is of opinion that radium and deep *x*-rays should not be used while colloid treatment is being carried on, for if they are used the symptoms and tumour increase in magnitude.

When at Home recently I visited Dr. Todd and he very kindly showed me scores of cases under treatment, most of them desperate cases, sent to him from all over England by other surgeons. Having seen these cases, many of them alive for years, the tumours having sclerosed and shrivelled up, I feel we should give it a fair trial. I have many cases at present under treatment in our out-patient department. The colloid can be obtained—10 c.cm. for Rs. 3-12 in ampoules from Mr. Clark, agent for British Drug Houses Ltd., 27/4, Waterloo Street, Calcutta.

Inoperable vesico-vaginal fistulæ

The operation of implantation of the ureters into the bowel is of considerable antiquity, and was first performed successfully for ectopia vesicæ by Peters and Lendon in 1900. Since then the technique has been greatly improved and thanks to the work of Bond, Stiles, Mayo, Grey-Turner and Coffey, the indications for this operation have multiplied, genito-urinary surgeons using it in cases of cancer of the bladder, or prostate, ectopia vesicæ and multiple perineal fistulæ; while gynæcologists employ it for inaccessible and inoperable vesico-vaginal fistulæ, for although such cases may be rare in the West, in the tropics, as a result of crippling osteomalacic deformity, or obstetric complications, where indifferent medical aid was available, it is no uncommon thing to see cases where cartilaginous scar tissue makes up the floor of the pelvis throughout which the upper wall of the bladder prolapses. In other cases scar tissue or bony deformity, due to falling in of the rami of the pubes, permits only the passage of one finger into the vagina, at the top of which the soft mucous membrane of the bladder can be left.

The condition of these patients, often only in their teens, is pitiable. For this reason many of us have tried out every known operation for fistula, and only within recent years have we arrived at any satisfactory conclusion, and that is implantation of the ureters into the bowel. But unless the set of the operation was perfectible surgeons have been deterred from carrying it out because of the initial cost and difficulties in the technique of Coffey's operation.

For this reason I have striven, during the last few years, to devise a technique easy and palatable to all surgeons wherever situated, the strategy being that of Coffey, namely, the formation of a gutter and valve-like mechanism in the bowel wall, as opposed to a sphincter, the tactics being that of simplicity, doing a one- or two-stage operation according to the general health of the patient.

Briefly stated I pass a flute-ended ureteric catheter up the ureter, and then, after inserting a 10-inch silver tube through the hole in the gut down to the anus, I pass the proximal end of the catheter through this tube. The silver tube is then removed by an assistant. The catheter-containing ureter is then laid in the bowel gutter and sewn over, following the method of Coffey. An illustrated account, in detail, will be published later. The advantages of this method are:—

(1) Simplicity.

(2) One or both ureters can be implanted at one sitting.

(3) Owing to the fact that a catheter is in the ureter there is no likelihood of an inflammatory exudate compressing the ureter in the bowel gutter and so giving rise to surgical uræmia.

THE USES OF MUSTARD IN MEDICINE

BY A CORRESPONDENT*

FOR many years the value of mustard and its preparations in the treatment of disease has been recognised, and it would be difficult to find a reputable work on medical treatment which does not contain favourable references to the mustard bath, pack and poultice, etc. As such references, however, are scattered throughout the large field of medical literature, and as fresh suggestions for the therapeutic uses of mustard are frequently being published, there seems reason to believe that an article in which the known medical applications of mustard are collated may be of value to the prescriber.

It is generally asserted that all the physiological effects of mustard are due to the presence of the volatile oil contained in black mustard seeds, and liberated when they are moistened with water. This statement is no doubt true in its essentials, but since practically no work has been carried out on the non-volatile oil of *white* mustard, and since the mustard flour of commerce is usually prepared from both varieties of seed, it is clear that it is inadvisable to be too dogmatic in explaining the physiological effects of mustard as a whole.

For the present, however, it is necessary to confine this article to volatile oil of mustard, the oleum sinapis volatile of the *British Pharmacopœia*. When crushed black mustard seed, or the flour therefrom, is moistened with cold or warm water, this volatile oil is rapidly evolved, being formed by the interaction of an enzyme, myrosin, with an organic compound known as sinigrin, which belongs to the group of glucosides so widely distributed in the vegetable kingdom. Myrosin, like other enzymes, is destroyed by heat, so that when mustard is added to hot water no volatile oil is formed. A temperature of about 60°C. (140°F.) is sufficient to destroy the enzyme completely, but even at lower temperatures than this the evolution of volatile oil is impaired.

The primary action of mustard oil upon the skin is to cause a dilation of the capillaries, yielding a sense of warmth and a 'tingling' sensation, pleasant at first, but rapidly becoming unbearable. A red flush is seen at the site of application, followed eventually by a wheal, similar to that produced by a burn. The physiology of these changes is very fully dealt with by Sir Thomas Lewis. His researches have proved that skin

* Since we sent this article to press it has appeared in the same form in the *Medical Journal of South Africa* to which journal we now make acknowledgment.—EDITOR, *I. M. G.*

stimulation of all kinds, whether due to heat, chemical agents or trauma, causes the liberation of a substance named by him H-compound, whose action on the capillaries causes the phenomena described above.

Therapeutically, these primary actions of mustard have valuable direct uses. The mere sensation of warmth produced is utilised in the treatment of many ailments of the kind typified by the common cold. The mustard bath or mustard foot-bath causes a sensation of warmth which not only is pleasant and soothing to the patient's feelings, but provides the body with the optimum conditions demanded for combating the invading organisms. Arising out of the rubefacient action, a strong diaphoretic effect is obtained, which is utilised by the prescriber who wishes to produce copious sweating, as in febrile ailments.

The treatment suggested for an oncoming cold, or a sensation of chill, will therefore be as follows. A hot mustard bath should be taken, containing 1 ounce of mustard per gallon of water, the mustard being mixed with tepid water five minutes before being added to the bath; failing this a mustard foot-bath, followed by a hot drink of milk, gruel, etc., and an immediate retirement to bed, accompanied by a hot water bottle.

If the physiology of the mustard application be further considered, fresh fields of use come into view. The dilatation of the capillary walls by the H-substance, called forth through the stimulus of the mustard, increases the flow of blood to the surface of the body from the organs lying beneath. This is the action of all counter-irritants, and mustard oil is the counter-irritant most generally valued by the prescriber, having nearly as much vigour as cantharides, while being easier of control and of wider application.

Counter-irritant action itself falls into several categories, but in the present survey it may suffice to mention a few of the chief aspects.

Congestion of all kinds is at the basis of many diseases of the internal organs. Application of a mustard poultice or plaster to the body immediately above the affected organ causes speedy relief and frequently prevents the engorged vessels from suffering permanent damage. A mustard poultice is prepared by mixing equal parts of mustard flour and either linseed meal or ordinary flour. If a weaker poultice is desired the proportion of mustard should be lessened. In any case, the mustard should be mixed with tepid or cold water several minutes before the hot water is added.

For a mustard pack, a piece of flannel or calico, folded 6 or 8 times, is soaked in mustard and hot water, wrung out and applied while hot.

In pleurisy, pneumonia and bronchitis, a similar use of mustard poultices, etc., is recommended by most authorities as affording relief from the feeling of 'tightness' and pain common to all respiratory diseases, as well as producing an increased flow of blood that assists in removing the accumulation of pus, bacteria, etc. This leads to a consideration of a further general use of mustard, namely, the relief of inflammatory disorders. The formation of toxic products in any part of the body demands their prompt removal if permanent local injury is not to result. This is considerably assisted by an application of mustard to the skin as near to the site of infection as is convenient. A field of disease which comes under consideration in this connection is that of rheumatic disorders, including lumbago and sciatica. Though definite distinctions exist between the various diseases of this type, they are mostly characterised by continued pain due to inflammation, swelling, etc., in the joints of the limbs and similar convenient sites for the accumulation of toxins. The relief afforded by the counter-irritation of a mustard preparation is well known, and with the present widely-increased interest in the treatment of rheumatism, particularly the dangerous rheumatism of childhood, it may be anticipated that mustard baths will play a large part in the hydrotherapeutic treatment already so popular for these complaints.

There is still another purely physiological action of mustard to which reference must be made. When the counter-irritant effect comes into play, and the dilatation of the capillaries is drawing blood from the organs beneath, a reflex nervous stimulus is produced, acting on the heart and respiratory organs. This may be one of Nature's protective mechanisms, designed to prevent the ill-effects on the heart of too sudden removal of blood to the capillaries, a dangerous condition typified in 'wound shock'.

Whatever the theory, in practice this stimulating action proves most valuable. A body weakened by continued pain, to which a mustard preparation is applied, receives not only relief in the manner above described, but also a definite tonic effect which tends to restore vigour. In other words, the value of mustard as an analgesic is enhanced by its action as a reflex stimulant.

The foregoing will have indicated generally the maladies for which mustard can be claimed to have a remedial or alleviating effect. Febrile disorders as a whole, and most inflammatory conditions, are benefited by mustard applied either locally, as a pack, plaster or poultice. or generally as a bath. Mustard is therefore recommended by medical authorities for all the diseases of the respiratory system, the various forms of pneumonia and bronchitis, pleurisy, etc., and for the milder catarrhs prevalent in a British climate.

Rheumatic disorders may be considered under the heading of inflammation, since though there may be disagreement as to the ætiology of some of the many diseases of this nature, authorities are united on the efficacy of mustard in relieving the pain characteristic of them all.

The counter-irritant action of mustard in alleviating congestion of the lungs, liver or brain has been referred to. The convenience of the mustard poultice is here a strong recommendation, compared with the drastic early remedies such as cupping and leeches.

Allied to this use of mustard are two which are to be found frequently in the literature; the hip-bath, to soothe menstrual pains and also induce delayed menstruation.

An application of the stimulating effect of mustard is in curing alopecia, or irregular and premature baldness. Though as yet this matter has not been completely investigated, it is clear that an increased stimulation of the capillaries serving the hair roots will increase the nourishment of the latter, to their undoubted advantage.

Ringer and Sainsbury and others recommend a mustard bath in eruptive fevers, where there is a recession of the rash, to bring it back to the skin. Various pediatricians favour a hot mustard bath for the treatment of infantile convulsions, and other uses of mustard in children's disorders include the mustard bath for general collapse, or sudden congestion of the heart or brain, or as a large poultice in heart failure.

Though the irritant action of mustard is usually a contra-indication in diseases of the skin, Hetherington recommends mustard baths for the treatment of acne and pustular diseases. This is, of course, in accordance with the generally-accepted use of frequent hot water applications to render the skin soft and hasten the elimination of the pustules.

Although this article has been primarily devoted to a consideration of the numerous applications of mustard applied externally, its well-known emetic action must receive mention. Used in the proportion of one tablespoonful of mustard in half a pint of warm water, mustard forms a powerful emetic. The reflex stimulant action referred to earlier has considerable value in this connection, counteracting the depressing effect which is associated with the use of most emetics, and causing it to be particularly recommended in narcotic poisonings. Its use is, of course, strictly to be avoided in poisoning by corrosive agents.

While the above article does not claim to cover all the applications of mustard which are met with in the wide literature of medical treatment, enough has been said to indicate the general conditions in which 'mustard therapy' is of proved value.