other anaesthetic may be injected before, during, or after the inhalation anaesthesia. If the spinal injection be administered first, the surgeon can assure himself of the success of the injection and the completeness and extent of the anaesthesia before the patient is rendered unconscious, and it may be possible to cut down the dose of the general anaesthetic very considerably. With a dosimetric method of administration it should be easy to show how small a dose of chloroform, for example, might be given to produce unconsciousness when the area of operation or injury is rendered anaesthetic. If the patient be very frightened, the general anaesthetic may be given first and the spinal injection undertaken before the operation is begun. Then, again, if symptoms of shock threaten to develop during an operation, a spinal injection may be given, while even after an operation or injury, if shock be feared, or even be present, a spinal injection of stovaine should do much to prevent it or minimize its symptoms.

With the idea of absolutely preventing the development of shock in a case of amputation of the only remaining lower limb of a very feeble old patient, I adopted a combination of these two methods of anaesthetization with strikingly successful results. The history of the case is as follows:

F. P., a warehouseman, aged 60 years, was first admitted to the Middlesex Hospital on December 13th, 1909, under the care of Mr. Sampson Handley, who transferred the case to my care, and to whom I am indebted for permission to report it. The patient was then suffering from senile gangrene of the left foot, and on January 1st, 1910, the left lower limb was amputated at the junction of the lower and middle thirds of the thigh. He left the hospital for the convalescent home, and in March, about a month after his return from there, noticed that his right foot often got very cold and painful. In spite of every care, gangrene set in, and he was readmitted to the hospital on June 4th, 1910. He was then very feeble, and looked at least 70 years of age. He suffered considerably from pain, and there was some septic absorption, the temperature rising to 100° F. each evening.

It was not until ten days after his admission, when he was still more feeble, and in an extremely nervous state, that he consented to have his right lower limb amputated, and it was then very questionable whether he was in a fit condition to have the operation performed. It was thought, however, that, if every precaution were taken to prevent damage to his medullary and other centres by cutting off impulses both from above and below, the operation should not have any bad effect.

Accordingly, on June 15th, a dose of 4 cg. of stovaine in Barker's solution was injected into the spinal theca, the puncture being made in the interval between the twelfth dorsal and first lumbar vertebrae. After about ten minutes the lower part of the body was absolutely anaesthetic, and Dr. F. E. Meadows rendered the patient unconscious and maintained a light degree of general anaesthesia. The limb was then amputated at the junction of the lower and middle thirds of the thigh. The result was that the patient did not suffer in the slightest degree from shock. From the time of the operation until the date of his discharge from the hospital he continually improved, and the satisfaction of having brought him successfully through a critical surgical operation was increased by his undoubted gratitude and unfailing cheerfulness in spite of the pitiable state to which he was reduced.

The case was one eminently suitable for such a test as this, and it was gratifying to find that shock could be prevented by isolating the lower parts of the brain from other parts of the nervous system, through which they might receive impulses likely to exhaust the vital centres.

As I have mentioned, the idea of isolating the medulla originated with Crile, who advocated the combination of local or regional anaesthesia with a general anaesthetic.

Regional anaesthesia by nerve blocking, in the case of amputation of the lower limb, entails some delay and inconvenience, and the combination of spinal and general anaesthesia is much more convenient and satisfactory.

It may be said by those who regularly practise spinal anaesthesia as a routine method in general surgical work that the light general anaesthesia is superfluous; but it will, I think, be held by the majority of surgeons that consciousness on the part of the patient is practically never desirable during a major surgical operation, not only for the sake of the patient but also for the comfort of the surgeon. The reports as to psychic influences affecting patients during spinal anaesthesia are rather conflicting, but these effects have obviously been quite noticeable from the fact that so many surgeons have adopted the use of some narcotic such as morphine or scopolamine and morphine as a preliminary to a spinal injection. I cannot but think that with the spinal anaesthetic the induction

of unconsciousness by the inhalation of a small amount of some general anaesthetic is superior to this combination.

No doubt in young children the general anaesthetic is superfluous, and probably in the later stages of acute abdominal conditions, when vomiting is taking place, spinal anaesthesia is better used alone. Fortunately these patients are as a rule markedly apathetic, and little likely to suffer much from the effects of psychic disturbances.

In the discussion on the present position and limitations of spinal anaesthesia in the Section of Anaesthetics at the recent annual meeting of the British Medical Association it is gratifying to find that Dr. Blumfeld⁸ expressed his belief that a combination of spinal with a light general anaesthesia should render surgical anaesthesia as safe as the administration of chloroform in midwifery practice, and that Gray's⁹ work on the localization of the action of stovaine was likely to do much to help this.

With regard to the choice of a general anaesthetic, ether might be given in small doses by the open method or a mixture of chloroform and ether might be used, though probably the most convenient drug would be chloroform. When, however, these drugs are contraindicated, as in diabetic patients, the best anaesthetic is nitrous oxide given with oxygen, for Crile¹⁰ has shown that this combination is less injurious to the tissues than any other general anaesthetic.

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THYROID EXTRACT IN RHEUMATOID ARTHRITIS.

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INDEPENDENT results and observations in therapeutic research are, perhaps, the strongest corroborative evidence of the efficacy or otherwise of various lines of treatment; and the writer, who has read with interest the excellent lecture by Dr. Macalister on rheumatoid arthritis, would put on record some experiences of results attained by the use of thyroid extract, without claiming any priority in treatment or originality of thought, though the use of thyroid extract by others for this complaint was unknown to him before reading Dr. Macalister's paper.

It first suggested itself to him in 1907, when called to attend an advanced case in which the patient was bed-ridden, all joints being more or less involved, with extreme wasting, anorexia, sleeplessness, and constant pain. The patient—a man of 54—had no illness until the onset of this condition, which had been coming on gradually since he was 40. He could not stand, had lost all power of locomotion, could not feed himself, nor raise his arms to do his hair!

The writer was struck with his rough, dry harsh skin, crisp hair, husky voice, and deep suprasternal notch; the prominence of the trachea and apparent absence of thyroid gland, analogy to other conditions suggesting deficiency of thyroid secretion.

Accordingly, the extract of thyroid was administered in doses of 5 grains three times daily, together with adjuvant treatment to be mentioned presently. In a month the results were remarkable. The patient could struggle on crutches from one room to another, his appetite returned, and pain was almost gone. In three months he could walk with two sticks, and in eighteen months he was able to walk three miles with the aid of one stick. His elbows and shoulders have regained their mobility almost entirely, and he has been for a year able to do without his thyroid extract without a relapse. At the present date he is able to get about well, with slight flexion of one knee and some metacarpo-phalangeal deformity, but is fat and well and enjoys life.

Another case was also that of an elderly man whose metacarpo-phalangeal joints were three months ago greatly enlarged with a pulpy synovial membrane and partial palmar dislocation of the joints, and whose knees and elbows were in much the same condition. He was put on the same treatment. There appeared to be little, if any, eburnation of the bones, but much periarticular thickening and weakening of the ligaments.

In this case the thyroid gland could not be detected. After three months' treatment on the above lines he has more pliability in his joints, a good grasp, and can walk without his stick; he has more confidence in locomotion and more muscular control over his joints. On the whole he is much improved and still making steady progress.

In the writer's opinion the group of cases likely to receive benefit are those in which changes are chiefly confined to the synovial membranes, without erosion of cartilage or eburnation of bone, such cases in fact as Schüller describes as "chronic villous arthritis."

In these cases, to which class both of the above belong, the local improvement is evinced by gradual softening of the pulpy synovial tissue under the influence of thyroid extract, the gelatinous feel under one's finger being replaced by a sensation of fluctuation. Subsequently absorption appears to take place, leaving a firmer, more useful joint, and at that stage adjuvant treatment by means of passive movement, massage of the neighbouring muscles (*not* the joint), and liniments are of great efficiency.

The liniment which the writer has found of great use has the following formula:

R. Unguent. hydrargyri	...	...	...	3ij
Olei nucis	...	...	...	3iv
Methyl. salicylatis	...	...	...	3j.
Fiat linimentum. Misce bene. Nocte utatur.				

The theory of the improvement is open to much discussion, but the writer is of the opinion that the cause of the pathological synovial change is metabolic, and that the chemical pathologist rather than the bacteriologist can find the key to the problem. Myxoedema is "characterized by an increase of connective tissue in and under the true skin," with "more than the usual amount of that substance (mucin) in the subcutaneous tissue."¹ There seems a distinct resemblance in the synovial deposits to the above condition in myxoedema, which may account for the influence of the thyroid extract on the pathological metabolism.

Further observation on the action of thyroid extract in suitable cases of rheumatoid arthritis would be of great interest and possibly also of great benefit to mankind.

REFERENCE.

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A CASE OF INTESTINAL REFLEX.

BY

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In an interesting paper published some time ago in the *BRITISH MEDICAL JOURNAL* Mr. Moynihan points out some various symptoms which are caused by a diseased appendix—symptoms so varied in their nature and locality that it becomes difficult, and at times impossible, to localize the disease. The appendix, on account of its variable position and length, may be the cause of pains which are located in various parts of the abdomen. For instance, a long appendix may through adhesions become fixed in the pelvis, and in the female simulate affections of the organs of generation.

It may also become attached to some part on the left side of the abdomen, or when adherent to the ascending colon produce symptoms akin to those due to renal or hepatic disease. This condition of things cannot be otherwise; the abdominal sac is packed with organs mostly tubular, overriding each other, constantly altering in shape

and position, according to their being full or empty, to the position of the body, to the movements of respiration, to the length of their mesenteries, and above all to their common innervation. In the early period of embryogenic life the alimentary canal is a simple tube; its innervation is derived from the sympathetic system. At a later period the fore-gut is subdivided into higher structures—namely, the stomach, liver, part of the duodenum and the pancreas—and although much more complex in their structure and functions, they still retained their same nerve supply—namely, the sympathetic, and in addition a few fibres from the cerebro-spinal ganglia. The afferent branches which serve to control those parts pass into the hepatic, gastric, vagus, and solar plexuses.

These four organs occupy that space which is found in the right upper abdominal quadrant, and it is in that region that the greatest difficulty in forming a diagnosis lies. It is easy to understand that if any organ in that locality is acutely affected, that short of premonitory symptoms to assist the diagnosis is fraught with difficulties.

With such lines of communication the complexity of symptoms becomes extreme; the nerve storm spreads rapidly among all those parts. In a sudden rupture due to gastric or duodenal ulcer, in a first attack of gall or renal colic, without premonitory signals to help one, or rather without the knowledge of such, it is usually a matter of impossibility to decide on the locality primarily affected.

Lower down in the bowel contractions are of common occurrence, normally from peristalsis, and abnormally from an exaggerated form due to local trouble such as undigested food, fermentation, and pathological contraction, but also from nerve irritation from afar.

Case.—A lady, aged 30, 3-para, youngest child 17 months old. A very thin, haggard woman. Previous to the birth of her last child she had suffered from tapeworm, for which she had been treated heroically, ultimately getting rid of it. Since that she had suffered from abdominal pain with periods of obstinate constipation, looseness, straining, together with the passage of blood and mucus. She looked very ill and emaciated, she had not had any relief for ten days, felt sick but had not vomited. Her abdomen was easily palpated owing to the extreme thinness of its walls. Coils of bowels were felt and seen contracting from left to right. There were several hard masses in the bowel; the transverse colon had descended in the pelvis, forming there an acute angle. In the caecal region an invagination of the ileum into the caecum was clearly felt, the region over the lower margin of the liver was tender on compression, the gall bladder could not be felt. There was no history of gall stone colic or jaundice. Under the impression that the trouble was due to intestinal ulceration, an exploratory operation was advised. For several days previous to operating she was kept in bed and fed on digested food, and enemata of sweet oil were forced as high as possible; in less than a week after the bowel had been freely opened all the hard masses had disappeared and the invagination had lessened perceptibly. On the day of the operation, previously to being chloroformed, the invagination had completely disappeared.

The abdominal cavity was opened through the right rectus, the bowel looked quite normal, the appendix healthy, the appendages free from trouble; the right edge of the liver was seen to be protruding from under the ribs for about half an inch. On tilting up the lower edge of the liver, the gall bladder was found to be enlarged, of a grey blotting-paper colour, its shape quite unusual. The common duct was very broad and of the same shape and breadth as the bladder. There seemed to be no division between the gall bladder and the common duct, no cystic constriction; it was impossible to see where the bladder ended and the cystic duct began. Three calculi were found in the duct, the higher one about where the hepatic duct enters the common duct, the lower stone in the second part where the duct dips under the second part of the duodenum, and middle stone, which was the largest, between the two. The largest stone, the size of a small marble, was first cut out, and as the others could not be milked into the middle incision, they were cut out; a rubber drain was fixed into the central opening; the other cuts were sewn and drained. The gall bladder, when incised, was found full of small stones, the size of millet seeds. For the gall bladder condition alone cholecystectomy would have been best, but whether in such circumstances it should have been done in the presence of the other conditions, I did not think so.

I was anxious that thorough drainage should be done, and in view of some further necessity for treatment the advantage of having the gall bladder to assist the manipulation was important. The patient recovered rapidly, and up to the present, seven months since the operation, has had no return of her trouble. She is in perfect health; has never had any return of pain, has put on flesh, and does not suffer from constipation.