupling the chain of neurons, or by relaxing protoplasmic tension or tone. This relief of tension as, it would seem, the only office performed by the shorter spells of sleep, and therefore the two forms of sleep suggest two therapeutic objects. The night's sleep which comes without any drugs may need to be bettered, and in improving the quality of spontaneous sleep our help is often of value. It might also need to be prolonged.

"The systematic prolongation of sleep for the cure of disease is one of our opportunities hitherto little used. In chorea, sleep entirely subdues the muscular agitation, and this observation has led to the attempt to arrest the disease by prolonging sleep for considerable periods. A complication arises in connection with alimentation which in this disease,

as in most other nervous troubles, is of primary importance. Partly for this reason, and because more than rest may be needed for a cure, the results hitherto reported have not sufficiently recommended the method.

"Prolonged narcosis has also been suggested in excessive wear and tear of the nervous system; and in various nervous affections, including the mental, its renewed trial, combined with suitable methods of feeding, might lead to encouraging results.

"Best suited, perhaps, to our every-day needs is a systematic resort to the shorter sleep. Like the light instalments of food which restore the lost function of appetite and digestion, short sleep in the day may be essential to the cure of nocturnal insomnia. Our growing wealth in hypnotics warrants a hope that a suitable agent may yet be found which in that direction would minister to the health of the invalid, and might command the luxury of sleep at any opportune time for the convenience of the worker.

"Body rest as a systematic therapeutic agent has long found its place in our treatment for patients whom weakness alone, in the absence of medical advice, would not have compelled to take to their bed. To that class belong the frail woman in whom the debility of anemia, of dyspepsia, and of overfatigue develop symptoms often mistaken for hysteria. Rest in bed is their first need. In the treatment of chlorosis this is now recognized as the essential element for a rapid recovery. Its methodication employment forms an essential part of the open-air rest cure for phthisis, which within quite recent years has largely replaced at foreign sanatoria the previous method by muscular exercise."—*Charlotte Med. Journal*.

ANTIPYRETIC DRUGS; THEIR USE AND ABUSE IN THE TREATMENT OF FEVER.

—Dr. A. Jacobi read a paper with this title. He said that the most effective antipyretic drugs were those which were directed against the portion of the body engaged in heat production. They acted either on the cells of the tissue or on the heat-regulating centres. Those most commonly employed reduce the temperature by increasing the heat elimination through hyperemia and perspiration. The temperature centres could be paralyzed by large doses of digitalis and of veratrum viride, or by excessive doses of phenol preparations. The effect of quinine was local in the cells, and remained evident even after section of the spinal cord, while the phenols appeared to act both on the centres and on the surface. The latter exerted their influence even when the lower part of the cortex was irritated by puncture. They also promoted analgesia. Some physicians object to antipyretic altogether on the ground that higher temperatures, in the infectious diseases chiefly, were necessary for the formation of antitoxins. But it should be remembered that the typhoid fever bacilli outlived their toxin, and possibly also their antitoxin. The mortality rises with the height and persistence of the high temperature. Pneumonias and typhoids, with fair remissions, permitted of fair prognoses. Relapsing fevers of long duration and very high tem-

perature had a mortality of only 2 or 3 per cent. because of the long remissions. The multiplicity of the causes of fever proved its nature—it was not an entity, but a symptom. Its treatment should not be governed by iron-clad rules. A temperature which might be dangerous to one individual was of little importance to another; moreover, a temperature which might be easily and safely borne at the beginning of an illness might prove very harmful in the later stage of the same disease. The treatment of the symptom, fever, gave us no hope of shortening the disease, of which it formed a part. On the other hand, we could add materially to the patient's comfort, and at the same time not at all interfere with the healing process. To allow a high temperature to deteriorate tissues and exhaust the brain was as injudicious as was the custom of emphasizing the number of degrees of Fahrenheit as the only important part of a morbid process. Protracted fevers interfered seriously with nutrition, and on this account became more serious in proportion to the youth of the individual. He believed more infants and children died of the slow results of protracted high temperature—what was called convalescence—then were destroyed during the active stage of the disease. An acute anemia was more easily overcome than a chronic one. To the latter class belonged those associated with, or following diseases attended with high fever and starvation. The younger the animal or person, the sooner would it succumb to starvation. The blood of the child is less in quantity, relatively, and had less fibrin and less salts, and contained more leucocytes than in later life. Most of our antipyretics were at the same time diaphoretics and analgesics, and hence were often powerful adjuvants to baths and other treatment, or were useful substitutes for baths when the latter was distinctly contraindicated.

Quinine.—Quinine affected bacteria but little. In watery solutions of quinine fungi readily grew. This drug diminished the metabolism of albuminates and the amount of uric acid; also the number of circulating leucocytes and their amoeboid movement. In small quantities it accelerated the pulse and increased the blood pressure; in larger doses it might cause urticaria or other exanthems, and even albuminuria and hematuria. In fair doses, quinine was certainly antipyretic. Besides malaria, febrile diseases of a remittent type, such as typhoid fever and pneumonia, were very amenable to the action of quinine. In malaria it should be given from three to five hours before the expected attack. Absorption was certainly aided by the addition of diluted alcohol or of spices, but the medication in children's diseases often demanded that certain advantages be sacrificed to palatability. Oleate of quinine should not be used because of the irritation produced by the oleic acid; inunctions with lanolin were far better, if this mode of administration were used at all. Medication by the mouth was always more or less unreliable when the temperature was high. The neutral tannate, given in doses 150 per cent. greater than the sulphate of quinine, would answer very well, but most physicians would prefer to administer the sulphate of quinine in some vehicle, such as syrup of coffee, chocolate or elixir adjuvans. It should not be forgotten, however, that if quinine were kept in contact with an elixir for some

time, portions would be dissolved; hence the quinine should be mixed with the vehicle only as wanted. Many children would take eagerly considerable quantities of the sulphate if it were mixed with a large proportion of chocolate.

In some cases of chronic malaria, associated with marked tumefaction of the spleen, it would be found that benefit would follow the use of ergot, even when most of the other drugs usually employed in this disease had failed. He had been able to confirm this statement by an experience extending over a period of forty years. It was often advisable to administer the ergot with quinine, or with arsenic.

Salicylic Acid.

Salicylic acid was both an irritant and an antiseptic. It was eliminated through the kidneys unchanged, or as salicyluric acid. It was a nerve sedative, and excited peripheral hyperemia and perspiration. For internal administration the salicylate of soda was better because less irritating. In many cases of pyemic fever the combination of quinine and salicylic acid acted admirably when neither drug alone was effective.

Antipyrin.

Under normal conditions antipyrin increased the pulse and blood pressure, and was, therefore, contraindicated in hemoptysis. It was moderately anesthetic and markedly styptic. It was quite irritating in the subcutaneous tissue. It was sedative and analgesic, but its action was not that of a pure nervine, as it appeared to produce its effect through the general circulation. The body temperature would be diminished with fifteen or twenty minutes after first dose. As a rule, it should be repeated in two hours except where the drug was given for its analgesic effect. This drug had seemed to him ineffective in the fevers of cranial disease.

Acetanilid.

This drug does not disturb the stomach and skin to the same extent as some other antipyretics. Being a derivative of anilin, it was poisonous; not only did it paralyze the central nervous system, but it decomposed the blood.

Phenacetin.

Phenacclin resembled acetanilid in its action, but was much milder. He never ordered adults more than three grains as a tentative or first dose.

Alcohol.

Alcohol possessed the great advantage over most antipyretics of rapid absorption in the stomach. As a dose of half an ounce was liable to prove fatal to every child less than ten years of age, one should well consider its advantages and disadvantages before using it. He was not one of those who withheld alcohol altogether. Alcohol was exceedingly well tolerated by feverish patients. In the aseptic fevers, at least in their earliest stages, it was rarely required, but in the infectious diseases, and in septic cases generally, the doses tolerated and required might seem excessive to the inexperienced. He had long been a firm believer in the value of large doses of alcoholics in grave cases of diphtheria. The large

doses often taken easily during the height of such a disease would no longer be tolerated as soon as convalescence had been established. For the antipyretic effect large doses of alcohol were required, and, therefore, it should not be given for this purpose except in septic cases. It should not for the same reason be given in the early stages of pneumonia for its antipyretic action. It was well to remember that 4 per cent. of the alcohol was eliminated through the lung, and that it was not wise to throw this extra work upon the lungs while these organs were in a state of acute inflammation.—*Pediatrics*.

Treatment of Bronchiectasis with Fetid Expectoration.

- R Natural acetate of lead . . . 0 gr. 015 to 0 gr. 03 centgr.
- Terpine 0 — 15 to 0 — 30 —
- Dover's powder 0 — 10 to 0 — 15 —
- M. Make twenty such pills. Take two or three pills a day (for an infant 2 years old).

From time to time stop the above and substitute the following:

- R Guaiacæ
- Fowler's solution, āā 8 grammes (ʒi)
- Oil of Eucalyptus 4 " (ʒij)
- M. Ten drops morning and evening.—*Sem. Medical*.

Simple Catarrhal Conjunctivitis.

- R Acidi borici gr. xl.
- Sodii chloridi gr. vi.
- Aquæ camphoræ
- Aquæ destil, āā ʒii
- M. Sig. Apply as lotion to eye every two hours.

—*Journal Amer. Med. Association.*

The Roetgen rays will reveal large cavities in the lungs, and large effusions into the pleura; but say the best we may, small areas of consolidation are hardly ever distinguishable.—*Manuel de Diagnostic Médical Debove-Achard, Paris, 1899.*

Heroin.—Heroin is not so harmless as was formerly supposed. It has a far greater depressant action on respiration than is seen in the case of morphine. Heroin is also a cardiac depressant, and in addition gives rise to muscular twitchings and convulsions. The maximum adult dose at present should not exceed 1-14 grain. Harnack (*Munch. med. Woch., July 4, 1899.*)—*Monthly Cyclop. of Prac., Med., September, 1899.*

TREATMENT OF CHLOROSIS.—The following method of treating chlorosis was advocated by Sir Andrew Clark. With careful attention to the diet and a tepid sponge bath, followed by brisk toweling night and morning, he prescribed the following mixture:—

- R Ferri sulphatis gr. xxiv.
- Magnes sulphatis dr. vj.
- Acid. sulph. aromat. dr. j.
- Tinct zingib. dr. ij.
- Infus. gentian comp. vel quassia q. s. ad oz. viij.
- M Sig. One-sixth part twice daily, about 11 and 6 o'clock.

Occasionally this acid mixture produces sickness, dries the skin, and is otherwise ill-borne. In such cases he prescribed the following alkaline mixture:—

R Ferri sulphatis gr. xxiv.
 Sodii bicarb dr. ij.
 Sodii sulphatis dr. vj.
 Tinct. zingib. dr. ij.
 Spt. chloroformi dr. j.
 Infus. quassiae q. s. ad oz. viij.

M Sig. One-sixth part twice daily, at 11 and 6 o'clock.

Sometimes neither mixture agrees with the patient, in which case he prescribed sulphate of iron pill with meals, and a saline aperient on first waking in the morning. By this plan Clark held that nine out of ten cases recovered in one to three months, and by careful attention to the bowels, taking twice a week a pill composed of aloes, myrrh and iron, the recovery probably would be permanent.—(*Practitioner*, lxiii. 359).

(9) LANDAU'S TREATMENT OF GONORRHOEAL CERVICAL CATARRH.

Feigl (*Wien. med. Woch.*, November 4th and November 11th, 1899,) has treated 50 cases of gonorrhœal cervical catarrh by the method introduced by Th. Landau, which is founded on the mutual antagonism between certain micro-organisms; in this case between the yeast fungus and gonococci. The author's results have not been so brilliant as those obtained by Landau (v, *Epitome*, vol. i., 1899, par. 289), possibly because in all his cases the diagnosis of gonorrhœa was confirmed by a microscopic examination of the secretion, while in Landau's the diagnosis was made clinically; the cessation of discharge being no guarantee of the cure of the gonorrhœa. The treatment was carried out exactly as described by Landau, 10 to 20 c.cm. of ordinary fresh beer yeast, mixed with a small quantity of beer, being injected every day or every few days into the vaginal fornix with a syringe. Before the injection the vagina is cleansed with a douche of hot water and dried with a cotton wool, and after it is given is plugged with a tampon. The average number of injections given to each patient was 6, the greatest 21. Though a slight diminution in the number of times the gonococcus was found, when repeatedly looked for microscopically, was observed, the gonococcus did not finally disappear even in the cases treated the longest. In 23 cases, with scanty mucous or muco-purulent secretion, there was a clinical improvement, the discharge becoming more watery or altogether ceasing, but in more severe cases the treatment almost always failed, and had to be abandoned in favor of old methods. Some cases, especially when the injection was made only once every second or third day, became decidedly worse, with an exacerbation of the inflammatory symptoms. In one case the injections were followed by slight, in a second by severe parametritia, but in all the other case were well borne. Feigl does not, therefore, consider

the method to be any improvement on those previously in use, which consisted in rest and cleanliness for acute cases, in the application of some astringent on a Playfair's probe every few days, and the introduction of vaginal tampons soaked in tannin-ichthyol glycerine twice a day.

Brit. Med. Jour.

ARTIFICIAL DILATATION OF THE CERVIX IN PRIMIPARÆ

Frarier, in his recently published monograph upon this important subject (Paris, Baillière, 1899), sums up his own discussion of the subject as follows:

"Given the question of accelerating the first stage of (normal) labor in primiparæ, while at the same time maintaining the physiological character, what method ought we to employ when labor is tedious and painful?"

"Such interference ought to be inoffensive for both mother and child, ought to be thoroughly practicable, ought to assist the first stage without compromising the succeeding stages of labor: it ought, further, to have a constant value in routine obstetrics.

"Electricity is both dangerous and difficult, while its results are inconstant.

"With regard to hot injections, those of the intravaginal sort are harmless to mother and child, but only feebly active. Hot intra-uterine injections, distinctly oxytocic, may lead to detachment of membranes or placenta and predispose to postpartum hæmorrhage. They are extremely inconvenient as they condemn the patient to prolonged immobility. They often rupture the membranes prematurely and lead to displacement of the normal presentation. These inconveniences more than counterbalance the benefits of the method, which might otherwise be considerable.

"Is the use of chloroform more advantageous? The best it can do is to regulate the irregular pains which may characterize the first stage of labor. For the rest, chloroform, as well as chloral, has a deplorable action on the cervix in nonuterine inertia."

The use of quinine leads to but indifferent results, which may often be harmful. *Lactose*, however, is evidently a drug in which the author has more confidence than he likes to admit. This apparently inert substance, given in two doses of six drachms each, actually fills all the indications originally laid down by the author with the sole exception of constancy. In more than half the cases in which it has been employed, it has been a marked success, and in his final summary it is placed next in efficacy to incision of the cervix.

The various mechanical dilators, air and water bags, are repudiated by the author in connection with normal labor in primiparæ. The drawbacks more than counterbalance the doubtful utility of these implements.

The general attitude of the author's criticisms of methods employed in dilating the primiparous cervix has clearly foreshadowed some measure which most nearly fulfills the indications originally specified. This measure we find to be simply incision.—*Medical Review of Reviews.*

SURGICAL SUGGESTIONS.

Evacuate pus wherever found. To wait for the action of poultices to decompose the skin, or "draw" the pus, is unworthy a modern surgeon.

Immediate amputation of an injured member is now seldom required. Control hemorrhage, dress antiseptically, and await reaction.

While the foregoing treatment will give by far the best results, altogether it must be remembered that the danger from cardiac and pulmonary embolism is increased where an effort is made to save bruised tissues.

A wise surgeon sacrifices no tissues that, if saved, would prove useful. Flaps, in order to heal kindly, must be free from tension,

Err in making flaps too long rather than too short.

In amputation, where bones are sawed, it is most difficult to keep thorough acespsis until the healing process is complete.

Bandages should be adjusted so as to control hemorrhage from the stump after amputation, but great care must be taken that they be not drawn so tightly as to affect nutrition by obstructing the circulation.

Unless there are indications, such as rise of temperature, soiling of the dressing, or hemorrhage, a single dressing should suffice for an amputation.

Do not inject cysts or vascular tumors with remedies tending to produce coagulation unless free drainage is provided.

Cysts should be evacuated or dissected out, while vascular tumors are best treated by excision or cutting off the blood supply.

Varicose veins should be ligated at suitable points and the intervening portion of the vein removed.

Injecting varicose veins with astringents and irritants is unsatisfactory, and not without danger.

Arteries and veins should be ligated with as little manipulation as possible.

Esmarch's bandage has rendered operations upon bones almost as simple as upon the cadaver.—*Dr. Bell, in Medical Herald.*

HOW TO ABORT A COLD.

Max Nassauer asserts that an incipient cold in the head can be checked if the nose is thoroughly rinsed with a weak (pale pink) solution of potassium permanganate, which seems to have a specific action upon the germs of coryza. It checks colds in the first hour or so. After blowing the nose vigorously, both nostrils are well rinsed out with the solution, the fluid being allowed to run out through the other nostril and through the mouth. Each nostril is wiped out with cotton on the finger. A small dry plug of cotton is then well pushed up into each nostril, and the nostrils are filled with the weak solution, with the head held back, the cotton being allowed to soak it up. The plug is left undisturbed for about an hour, when it can be expelled by blowing the nose. Even an established cold is favorably influenced by this treatment, but it is most effective when the sneezing, tickling and increased secretion announce the onset of the attack.—*Practitioner: Cincinnati Lancet-Clinic.*

TORONTO MEDICAL SOCIETY.

(Stated Meeting February 1st, 1900.)

Subject, "Puerperal Fever."

Dr. F. N. G. Starr, Vice-President, in the chair.

Dr. W. J. Wilson, in opening the subject said:—Among other causes of this condition the numerous small tears and cracks occurring in the vagina and os uteri gave the required entrance for pathogenic organisms, especially if from any cause the powers of resistance were below the normal. The constant recumbent position was also a danger by retarding drainage and favoring retention of lochia. Another important cause was the patient's own finger, by conveying organisms from discharging nose or ear or boils, etc. The surroundings of the patient might be at fault, milk and food might convey the organism, also the urine since the presence of pathogenic germs had been demonstrated in the excretion.

The physician or nurse should not be blamed except on absolute proof.

Prophylaxis was the proper treatment. Abnormal discharges should be washed out. When sepsis had set in the uterus should be explored by the finger and debris removed and an antiseptic wash given. He warned his hearers against the use of ac. carbol. as liable to produce collapse. The system should be flushed with salt solution, the patient being supported until the disease wears out.

Dr. H. T. Machell followed on the "Early Diagnosis." He did not agree with Dr. Wilson that the use of carbolic acid in swabbing out of the uterus was liable to produce collapse. No one liked to admit that he had a case of sepsis. The early signs were:—After a normal labor on from the second to the fifth day a sudden rise of temperature above 99° or $99\frac{1}{2}^{\circ}$ F. should call for inquiry. Headache, loss of appetite, sleeplessness, quickened pulse, a sense of impending danger, and an anxious countenance, should warn the attendant to investigate. The patient should be placed in a good light and ocular as well as digital examination carried out. If abnormal tenderness is found at the fundus, the os uteri patulous, and uterus soft with cervix looking irritable, there could be no doubt of sepsis, especially if foul discharges are present. All other causes should be carefully excluded.

Dr. J. F. W. Ross followed on "Retained Placenta" as a cause. He divided the causes in to four heads:

- I. Traumatism, lacerations of uterine fundus, wall, vagina, perineum.
- II. Presence in abdomen of some foreign body, becoming inflamed or ruptured, as ovarian cyst, etc.
- III. Pressure of latent gonorrhœa.
- IV. Retained placenta.

He credited the last two with 50% of the cause. The inspection of the secundines was not sufficient to exclude retention of a portion of the placenta.

Dysphtheria, typhoid fever, diseases from food, were diseases of the puerperium. He did not believe in epidemic puerperal sepsis without actual contact as a means of conveying the infection. He had investigated a supposed epidemic in which he found gonorrhœa twice, and

placental retention accounted for the three cases which had occurred in a certain institution following rapidly upon each other and called epidemic. He had removed pieces of afterbirth from a great many cases and claimed that the uterus should be explored as a matter of routine with the finger, and if necessary the hand in the vagina. Most patients were under an anæsthetic, and there could be no objection, and if necessary give the the anæsthetic and examine thoroughly, also examine for rents in the body of the uterus behind

Dr. J. J. Mackenzie on the "Bacteriology" said Doederlein in 1892, from a series of 195 cases, concluded that the vaginal secretion in 55.3 per cent was normal, sterile and markedly acid, made up of epithelial cells, large numbers of long, tolerably thick bacilli and occasionally a few yeast cells; in 44.6 per cent. abnormal, more fluid in character, less acid and occasionally neutral or alkaline, and varieties of bacteria, cocci and short bacilli.

In 1894 Kronig, as a result of 100 cases, stated that the vaginal secretion of pregnant women who have not been examined never contains organisms which grow aerobically upon ordinary media at the body temperature except yeast gonococci, and therefore never contains septic bacteria. Williams, of Baltimore, in 1898 published an article agreeing with Kronig. The conclusion was that auto-infection was improbable if not impossible.

Dr. K. C. McIlwaith on the "Treatment." He divided puerperal fever into two forms, sapraemia and septicemia.

In sapsemia the treatment was not so radical. Drainage must be favored and uterus examined. He claimed the retention of plasenta was not a cause until it became infected by the introduction of pathogenic organisms. He objected to the use of the curette except where failure with the finger rendered the dull curette a necessity. Then flush with an antiseptic douche. General treatment consisting of tonics and food, also the elimination by mag. sulph. Lacerated points should be touched with carbolic.

The treatment for the second class was the same.

Antistreptosoccic serum had not proved successful as yet.

Discussion.

Dr. C. J. O. Hastings said the term puerperal fever was a misnomer. The disease was identical with septic infection in any surgical case. He thought he could tell if all the placenta were away by inspecting.

Dr. Hunter still believed in auto-infection and agreed with Dr. Ross that the uterus should be examined.

Dr. Starr said it was as necessary to disinfect the external genitals as the attendant's hands. How many were in the habit of washing off the external genitals when attending a case of obstetrics before making an examination? He also said that the cavity of the uterus should be wiped out with gauze after using the finger or curette to remove hanging particles too small to be caught and still attached enough to resist the douche. He had had a case when a pseudo membrane had formed and infection gone on beneath it.

Drs. Oakley and Walker also spoke.

Dr. Wilson replied that collapse had occurred after the use of ac. carbol. in a case he had. He said gonorrhoea was rather rare in country practice.

Dr. Machell protested against Dr. Ross' suggestion. If it became a rule of practice puerperal mortality would be more than doubled. He did not believe that 50% were due to retention of placenta. He saw no use in the eliminative treatment in a routine way.

Dr. Ross said antiseptic surgery has not relieved the mortality from puerperal fever. No attendant would hesitate to pass the entire hand to remove an adherent placenta, yet the mortality was not greater in that class than any other. The lochia was infective.

Dr. McIlwaith said the retention of placenta was the cause in a very small number of cases, and could only become so when infected by the introduction of germs from below.

The society adjourned.

A. G. ASHTON-FLETCHER, M.D.C.M.

Recording Secretary.

THE EIGHTH COMMANDMENT IN MEDICAL JOURNALISM.

Under the above heading *THE LANCET*, owing to the unfortunate oversight of not crediting the source of some selections made use of in its pages during the past year, comes in for some caustic, though we regret we cannot say, unmerited criticism from some of our contemporaries. A year ago the editorial staff of the journal resigned, and in the somewhat disorganized state of affairs that followed, the matter complained of occurred. For this the present staff disclaims all responsibility. In justice to our contemporaries, however, we wish to express our extreme regret at the occurrence and our strongest disapproval of such a breach of the ethics of medical journalism.

While in the present instance we believe from information received, that it was the result of an oversight, we do not wish to claim this as a satisfactory defence.

THE LANCET with the March number will be under the control of an entirely new staff, with an editor in charge, responsible for the conduct of the journal, and associate editors, responsible for each department. This staff will endeavor to maintain the high reputation for integrity and journalistic honor, which has characterized the "*CANADA LANCET*" since its establishment in 1867, and will be assured that it will not again be necessary to appear in the rôle of apologists in a matter so thoroughly distasteful and indefensible.

The Canada Lancet

A MONTHLY JOURNAL OF MEDICAL AND SURGICAL SCIENCE, CRITICISM
AND NEWS.

The Oldest Medical Journal in the Dominion : Established 1867¹

Editor :—H. B. ANDERSON, M.D., C.M.

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EDITORIAL.

VACCINATION IN THE PROPHYLAXIS OF TYPHOID FEVER.

The publication, by Prof. A. E. Wright and Major Leishman, R.A.M.C., Army Medical School, Netley (*Brit. Med. Jour.*, Jan., 1900), of the results obtained by their Antityphoid inoculations, brings to the notice of the profession a most important departure in the preventive treatment of typhoid fever. If future investigations and wider experience confirm what their Indian statistics appear to establish a decided advance will have been made in dealing with the disease.

Apart from its scientific aspect, their work will be followed with particular interest at the present time on account of the exposure of our troops in South Africa to this dreaded scourge of military camps. During the late Spanish-American war, which is not altogether an exception to the rule, the actual casualties on the field were comparatively insignificant, compared with the mortality from typhoid fever in the camps. Modern preventive medicine has done much to hold the disease in check, but the overcrowding, the privation and exposure, the contaminated water supply, bad drainage, and many other insanitary conditions, necessarily connected with the hasty massing of large bodies of men in camps, and especially in besieged garrisons, render it almost an impossible task to prevent the outbreak of typhoid and other filth diseases, in proof of which we have only to note the presence of these diseases among the troops at Ladysmith.

Antityphoid inoculations have been largely resorted to with the hope of immunizing the troops in the present South African campaign, and if

successful, not only will it result in a great saving of life, but it will have a most important bearing on the final issue of the war. From a military point of view, the far-reaching importance of the success of this method of treatment will appear, when we remember how much efficiency for active service depends upon the health of the men.

Warned by past experience, however, the profession will be slow to hail with too great acclaim, any brilliant scientific promises, no matter how devoutly to be wished, until they have fully satisfied the test of practical utility. While withholding judgment until further data are forthcoming, the work of Professor Wright and Major Leishman certainly gives us good reason to hope that we have obtained for typhoid fever a means of prophylaxis scarcely less efficient than that of antitoxin in diphtheria, or vaccination in smallpox.

In their investigations they have followed practically the same mode of procedure used by Haffkine with considerable success in his anti-cholera inoculations in India. The vaccine used consists of a pure culture of the typhoid bacillus, attenuated by being sterilized at 60°C, to which 1% lysol was added for preservation. The amount used for each inoculation varied from .5 to .75c.cm., this being the minimum dose fatal to a hundred grammes of guinea-pig. Following inoculation, the patient shewed a fairly severe reaction, and the blood of immunized individuals responded to the Widal test the same as that of patients suffering or convalescent from an attack of typhoid fever.

The subjects for inoculation were chosen from among the British troops stationed in various parts of India, new-comers and others particularly liable to contract the disease being specially selected. Altogether among 11,315 troops, 2,835 inoculations were made. Among those inoculated, 27 cases of fever subsequently developed (.95%), of whom five died (.2%).

Among the 8,460 uninoculated troops, during the same time, 213 cases of typhoid developed (2.5%), with 23 deaths (.34%).

Looking at the figures as they stand, it will be seen that the occurrence of typhoid fever and the mortality were both much less among the inoculated troops. These figures, however, appear in a much more favorable light when we consider that the thoroughly seasoned and acclimatized soldiers were excluded from inoculation, only those who considered themselves particularly liable to take the disease, subjecting themselves to the treatment. Moreover, the circumstances under which the inoculations were carried out were not the most favorable, and there were no opportunities for re-inoculation. The investigators had difficulty in obtaining a sufficient supply of vaccine, having to frequently re-sterilize that used

in order to preserve it aseptic, with the probable result of lessening its potency. It would not, therefore, be unreasonable to expect more favorable results from the use of a properly standardized and well preserved vaccine, with the treatment carried out under more satisfactory conditions.

The artificial immunity produced is said to last from one and a half to two years.

The rationale of the treatment is essentially the same as that of vaccination in smallpox—the inoculation of an attenuated form of the typhoid bacillus or their toxins producing a modified or mild type of the disease, resulting in the production of an immunity from the more severe attacks.

The authors refer to the possibility that the antityphoid inoculations may confer a degree of immunity against malaria, that disease occurring less frequently among the men subsequent to treatment. This, on scientific grounds, is rather difficult to believe and much stronger proof than is yet forthcoming will be necessary to establish the truth of the statement.

PERSONAL.

Dr. McNulty (Tor. '98), for the past two years house surgeon at St. Michael's Hospital, has begun practice in Peterboro.

Dr. A. H. Garrat has removed to his handsome new residence on College street.

Dr. J. N. E. Brown, clerk of the Yukon District, was married on January 1st 1900, at Dawson City, to Miss Freeman (Faith Fenton), of Toronto. Dr. Brown was a member of the house staff of the Toronto General Hospital 1892-3, and was secretary of the Ontario Medical Association for a number of years. He practised for some time in Toronto, but went to the Yukon two years ago as secretary to Commissioner Ogilvie.

We are pleased to hear that Dr. Meyers has concluded the purchase of the property formerly known as the Deer Park Sanitarium, which he has changed in the past two years into a private hospital for the treatment of nervous diseases exclusively. As none of the class of patients for which the Deer Park Sanitarium was established has ever been received under the present management, this name has no longer any significance and it will in future be known as a private hospital. The advances of neurology of recent years have shown the increasing necessity of a properly equipped private hospital for the treatment of neurological cases, and the results so far obtained have amply justified the hope that useful work could be done in Canada in this important branch of general medicine.

Dr. V. A. Hart, of Sault Ste. Marie, Michigan, and Dr. J. L. Bradley, of Creemore, sailed from New York on the *Lucania* on Feb. 10th. They propose spending some time doing hospital work in Great Britain and on the continent.

OBITUARY.

Dr. Harry Chapple, of Billings, Montana, who for the past two years had been suffering from Addison's disease, died on January 10th in Arizona, where he had gone for his health. The deceased was born at Orono, Durham County, Ontario, and graduated at Trinity Medical College in 1889. He began practice in Billings, where he was very successful. He was elected mayor of the town, and he was also at the time of his death Deputy Grand Master of the Masonic fraternity of Montana. Dr. Chapple was married to Miss Mattie Murphy, of Brantford. His many friends regret that death has so early ended a promising career.

Dr. Josiah Roseburgh, who graduated from Trinity Medical College in 1893, died suddenly last month, in Michigan, where he had established a successful practice.

Dr. J. H. Corbett, of Orillia, died suddenly on January 31st. He had had been attending to his professional duties and was driving home from a visit to the Indian Reservation at Rama, when he was apparently taken faint. He was carried into the office of a brother physician, but expired almost immediately. Dr. Corbett was the oldest physician and one of the most highly esteemed citizens of Orillia. He was a staunch Tory and a devout member of the Church of England. He leaves a widow and ten children. His family have the deepest sympathy of the community in their bereavement.

THE IMPORTANCE OF PROLONGED REST IN BED AFTER ACUTE CARDIAC INFLAMMATIONS IN CHILDREN.*

BY L. EMMETT HOLT, M. D.,

Professor of Pediatrics, New York Polyclinic; Attending Physician to the Babies' and to the New York Foundling Hospitals, New York.

The general impression prevails that the prognosis is acute cardiac inflammations of a severe type is much worse in childhood than in later life. Certainly the consequences of such inflammations which are continually brought to the physician's notice, whether in hospital, dispensary or private practice, would seem to justify the opinion.

There are three reasons why cardiac inflammations are likely to be especially serious in young children: (1) the frequency with which both the endo- and pericardium are involved; (2) the great tendency to acute dilatation; (3) the liability of these attacks to be complicated by pneumonia.

The cardiac muscle, like the voluntary muscles, in young children, has by no means the resistance which it attains in later life; as a consequence of this, it happens that under the strain of an acute inflammation, dilatation comes on very readily and progresses more rapidly than its adults. The danger of dilatation is much increased in cases complicated by pericarditis. It is largely owing to rapid dilatation that

*Read by title before the American Pediatric Society, Deer Park, June 29, 1899.

we see so many cases succumb during the acute attacks, and it is usually in consequence of progressive dilatation that cardiac failure with dropsy and all its attendant features so often follows within a few months after the primary attack.

It is this condition of the heart walls which must be the chief consideration in the treatment of acute attacks, not only during the period of active inflammations, but for a considerable time afterward. I have long been of the opinion that if we would minimize the injurious effects of acute endo-pericarditis, we must secure to these patients as nearly absolute rest as is possible; and that, not simply for a period of two or three weeks after acute symptoms, but for as many months.

With adults the amount of work required of the heart may be pretty well regulated after the patient is sitting up or even walking about. With children, however, it becomes a practical impossibility to control or regulate the amount of exertion when once they are allowed out of bed. With them, therefore, if rest is to be secured at all, it can be accomplished only by strict confinement to the bed and in a recumbent position. This must be continued long enough for the heart to regain its tone and for a readjustment of the circulation to take place. In practice, I have not found this as difficult in any case as had been anticipated.

The two cases whose histories are given below, illustrate in a striking way the benefit resulting from this plan of treatment. They are selected as representing types of most serious inflammation affecting both the endo- and the pericardium; both were complicated with pneumonia and both were nearly fatal in the acute stage. The third case illustrates only too well what is so often seen to follow where children after acute heart inflammations are allowed to be up and about as soon as their general symptoms permit. All of these cases were observed in private practice and all were living under circumstances which made possible anything and everything which the patients required.

CASE 1.—Acute rheumatism; endo-pericarditis; two attacks of pneumonia: condition of the heart two and a half years after the primary attack.

C. D., male, three and a half years old, a private patient living in the best surroundings; under close personal observation since infancy. Never any previous illness of importance. Family history strongly rheumatic; the mother, an older brother and sister had suffered from repeated attacks of acute or sub-acute articular rheumatism.

The boy was taken on March 9, 1897, with chilly sensations, vomiting and high fever. He was seen on the following day with a temperature of 102.5° F., and seemed much prostrated, but a careful physical examination gave no clue as to the cause of the constitutional symptoms. On the third day, the temperature having continued, an eruption of urticaria appeared upon the hands and thighs, and this on the following morning gave place to quite a remarkable erythema, which occurred in large patches of symmetrical distribution, especially about the knees, ankles, abdomen and back. The larger patches were somewhat larger

than the hand, and the smaller ones scarcely an inch in diameter; all were sharply circumscribed, and all of the same dark, purplish color, looking almost hemorrhagic. This eruption faded after two or three days, changing to a coppery hue before it disappeared. Coincidentally with the eruption there occurred pain, tenderness and swelling of the large joints of the left lower extremity, and on the next day the joints of the right side were also affected.

On the fifth day of his illness a distinct systolic murmur was heard for the first time at the apex of the heart. The temperature is shown on the accompanying chart.

The early part of the second week of the illness was characterized by a gradual subsidence of the articular symptoms, slowly falling temperature, and improvement of the general condition; but the cardiac murmur persisted and became gradually more and more pronounced. The urine was highly acid, and contained traces of albumin, and there were frequently recurring outbreaks of urticaria. The treatment so far had been salicylate of soda, given in as full doses and as regularly as the stomach would permit, and a sufficient alkaline salt to overcome the high acidity of the urine. As much as gr. vii. of the citrate of potash was required every two hours to produce this effect. The lungs thus far had been normal.

On the thirteenth day a sharp rise in the temperature occurred, with considerable dyspnoea, which was explained two days later by the development of acute pericarditis, and subsequently by pneumonia of the left lung. Loud pericardial friction sounds were heard over the upper half of the cardiac area. The prostration now became marked, and the pulse, which had previously ranged from 110 to 125, rose to 140. The stomach became so irritable that all food and almost all medication had to be interrupted, and the general symptoms were most disquieting.

On the sixteenth day (March 25th) a small area of pneumonia was discovered at the left base behind, which rapidly extended until nearly the entire lower lobe became consolidated. For the next week the pneumonia became the most important condition, and the child remained in a very critical state. Nothing but a little bovine and whiskey could be retained in the stomach, and he was kept alive chiefly by the use of oxygen, which was given almost continuously.

The heart's action became very weak and at times irregular; the pulse ranged from 140 to 150, and the whole precordial space throbbed violently under the laboring action of the heart. There was now a double murmur at the apex; steadily increasing dilatation was evident, the apex beat being now one-half inch to the left of the nipple. For three or four days it did not seem possible that the heart could continue to hold out against such odds. But gradually at the end of the third week things took a turn for the better, and slowly there was improvement, first in the general symptoms, and a little later signs of resolution appeared in the lung. Things progressed quite favorably for the next three or four days, and the signs of consolidation had entirely disappeared; but on April 5th, without any assignable cause, the temperature again rose, pulse increased to 154, respiration ran up to 60, and for the second time the left lower lobe became almost completely solidified.

During the next four days his condition was worse than at any previous time during his illness. Food had to be practically discontinued on account of the irritability of the stomach, and only the smallest quantity of stimulants could be retained. Oxygen was given constantly and strychnine and digitalin pushed as far as possible. He had now become greatly wasted; respiration ranged from 60 to 70; there was extreme pallor, great muscular feebleness and almost every day two or three attacks of syncope. Gradually he rallied from this low condition, and by April 11th, for the second time, resolution was well under way in the lung, while the clearing tongue and returning appetite indicated an improvement in the digestive organ. It was really remarkable to see how the heart stood the strain of this second attack of pneumonia. The dilatation increased steadily, and the organ labored hard to keep up the circulation, but the odds were so great that on several occasions it would seem that the heart could not maintain the effort. Once or twice, even after there was marked improvement in the lungs, attacks of syncope came on, in one of which, I think, he would have died but for prompt and energetic stimulation.

It was not until the end of the fifth week of his acute symptoms that there was really any continuous improvement. The apex impulse was now $\frac{3}{4}$ inch to the left of the nipple and about the same distance below the mammary line. The pericardial friction sounds had disappeared, but there was a double murmur at the apex, the systolic one being loud enough to be heard over the whole left chest in front and behind. The impulse was heaving, but the pulse most of the time continued regular. From time to time during the next week or two, slight articular manifestations of rheumatism occurred, but they were not severe nor persistent.

After this time the progress toward recovery was rapid. The digitalin was continued until the 10th of May, and after this only strychnine used. Even during this month a marked change took place in the heart. The apex beat receded until it was nearly in the mammary line, although there was no change in the murmur. No dropsy had been present at any time. The lung had entirely resolved. Up to this time the child had been kept absolutely flat on his back, not being allowed even to raise his head.

On May 12th he was taken out of doors for the first time in a rolling chair, still being kept entirely recumbent. This was continued daily; but it was not until the 1st of July that he was allowed to sit up, and not until August to put his foot to the floor or take a step.

On July 1st he was taken to the country and kept there nearly three months, for the most of the time being in the open air, lying flat in his rolling chair. No return of the rheumatism and no symptoms referable to the heart occurred during this period.

I examined him again carefully on October 1st. He was apparently in as good physical condition as ever in his life. He had grown fat, strong and was no longer anæmic; the pulse was regular and from 104 to 110 a minute. The apex impulse was now one-half inch *inside* the

mammary line and only one-half inch below the nipple. The systolic murmur was still heard at the apex, but it was not loud, and audible only over the heart and at the angle of the scapula behind. The pre-systolic murmur had entirely disappeared; no trace of pericardial friction sounds could be heard, and lungs, liver and spleen were normal.

During the succeeding winter he was gradually allowed more and more liberty in the way of exercise, and was permitted to walk in the street and about house on the level, but not to go up and down stairs without assistance.

June 1, 1899.—It is now over two years since the acute attack. The boy has been kept under close observation and heart carefully examined at short intervals during this period. For more than a year no restraint has been placed upon the child's activity except that of avoiding violent, romping play. He runs about, goes up and down stairs, rides a tricycle and, in fact, does almost everything that any six-year-old boy does, and without the slightest inconvenience of any kind. The apex beat remains fully one-half inch inside the mammary line and in the fifth space. No unnatural impulse in the cardiac region is noticed. The murmur has become much less distinct, but is still easily recognized. There has been no dropsy and no return of rheumatic symptoms. At no time has the child complained of the slightest discomfort which could be attributed to his heart. The general health has remained good with the exception of a chronic indigestion during the past spring which continued for over two months, and, although he lost several pounds in weight, became very pale and excessively nervous, his heart stood the strain remarkably well. It was carefully watched with a good deal of anxiety, but did not seem to be affected in the slightest degree. He is now well-grown and considerably above the average both in height and weight for his age.

November 13, 1899.—I examined him to-day for the first time since the summer. There has been no striking change since June, except that the murmur is much fainter and behind is heard only with difficulty. The apex beat remains in the same situation. He never complains of his heart, though he is of an active, restless temperament and never quiet. He is gaining rapidly in height and is somewhat paler than usual, but otherwise in excellent health, and has had no rheumatic symptoms since his primary attack.

CASE II.—*Pericarditis with effusion; endocarditis; two attacks of pneumonia; malaria; condition of the heart twenty-one months after the acute attack.*

E. P., eight years old; female. Seen in consultation with Dr. W. H. Risk, of Summit, N. J., February 3, 1898.

The family history was strongly rheumatic on the mother's side, and a younger sister of the patient had died two years before of acute rheumatic endocarditis and complications. The patient had always been considered a rather delicate child, but she had never suffered from any of the ordinary infectious diseases. The present attack was preceded about a month by an irregular fever which was regarded as malarial and which continued for two weeks. After this she was well enough to go out coasting on January 29th. This exposure, however, was followed by a

high fever, which marked the beginning of her illness, and the child from that time had to be kept in bed. During the five days preceding my visit the temperature had ranged from 101 to 104 deg.; the only other symptoms were great restlessness, marked by prostration and a short, teasing cough.

On examination I found a pale, thin girl, with considerable dyspnoea, the respiration accompanied by a short expiratory moan; temperature, 103.6 deg. F.; pulse, 136 and weak; respiration, 50. Her general appearance was that of a child who was very ill. Over the left chest in front there was marked dulness extending outward nearly to the axillary margin; above, to about the second intercostal space; below, to about the fifth space; to the right, a little beyond the median line. This region of dulness was sharply outlined, and over the upper portion of it a very loud pericardial friction sound was heard over a circumscribed area. A loud double murmur was heard at the apex of the heart, and at the angle of the scapula, left side, a single, systolic murmur. The respiratory sounds in front over the area of dulness, were absent; behind bronchial breathing was heard over a small area at the middle of the lung, near the spine. This was also dull on percussion. There were no râles in the chest in front or behind. The right lung was normal; other organs normal.

A diagnosis was made of mitral valvulitis and pericarditis with effusion. The pulmonary signs heard posteriorly in the left lung regarded as due to pressure. The treatment was salicylate of soda in full doses, digitalis and small doses of morphine.

I saw her again five days later. A striking improvement had taken place both in the general condition and in the local symptoms. The pulse now ranged from 90 to 104. The temperature had gradually fallen, and on the day previous to my visit it had been normal both morning and evening. Pericardial friction sounds were still present, but not so distinct as at the first examination. There was only a single murmur at the apex, but this was transmitted to the left and heard distinctly behind. The area of dulness anteriorly was much smaller and respiratory murmur in the region more distinct. A few râles were heard in front toward the margin of the axilla, and behind where formerly there had been pure bronchial breathing the lung was filled with moist râles, indicating that probably the signs previously present had been due to a pneumonic consolidation and not to pressure. A few coarse râles upon the right side.

The general improvement in all the symptoms continued for nearly a week after which time she was regarded as convalescent; but on Feb. 13th, without any apparent cause the temperature again rose to 102.5° and with this there was cough, dyspnoea and sharp thoracic pain. I saw her for the third time the following morning and made out a small area of pneumonia at the extreme base of the left lung behind. Examination of the heart showed that a good deal of dilatation had already taken place. The apex beat was one inch to the left of the mammary line and three-quarters of an inch below the level of the nipple. The area of cardiac dulness, however, did not extend beyond the border of the heart.

No pericardial friction sounds were heard and fairly good respiratory murmur was now present at the upper part of the left lung in front, where in her first acute attack there were no breathing sounds. There was no evidence that any increase in the heart inflammation had occurred, but the rise of temperature and other symptoms seemed entirely explained by pneumonia. The child had become greatly wasted, very irritable and extremely anæmic.

From this second attack she rallied quite rapidly; the temperature gradually fell but did not quite reach normal. The pneumonia resolved in a few days.

On February 19th. a third exacerbation in the temperature occurred without any evident explanation. I saw her again on the 21st and was surprised to find improvement both in her general condition and in the heart in spite of the persistence of the fever which ranged from normal to 104.5°. The lung had cleared with the exception of a few short râles; the apex beat was now an inch to the left of the nipple, and one and one-fourth inches below. Pulse, 110 to 120.

I did not see her again until March 2nd, but the irregular high temperature had continued. It did not seem possible that this could be due to the cardiac lesion, as the physical signs indicated steady improvement here. The spleen could now, for the first time, be made out by palpation and an examination of the blood showed many malarial organisms. Quinine was now begun in full doses; improvement soon followed and the temperature gradually fell to normal. From this time convalescence was uninterrupted.

I did not have another opportunity to see the patient until eight months later, when she was brought to my office, January 15. 1899. I had, however, been kept informed by Dr. Risk of her condition. The same general plan had been followed as in the previous case. She was kept in bed for two months after all febrile symptoms had disappeared. This did not seem to affect her general health unfavorably; not only did her heart improve, but she gained steadily in weight, so that when she got up she weighed six pounds more than before she was taken ill. During June she was allowed to sit up part of the day and take short drives; and during July, for the first time, she was allowed to walk. The exercise was carefully and gradually increased during the summer, and by the late autumn she was able to go up and down stairs without the slightest discomfort, and seemed to be in every way normal.

The summer was spent in Vermont at the elevation of 1,000 feet without inconvenience, and she improved steadily throughout the season. At no time during the summer was there any return of the rheumatism or any symptoms complained of referable to the heart. At her visit to my office she came skipping into the room in the highest of spirits, with rosy cheeks, and in every way was in excellent physical condition, hardly recognizable as the invalid of the previous winter. The pulse was 100, full and regular. The apex beat in the mammary line, and $\frac{1}{2}$ inch below the level of the nipple. A soft systolic murmur was heard at the apex, but it was faint, not loud enough to be heard behind. No increase in cardiac dullness; no pericardial friction sounds. Lungs normal.

She did not suffer the slightest inconvenience on account of her heart, and it was difficult for one seeing her at this time to believe that she had had so serious a lesion as the one observed only a year before.

November 13, 1899.—She came in for examination at my request. With the exception of a slight diarrhoea last summer she had not been ill since the last note. She leads quite an active life rides her pony, runs about and plays pretty much like other children. No return of rheumatism and no cardiac symptoms since the last examination. The position of the apex beat is unchanged. It is only by the most careful auscultation that any murmur can now be detected. It is very faint and is heard only in the neighborhood of the apex, not at all behind. The pulse is full, strong and regular. The child's development is in every way most satisfactory. Her general health is excellent; she has in fact been better and stronger since than before her serious illness.

I have given the histories of the the cases considerably in detail in order that the type of the disease might be appreciated. The strain upon the heart during the attack of pneumonia in the little boy of three years (Case I) was so great that I did not expect him to recover. The second patient, though at no time so desperately ill, was for a week in a very critical condition, and her cardiac lesion seemed to be quite as serious as that of the little boy.

Had either of these patients been allowed to get up soon after the acute attack I feel very sure that the outcome would have been very different. As an illustration of such a practice I will give the history of another patient whom I saw last year.

CASE III.—*Endocarditis complicating pneumonia; death seven months after the initial attack from progressive cardiac failure.*

G. O. female, eleven and one-half years old; first came under my observation December 24, 1898. No rheumatism in the family; the patient was the robust member of the family and previous to July of the same year had never been seriously ill. At that time she had an acute lobar pneumonia of the left lung and was seriously ill for two weeks. The pneumonia was chiefly in front; involvement of the heart was recognized during the acute attack. She was, however, kept in bed only two weeks. In a few days she was allowed out to drive; and shortly after she was taken to the Adirondacks where she spent the balance of the summer. She was allowed to walk about the place, but not to engage in active exercise, and spent most of her time in a boat.

Dr. S. K. Bromner, who examined her early in August, soon after she came to the Adirondacks, reported the condition to me at that time as follows: The apex beat was over an inch to the left of the nipple and a very loud mitral regurgitant murmur was present.

Her general condition during the summer continued apparently good. But in September she had a short malarial fever; and in November a mild attack of gripe. During both of these she was a good deal prostrated, making a tardy recovery, and suffered from considerable cardiac embarrassment. Except when acutely ill she had been allowed

to be up and about the house, and drove out nearly every day, even up to a few days before my first visit. She also walked somewhat upon the level, but seldom up and down stairs. Early in December a slight dropsy of the feet and ankles was first noticed.

At my first examination there was noted a heaving cardiac impulse the apex was $1\frac{1}{2}$ inches to the left of the mammary line and two inches below the nipple. The heart's action was labored and the sounds somewhat confused, but there was a loud systolic murmur at the apex, which could be heard all over the chest in front and over the left chest behind. Near the apex there was heard over a small area a presystolic murmur. The pulse was 120 and somewhat irregular; the face considerably and the feet slightly œdematous; lungs normal; spleen and liver not enlarged; no fluid in the peritoneal cavity.

For the first ten days under absolute rest and the free administration of digitalis some improvement occurred and the dropsy disappeared; but after a short interval in spite of everything that was done the case went steadily downward. The dropsy in the face and lower extremities returned early in February; the liver and spleen became very greatly enlarged, and she finally died with general anasarca from cardiac exhaustion and pulmonary œdema on February 22nd, two months after I first saw her and a little more than seven months after from her first cardiac symptoms. No autopsy.

This girl belonged to a very healthy family, was of strong constitution and lived in the very best surroundings. She was a highly nervous, strong-willed child and was very difficult to control.

These cases teach their own lesson, and comment seems almost unnecessary. I firmly believe that in few things are physicians more blameworthy than in allowing children to get up as soon as acute symptoms have subsided, after they have suffered either from acute cardiac inflammations or from general infectious diseases (especially diphtheria, scarlet fever or typhoid,) of severe type and in which the heart muscle has been affected. The possibilities of harm which may result from this practice are certainly not appreciated. Nor, on the other hand, are the possibilities of improvement or the extent of recovery appreciated, where the plan of treatment above outlined has been followed.

—*Archives of Pediatrics.*

LONDON MEDICAL SOCIETY.

At a meeting of the London Medical Society, the following officers were elected for the year 1900:—President, J. D. Balfour (Superintendent Victoria Hospital); Vice-President, H. T. H. Williams; Secretary, W. M. English; Corresponding Secretary, H. A. Stevenson; Treasurer, W. J. Weeks. The acting President, Dr. R. Ferguson, gave a resume of the work done during the past year, the most prosperous year in the history of the society. Rev. Dr. Saunders read a paper on "Hypnotic suggestion in Medicine." Dr. H. A. Stevenson exhibited a uterus containing a large fibroid, with a dermoid cyst of each ovary, size of large orange, patient of Dr. H. Meek, patient made a good recovery.

ON THE AETIOLOGY OF THE NAUSEA AND VOMITING OF PREGNANCY.*

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The purpose of this preliminary paper is to advance a theory, which seems to be founded on sound physiological grounds, of the causation of the nausea and vomiting of pregnancy.

In a brief review of the somewhat copious recent literature of the subject, I have been unable to find anything which leads me to think that the theory which I wish to advance is other than new.

The vomiting of pregnancy is usually divided into two classes, namely: the mild or physiological; and the severe or pathological, hyperemesis gravidarum. The mild form, with which this paper particularly has to deal, occurs in the vast majority of cases of pregnancy.

In a brief paper it is impossible to refer to the various theories which have been advanced from time to time in explanation of the origin of this vomiting of pregnancy. That there exists in the pregnant woman a condition of exaltation of nervous tension all are agreed. A few consider that the origin lies in direct irritation of the medullary centers by toxic material circulating in the maternal blood. Others explain the irritation as originating peripherally, either in uterine contractions or in abnormal states of the gastro-enteric tract.

Exactly how conditions about the uterus give rise to peripheral irritation has been variously explained. Mechanical pressure of the enlarging uterus on the nerves of the pelvic ganglion; stretching of the muscle fibers of the uterus causing pressure on the nerves; versions and flexions of the pregnant organ; ovarian irritation from uterine pressure; diseased conditions, as endometritis, cellulitis, endocervicitis, etc., have all been advanced as factors in the production of this irritation. Gastric ulcer, gastritis, and various abnormal conditions of the large and small bowel have also been advanced as possible sources of the peripheral irritation.

Dirmoser,¹ as the result of a careful examination of the urine in six cases of hyperemesis gravidarum, comes to the conclusion that intoxication is the cause of the severe symptoms. As to the production of the intoxication,¹ he advances the following elaborate hypothesis: "Through the increase in size of the uterus the motor nerves of that organ, the sympathetic and the vagus, are at once mechanically irritated. They being irritated, bring about respectively contractions of the uterus and of the stomach. Irritation of the vagus increases, however, the secretion of the gastric juice and also the mucous production, so that the alkaline mucous frequently neutralizes the gastric juice, which is often observed in cases of hyperemesis. These changes form a predisposition to the formation of toxins, which is still more increased by the atony of the whole intestinal tract, which is present in all severe cases." Dirmoser thus considers that the uterine contractions are the result of irritation

*Read before the Montreal Med.-Chir. Society, Nov. 19th, 1899.

due to mechanical pressure of the enlarged uterus upon the motor nerves of that organ, and that the contractions so produced are evidently pathological.

I cannot do better than quote verbatim the summary of the present views as to the explanation of vomitus gravidarum which is given in *Progressive Medicine* for September, 1899.²

"The possible ways of explaining vomitus gravidarum are: (a) Direct vomiting may be produced by an abnormal condition of the vomiting center, due either to the irritating effects of chemical substances, toxins, etc., circulating in the blood, or to nutritional changes caused by variations in blood pressure in the medulla, or to other circulatory changes. (b) Reflex vomiting may be produced by sufficiently powerful impulses sent from the genital tract, causing an irritation of the vomiting center. (c) Vomiting may be produced by a combination of influences affecting the vomiting center both directly and reflexly. (d) The psychopathical factor may be important, as in the vomiting of hysteria.

"We must assume that in two-thirds of all cases of pregnancy there exists an increased irritability of the medullary centers, due wholly or in part to one or both of these two factors: (a) Nutritional changes, resulting from circulatory disturbances; (b) poisoning from toxic elements circulating in the blood. We must further assume that this abnormally irritable vomiting center is acted upon by afferent impulses sent from one or more of a variety of peripheral sources. Among the most important causes of reflex irritation are an incarcerated retroflexed uterus, abnormal adhesions of the uterus, pathological changes in the uterine wall, resulting from endometritis, pelvic, congestion, constipation, gastritis, etc. To these sources of afferent impulses we must add the psychopathic or hysterical condition, which is of especial importance in the more serious cases."

A brief consideration at this point of some of the more important conditions which are present in the gravid uterus will make my further remarks more intelligible. Tarnier has said, "All the properties of the gravid uterus exist in a rudimentary state in the nulliparous woman, and gestation only exalts them." Pajot has expressed this by saying, "Pregnancy does not create any new properties."

The principal properties possessed by the uterus are, sensibility, irritability, and contractility.

The *sensitiveness* of the non-gravid organ to pressure is easily demonstrated in making the bimanual examination. Pain is frequently complained of when the uterine sound is inserted. That this sensitiveness is increased in pregnancy is apparent to any one who has practiced abdominal palpitation for diagnosis of the foetal position. The manual pressure exerted in expressing the placenta frequently gives rise to severe pain. Women occasionally complain of uterine tenderness, especially those cases where the liquor amnii is deficient and the foetus exerts direct pressure on the uterine wall.

The *irritability* of the uterus is frequently markedly increased as the result of pregnancy. This fact is well known even to the laity, who not infrequently make use of their knowledge to induce abortion by introducing foreign bodies into the vagina to set up powerful uterine contractions.

The *contractility* of the uterus is its most important property. Tarnier and Chantreuil³ state that the uterus possesses the power of contracting even in a state of vacuity, citing by way of example that it may be noted in certain women at the period of menstruation, especially in cases of dysmenorrhœa. It favors the expulsion of clots and débris and is probably the origin of the severe cramp-like pains so often complained of by women at these periods. They state very strongly that these contractions of the uterus occur at regular intervals throughout the whole period of pregnancy.

Hirst⁴, Davis and others also draw attention to the fact that uterine contractions occur regularly throughout the whole period of pregnancy, and Hirst states that during pregnancy the contractility is always most marked at the menstrual epoch, hence the frequency of abortion at these times. After the fourth month these uterine contractions are manifest in placing the hand upon the abdomen over the fundus. The uterus can be felt hardening under the hand. In the earlier months these contractions can easily be made out by the bimanual method, and are frequently made use of in diagnosing the fact of pregnancy when the uterus is found to be enlarged.

Contractility is more markedly developed in the muscle cells of the body of the uterus, particularly towards the fundus, while it is less pronounced in the cervix. The cervix seems to be in a state of tonic spasm, while the contractions of the uterus are clonic. That this contractility of the uterus is independent of the will and yet capable of being affected by the emotions, all are aware. Uterine contractions may be set up reflexly by irritation of the breasts, and particularly of the nipples. It is probable that any powerful cutaneous irritation, as the application of heat and cold, may act in the same way.

The nerve-supply of the uterus is derived chiefly from the hypogastric and ovarian plexuses of the sympathetic system. Cohnstein* has shown that the uterine ganglia have to a certain extent an independent action, like the cardiac ganglia. There exists, as has been proven repeatedly, a center in the medulla oblongata which presides over the uterine contraction. Thus the uterus is provided with a nerve apparatus to preside over contraction, very similar to that of the heart.

That uterine contractions occur at more or less regular intervals throughout gestation may then be taken as proven. The question then arises: What is the purpose of these painless rhythmical contractions of the uterus.

It is very probable that by these contractions the uterine circulation is accelerated, and thus the uterus supplements to a certain extent the action of the heart throughout pregnancy. In considering the circulation of the blood in the gravid uterus the thing that probably attracts particular attention is the arrangement of the venous system. The

veins, especially in the middle coat of the muscular uterine walls, are simply enormous sinuses whose inner coat alone remains, being in direct contact with the muscle-cells. Thus these uterine veins are converted into large contractile sinuses, in which, no doubt, there must occur considerable retardation of the blood flow.

If I may be permitted, I would for the purpose of illustration compare the gravid uterus to a sponge held in the hand under a flowing faucet. As the sponge becomes filled and distended with water the hand is contracted upon it, and so the sponge is squeezed and emptied more or less of the water it contains according to the force exerted by the hand in squeezing it. When the hand is relaxed, the sponge again fills up, and so on. This, I take it, is very much what takes place in the gravid uterus.

In studying two cases of pregnancy with vomiting which I have attended recently, my attention was arrested by certain phenomena which seemed to me to be explicable only on one hypothesis.

In the first of these cases, a primipara, *æt.* 40, nausea and salivation occurred throughout the whole period of gestation. At intervals the vomiting was extremely severe, at one period the prostration resulting was so intense as to make it seem probable that the pregnancy would have to be terminated by the induction of abortion. I noticed that the severer attacks of vomiting occurred at certain intervals, which, on questioning the patient, I found corresponded to the menstrual epoch. On one occasion I precipitated a severe attack of vomiting when examining the breasts; on another a vaginal examination produced the same result, though on both occasions the patient had been fairly well for several days previous.

In the second case, also a primipara, the patient complained that her breasts were excessively tender, particularly the left, and on my examining this breast the patient was seized with a severe attack of vomiting. A vaginal examination produced the same result. The uterus was found to be unusually sensitive, and the left ovary was very tender. This patient had previously suffered from dysmenorrhœa, the pain being chiefly located in the left side. While talking with this patient I noticed that the nausea occurred in paroxysms, separated by a considerable interval, in which she said she felt perfectly comfortable. The patient, as long as she was kept quiet, either on a lounge or in bed, rarely vomited, though she still suffered from paroxysms of nausea. She noticed that after walking about the paroxysms occurred more frequently, and very often terminating in retching.

The hypothesis which to my mind affords the best explanation of the phenomena observed in the two cases mentioned is that rhythmical uterine contractions were the primary cause of the reflex irritation which resulted in paroxysmal nausea and vomiting.

In the first case, where the attacks of vomiting were more marked during the menstrual epochs, the uterine contractions were probably

accentuated, and at the same time the general nervous tension was exalted, hence the increased severity of the symptoms at these periods. My examinations in both cases acted by increasing the uterine contractions and thus precipitated the paroxysms.

The theory which I wish to advance is that the essential exciting cause of the nausea and vomiting of pregnancy is frequently the physiological contraction of the muscular fibres of the gravid uterus.

The contractions of the non-gravid uterus which follow the introduction of the uterine sound not infrequently result in reflexly inducing nausea and vomiting. Intra-uterine applications are frequently followed by cramp-like pains, which are associated with nausea and vomiting. In dysmenorrhœa nausea and vomiting sometimes occur, the explanation being that the effort of the uterus to expel clots and débris reflexly irritates the vomiting center in the medulla. Giles' has noted that in the primipara there is a close and constant connection between the sickness of pregnancy and previous dysmenorrhœa. Vomiting is frequently noted in the first stage of labor, and usually occurs at the acme of uterine contraction.

The over-distended bladder, in its effort to contract, not infrequently reflexly induces nausea; similarly the stomach sets up the same reflex. In ileus an analogous reflex action occurs. Appendicular colic is frequently associated with nausea and vomiting.

Thus we see that any hollow viscus in contracting may set up reflex nausea and vomiting.

The fact that the paroxysms of nausea occur most frequently on first assuming the erect position in the morning has led the laity to apply the term "morning sickness" to this condition. This has also been noted that if the patient, before rising, partakes of a light breakfast, the sickness is not so apt to occur.

"Morning sickness" is, I think, susceptible of explanation: There is probably more or less of an accumulation of effete material in the maternal blood in the morning, which leads to increased irritability of the nervous centers. The effect of assuming an erect position is to bring about a determination of blood to the plevis. This engorgement of the plevic circulation probably leads to more energetic uterine contraction, which, acting reflexly upon the center, produces nausea and vomiting. When food is taken before rising it is probable that considerable blood is determined to the stomach, hence less will find its way to the plevis when the patient stands erect, so that the uterine contractions are apt to be less vigorous than when the patient rises fasting.

It is probable that the beneficial effects of nerve-sedatives in the treatment of this distressing condition are obtained not so much by inhibiting the uterine contractions as by soothing the irritable nervous system and thus controlling the reflex.

I would summarize my conclusions as follows:—

1. There exists more or less of a rhythm in the paroxysms of nausea and vomiting in pregnancy.

2. There must also exist a rhythmical exciting cause for these paroxysms.

3. There is a rhythm in the contractions of the uterus which occur throughout pregnancy.

4. The essential exciting cause of the paroxysms of nausea and vomiting of pregnancy is frequently the physiological contraction of the muscular fibers of the uterus.—*Amer. Jour. of Obstetrics.*

SURGICAL HINTS.

All hypodermic injections may be rendered less painful, and be more readily absorbed if the active substance is dissolved in saline solution instead of plain water.

In nursing women, every inflammation of the breast and nipple must be considered as having a bacterial origin, and should be treated like any other local infectious process.

In alcoholic coma always investigate the bladder. It is apt to be very full. If there is no stricture the urine would drain itself out after a while, but if prostatic or other stricture would exist a rupture of the bladder might take place.

In administering chloroform to patients who have to be placed upon the side, as in some obstetrical operations, etc., place them on the right side if possible, as the heart's action is much better under chloroform in that position, than it is when the left chest is compressed against the table or bed.

In men, the intense scalding during urination in acute gonorrhœa may be relieved by urinating with the penis immersed in a vessel containing hot water. Women with gonorrhœal urethritis may similarly be relieved by directing them to urinate while taking a copious hot douche, or while sitting in a warm sitz bath.

After having succeeded in passing a catheter through a stricture, after some trouble, it is better to wait for some hours before withdrawing it. If you do not you may have just as much trouble in introducing another, whereas a catheter left in situ for a day or so will dilate the canal enough to allow you to pass the constriction quite easily.

In ankylosis resulting from disease still existing, passive motion is harmful. The only manipulation allowable in such cases is for the purpose of placing the limb, if possible, in the most useful position. In deforming arthritis, for instance, knees should be straightened out and elbows bent to a rather acute angle, under anæsthesia. Then use rest, with splints and ice bags to prevent inflammation.

In women climacteric hemorrhages sometimes occur as the result of vasomotor disturbances or of arterial sclerosis. It sometimes happens that several such hemorrhages take place prior to the final establishment of the menopause. Women at this period always attribute such an occurrence to the change of life, but the surgeon must invariably examine the patient on account of the strong chances of cancerous trouble.—*Int. Jour. Surgery.*