the surgeon and the physiologist could easily be multiplied, but I hope that those I have put before you may suffice, and have some influence in promoting that close intercourse between surgery and physiology which is essential for the progress of both branches of science.

LISTERIAN METHODS IN SURGERY.

I have often wondered what difference it would have made to my own life if Joseph Lister had been elected to the chair of surgery in University College in 1866, instead of John Marshall. It is easily the worst mistake that the Council of the College ever made. The echo of the election was remaining when I joined the College in the winter of 1866 as a very young student. I came to know Marshall very well. He was a good friend to me and I had a great respect and liking for him. But he was the most uninspiring teacher that I ever sat under. His systematic lectures were desperately dull, and being given late in the afternoon with a monotonous, musical utterance, most of his audience were soon fast asleep: I was one of the sleepers! Nor was his clinical teaching any better. His operating was slow and the reverse of brilliant. Whether he ever fully embraced Listerian methods—at the time I joined they were unknown outside Glasgow—I do not certainly know, but I much doubt if he did. He was not a physiologist although he published a textbook of physiology, largely founded on his notes of Sharpey's lectures: I do not think it went through more than one edition. Lister's biographer speaks of Marshall as scientific and a good teacher, but these are terms which I cannot endorse. He had a charming personality, and as he was already on the staff of the hospital he obtained the chair in preference to Lister, who had been many years away from the institution and was unknown both personally and through his work to most of the staff. John Marshall became a Fellow of the Royal Society and President of the Royal College of Surgeons. There is an admirable bust of him at Lincoln's Inn Fields. But Lister's name will be famous when Marshall's is forgotten.

It has always been a source of regret to me—as it must be to all alumni of University College—that Lister's work was not carried out at his old school. But the fates ordained otherwise, and to Glasgow and Edinburgh must be conceded the credit of nursing the new surgery into vigorous existence. I believe it would have made a great difference in the rapidity of the spread of the new doctrines if they had emanated from London, and Lister, no doubt, thought so himself, as his subsequent migration to London showed. The atmosphere of University College—if not of the hospital—was distinctly scientific, and at any rate amongst his scientific colleagues he would have received full encouragement. It was in 1866 that he applied for the appointment—less than a year after he had started his experiments on antiseptics in Glasgow. According to Horsley it was sixteen years (1882) before it was in general use in hospital surgical practice in London. The change occurred when Horsley was a student and long after my own time. And if I have wondered what a difference it would have meant to me, a mere physiologist, to have had a surgical training under Lister, how much greater would have been the difference to Victor Horsley if he had come under the direct influence of this great scientific surgeon. He would have been Lister's house-surgeon instead of Marshall's, and how enormously he would have benefited by the close relationship with Lister, and how keenly he would have followed and assisted in his experiments, those who best know both men can appreciate!

It is easy to speculate on the "might have beens." Sufficient to know that as soon as he came into his own Horsley was foremost in his adoption of Listerian methods, and it was in consequence of this that that particular combination of surgery with physiology which I chose as my first illustration of the mutual benefits they confer on one another was effected. If Lister had come to University College in 1866 I should have learned his methods from the master himself, but I should have missed the opportunity of being associated with so delightful a colleague as he whose memory we are assembled to-day to commemorate, and whose loss not only to physiology and surgery, but to the whole world, will be felt for many a year.

An Address

ON

CHRONIC INTESTINAL STASIS AND CANCER.*

BY

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At present surgery and medicine appear to be one horrible mêlée of attempts to understand and treat end-results, little or no endeavour being made to obviate the development of these conditions. In surgery operations increasing in severity replace less extensive procedures; whereas in such a condition as ulcer of the stomach, while no attempt is made to remove the factors which produce it together with many necessarily associated results, the possibility of the recurrence of the ulcer is only eliminated by the removal of the entire organ. The safety with which such operations can be performed, and the ease with which a surgeon can acquire sufficient skill to effect them at comparatively little risk, tend to increase the number and severity of these operations. Everyone worships the god "technique," to the complete elimination of the importance of dealing with the causation, and therefore the prevention, of disease which should be our real object in life.

The profession is only just beginning to realize the enormous part played by the defective functioning of the gastro-intestinal tract, the consequent fouling of the food supply, and the poisoning and deterioration of the tissues by septic material absorbed from the intestine.

DIET OF CIVILIZED AND UNCIVILIZED.

That we pay dearly for the luxury we enjoy in our food and habits of life is shown clearly by the fact that civilization brings in its train a very large number of diseased conditions which do not exist in those leading the simple life of the native. That these conditions are all due to acquired defects in the functioning of the gastro-intestinal tract is, in my opinion, undoubted, since they occur at once in the native when he is placed in a civilized community; and it can be shown that these diseases bear a direct proportion to the degree of civilization enjoyed.

Roughly the difference between the civilized and the uncivilized is a matter of diet. While the latter eat much food that is uncooked or only imperfectly cooked and which contains a large proportion of indigestible matter, the former eliminate from their meals all but the digestible. By this means the bulk of the food and its stimulating action on the intestinal wall are diminished as much as possible and the material stagnates and becomes poisonous. As evidence of these statements I will quote an extract from a lecture by a great observer, Colonel McCarrison. He spent nine years in the Himalayas, during which time he had a large practice, performing more than 400 capital operations each year. During that time he never saw one case of asthenic dyspepsia, of gastric or duodenal ulcer, of appendicitis, of mucous colitis, or of cancer. I would call your attention to this sequence, all evidence of chronic intestinal stasis, since I am certain that cancer is the last stage in the sequence, and that it never attacks a healthy organ. The diet of these people is very simple. They live chiefly on corn ground between stones. This is made into a cake which is imperfectly roasted over a charcoal fire. They very rarely eat meat. Mr. F. L. Hoffman the eminent American statistician writes me as follows: "Your views regarding dietary or nutritional causation (of cancer) coincide with my own based upon extensive research among native races. I recently returned from a trip to South America, where I lived for seven

* Delivered before the Guy's Hospital Physical Society, October 18th.

months among native Indians and mixed bloods. During the entire period not a single case of cancer was brought to my attention, although everywhere I inquired, although every doctor was asked the question, and although I personally came in contact with more than two thousand natives. The diet is very simple and the habits of the people are very regular."

Dr. F. P. Fouché (BRITISH MEDICAL JOURNAL, June 30th, 1923) writes: "For six and a half years I was district surgeon in the Orange Free State. . . . During the whole of that period I never saw a single case of gastric or duodenal ulcer, colitis, appendicitis, or cancer in any form in a native, although these diseases were frequently seen amongst the white or European population."

Dr. Bernard Hollander, writing in the BRITISH MEDICAL JOURNAL, July 7th, 1923, says: "Thirty years ago I was interested in the causation of cancer when my friend, the late Sir Henry Morton Stanley, the African explorer, drew my attention to the fact he had observed, that the native races in the regions through which he had travelled were free from it. . . . only in coast towns, where natives mingled with Europeans, did cancer occur, and then only . . . one case in about ten or twelve years." Dr. Dyce Sharp (BRITISH MEDICAL JOURNAL, July 14th, 1923) fully confirms these statements as regards Northern Nigeria and Abyssinia.

I could furnish much more evidence showing that the freedom from any of the stasis sequence is due chiefly to diet, and to a lesser degree to the habits of these races. Place these people in a civilized community, as in the case of the American negro, and the diseases they suffer from are precisely those of the white man among whom they live and whose diet and habits they imitate.

DIET AND CANCER.

I think I have proved that the primitive races, while living in their normal conditions and surroundings, are free from certain diseases of the gastro-intestinal tract and from cancer, all of which exist widely in civilization and are apparently becoming more and more frequent. This is so obvious in the case of cancer that much attention has been drawn to this particular stage of the stasis sequence and an enormous amount of money and time has been spent in endeavouring to find the origin of cancer. The chief cause of the failure of these efforts is the fact that cancer is not recognized as a part of a mechanical sequence and as never affecting a healthy organ, but is regarded as a primary condition. The cancerous cell will only grow in a suitable soil, and that soil is provided by the prolonged action of toxins in the tissues.

CHRONIC INTESTINAL STASIS.

I will now proceed to the description of the condition I called chronic intestinal stasis, and will endeavour to show how it runs parallel with civilization, producing misery and disease in a progressive and disastrous manner.

Many years ago, while walking over a bridge in Paris with my old friend Moynihan, he said to me, "You have completed your work on the treatment of fractures: why do you not turn your attention to the abdomen?" That remark sank into my brain and I went up to Leeds and saw the magnificent work he was doing in the school on which Mayo-Robson had shed so much lustre.

On my return to London I applied to the gastro-intestinal tract the same mechanical principles that I had formulated from the study of the changes which ensue in the bodies of labourers which I had employed in the treatment of fractures. They are the following:

1. Pressure produces changes in the structure and form of the bones and in the form and function of existing joints, while it determines the formation of new joints.
2. Strain produces change in the form of bones, and in the form of existing joints and also produces new joints.
3. When, apart from the exercise of pressure or strain, it is important, from the altered mechanical relationship of the individual to his surroundings, that a mechanism should be modified or an entirely new one developed, such a change takes place.

Its Mechanical Effects.

These laws show that we have a definite mechanical relationship to our surroundings, and that any variation in that relationship is followed by corresponding changes in our mechanism. In other words, this is the basis of evolution. Realizing the fact that civilization, because of the variation from the diet and habits of primitive man, meant constipation or the delay in the passage of material through the gastro-intestinal tract, I argued with myself as to what changes would develop in the viscera and in their attachment in order to obviate as far as possible the ill effects which must otherwise ensue from the stagnation of the contents of this tract. In the case of the large intestine to oppose the elongation and distension of the bowel it would be advantageous to strengthen the layers of peritoneum which secure the gut to the abdominal wall.

It is the habit in civilization to regard a single formed motion a day as the normal, so that the individual is habitually constipated for at least twenty-four hours, and the products of the food consumed during that period are accumulated in the large intestine, and in the first instance in its termination. Therefore strain is experienced first upon the outer layer of the mesentery which fixes the iliac colon to the floor of the fossa, and this strain is greatest about the junction of the iliac and pelvic segments of the colon. Corresponding exactly to this strain there is developed upon the outer surface of the mesentery, extending from its base, streaks or bands of peritoneum, fibrous in appearance. These spread gradually along its outer aspect and as they grow they contract and shorten this portion of the mesentery, so limiting the range of movement of the portion of intestine which it secures. Later this new growth of tissue, or the crystallization of lines of force, extends to the outer wall of the large bowel and gradually encroaches on its circumference. Not only does it pin the intestine immovably in the fossa, but by its progressive attachment to the bowel wall it rotates it upon its long axis and reduces its lumen very materially, and consequently obstructs the passage of faecal matter through it. The contents of this portion of the intestine are usually firm and often hard in consistency, so that it is easy to realize how difficult it may be for the faecal mass to negotiate this obstruction, even when it exists only in a moderate degree. Any interference with the free functioning of this portion of the bowel is a serious obstacle to efficient drainage, and the more marked the obstruction the greater the delay of material in the entire gastro-intestinal tract proximal to it.

To this particular obstruction I gave the name of the "first and last kink"—the *first* because it is the earliest to form, and the *last* because it is the lowest in the gastro-intestinal tract.

I cannot exaggerate its importance, as I believe its capacity for harm is tremendous and far-reaching and that it is responsible for all the changes which are due directly and indirectly to chronic intestinal stasis. It spells the failure of civilization and is a veritable Pandora's box.

Consequent on the stagnation of material in the large bowel similar bands develop along the mesentery, securing the convexity of the loaded colon. These are most marked in certain situations, as at the splenic flexure, and again at the end of the ileum, where it is called the ileal kink. The secondary accumulation of material in the small intestine angulates the duodeno-jejunal junction, causing first dilatation of the duodenum and later ulceration of its first portion, spasm of the pylorus, dilatation of the stomach and its ulceration along the seat of strain—namely, the lesser curvature. This ulceration of the stomach tends readily to become cancerous.

The same tendency to the development of cancer occurs in the large bowel where angulated and obstructed, by acquired bands or by spasmodic action of the sphincter ani or of Mayo's circular band of muscle, in direct proportion to the degree of obstruction and to the increase in consistence of the faeces. The stagnation of the contents of the large

bowel also causes an inflammation of the appendix, which is frequently anchored and obstructed by acquired adhesions of the mucous membrane of the colon, producing colitis in its various degrees and forms. The appendix is often so secured as to control the ileal effluents and to increase the stagnation of the material in the small intestine.

Its Toxic Results.

Besides these mechanical results of stasis, the sequence of which is quite obvious, we have those which are consequent on the fouling by organisms of the dammed-up contents of the small intestine of the duodenum, and even of the stomach, with the extension of the infection along the hepatic and pancreatic ducts which produces gall stones and cancer. The mode of extension of the infection in these is as apparent as the mechanical changes.

The next series of changes we have to consider are those which come about by the absorption from the infected contents of the gastro-intestinal tract of more toxins, etc., than the liver is able to deal with. These noxious substances getting into the circulation are carried to every organ and tissue in the body and produce disastrous results in proportion to the degree of the toxicity of the blood.

The degenerative changes in the thyroid, adrenal, and other ductless glands, the heart and blood vessels, the nervous system, the eyes and ears, the kidneys, liver, pancreas, uterus, ovaries, testes, prostate, breast, fat, skin, hair, lymphatic tissue of the naso-pharynx, and the gums and teeth—these two last being the most frequent and conspicuous of all—I have frequently described in detail, and I have shown how liable certain of these degenerated organs, such as the breast, uterus, ovary, and pancreas, are to be infected with cancer.

Among the nervous symptoms may be mentioned intense headache, neuritis, neuralgia, sleeplessness, misery, complete mental and physical prostration, melancholia, epilepsy, disseminated sclerosis, delusions, and dementia praecox.

Besides these changes, which are the direct result of the supply of toxic blood to the tissues, we have a number of infections which occur because of the inability of the degenerated tissue to withstand their inroad. These infections are all of such a nature as to be unable to obtain a foothold in a normal healthy subject.

CANCER NEVER AFFECTS A HEALTHY ORGAN.

Perhaps the most conspicuous at the present moment is cancer. In every case in which I have had an opportunity of verifying it I have found that the cancer patient was suffering from chronic intestinal stasis and that the infection by cancer was an indirect consequence of this condition.

If this assumption is correct it is obvious that to prevent the development of cancer it is necessary to obviate these changes which result in the gastro-intestinal tract from the diet and habits of civilization. That an enormous amount of benefit and a corresponding freedom from cancer has been obtained by the use of paraffin is in my opinion undoubted. I started to employ paraffin when I recognized the mechanics of chronic intestinal stasis, and have used it in every case since, as it would have been impossible and unnecessary to operate on all patients suffering from this disability. Its usefulness is also confirmed by the extraordinary manner in which it has spread over the whole world. I doubt whether any other material or drug has ever given anything like the same comfort and security from disease that it has. By its use the irritation and harm which result from the action of a purgative are avoided, while it acts on the principle of the flushing tank, rendering the motion soft and ensuring two or three free actions a day.

The other diseases that affect the subjects of chronic intestinal stasis are rheumatoid arthritis, Still's disease, tubercle, Raynaud's disease, many splenic affections, ulcerative colitis, many skin diseases, diabetes, ulcerative endocarditis, gout, etc.

PREVENTION OF STASIS.

Our chief interest at the present time is to prevent the development of chronic intestinal stasis and so to obviate the development of the several conditions which are due directly or indirectly to its presence, of which latter group cancer interests the public particularly because of its frightful mortality and the physical and mental anguish so frequently associated with it.

How is this to be done? It can only be effected by a complete revolution in our diet and in our habits of life. We must assimilate them to those of the natives, among whom the entire stasis sequence is unknown. How this can be done with as little sacrifice of the pleasures of the table must be investigated by dietetic experts, to whom the problem should not present insuperable difficulties. It must necessarily be a compromise, but the more thoroughly we approach the conditions of primitive life the more successful shall we be in avoiding the incidence of a very great number of diseases.

Roughly, it would seem that the diet should consist as much as possible of vegetable matter, that it should be consumed largely in a raw state, to avoid damage to vitamins, that coarse indigestible material be retained in order to increase the bulk of the intestinal contents and their stimulating action on the reflexes, that food which if kept becomes offensive and poisonous should be eliminated as much as possible, and that the consistence of the faeces be diminished, and the frequency of their evacuation increased.

SIMPLE OPERATIVE TREATMENT.

So much for the prevention of stasis. As to the treatment of the existing condition apart from medical treatment by a Curtis belt, paraffin of high viscosity, kaolin, and abdominal exercises, all operative measures on any portion of the gastro-intestinal tract should be started by an examination of the last kink, and by the careful freeing of this bowel from its acquired attachment to the iliac fossa. This requires to be done thoroughly, and when the mesentery has been restored to its normal length and the bowel to its normal freedom any raw surfaces of mesentery must be *accurately covered by peritoneum* to obviate any recurrence.

Perhaps of all operations in surgery this procedure alone is followed by the most wonderful effect. The whole condition of the patient is transformed and he is rapidly restored to vigorous health. After all this is not surprising, since it is because of this obstruction that all the other changes in the gastro-intestinal tract, whether mechanical or tonic, ensue.

To my surprise I have on very many occasions secured the same advantage by this simple operation that I have previously obtained by colectomy at a considerably greater risk. Because of the remarkable results which can be obtained by this procedure I am anxious that its value should become recognized.

Having dealt with the last kink the colon should be examined to make sure that no secondary constriction has developed, and particularly in the region of the splenic flexure. Any acquired band found controlling the lumen of the bowel should be divided carefully, avoiding leaving any raw surfaces deprived of peritoneum. An inflamed or controlling appendix in an ileal kink should be looked for, and dealt with if present.

I do not propose to discuss the surgery of ulcer of the duodenum and stomach, but I would like to state that the duodenal distension, pyloric spasm, and gastric dilatation disappear very rapidly after this simple procedure. I hesitate to say what I believe to be the case of its effect upon duodenal and gastric ulcers till I have been able to confirm my views by a much larger experience, but I am convinced that the employment of the common-sense measures I adopt will reduce very materially the frequency and severity of operations on the upper portion of the gastro-intestinal tract, and will free the sufferer from a large number of the consequences which ensue directly and indirectly from chronic intestinal stasis and from the auto-intoxication which results from it.