should transfusion be performed, unless a surgeon is opening the abdomen.

We have to make some sort of preliminary diagnosis. If the patient is young and well covered the condition of the stomach is probably not a chronic ulcer, and the treatment must be medical. If a history can be obtained which suggests chronic gastric or duodenal ulcer, then a surgeon should be consulted, not with a view of immediate operation, but so that he will be able to appreciate any subsequent change in the patient. If, in such a case, there is a recurrence of haemorrhage and it is thought that the haemorrhage is coming from some such vessel as the splenic vein, then transfusion of blood and exploration can take place together. But the majority of cases of gastric haemorrhage recover without the aid of the surgeon. Only in cases of repeated haemorrhage and when a chronic gastric ulcer is suspected should surgical measures be employed.

The most important question is the feeding of the patient. On this point there are various opinions. Certainly no one will object to rectal salines being given. If they are well tolerated they can be given every six hours, or the drip method can be employed. By this means thirst can be relieved. Some say that nothing, not even water, should be given by the mouth for forty-eight hours. Personally I believe this period is too long. After a haemorrhage the stomach is left in a slack state. If the blood is vomited the stomach will contract, which is a desirable state for it to be in. We cannot keep it contracted as we do the uterus after haemorrhage, but we must aim at not letting it be dilated. Dilatation is more dangerous than peristalsis. If we keep a certain amount of the digestive process going the interior of the stomach will be kept cleaner.

Further, the acidity of the gastric juice was probably too high before the haemorrhage. It may be lower after the haemorrhage, but it is probably an active juice, and it is better to give it something to digest rather than to allow it to eat its own wall. I have often given food within twenty-four hours to patients who have had haematemesis. In fact, if there has been no bleeding for twelve hours I see no reason for withholding food. The object of feeding is twofold: first, to nourish the patient so that his tissues will have a chance to heal; and secondly, to "fix" the acid gastric juice. Alkalis also should be given to neutralize the acidity of the gastric juice. While food and alkalis lower the acidity of the juice for a time, they have the faculty of stimulating a further secretion; so that treatment consists in alternately neutralizing and stimulating the secretion. This means that the patient is constantly taking something, either food or medicine.

Two names are associated with the special dietetic methods of treating gastric ulcer—Lenhartz and Sippy. As they are respectively German and American, some small modifications are desirable in their diets to make them more suitable for British tastes. But apart from these slight modifications the original diet should be closely followed. Too often one hears that the patient was treated on the lines of Lenhartz or Sippy, but without success. Failure cannot be laid at the doors of Lenhartz or Sippy, for the line of treatment will be found to have no relation to that laid down by either of them. The details of these two diets need not be given here, but the Lenhartz method is more suitable for early feeding after haemorrhage.

Drugs, in the treatment of gastric haemorrhage, have their uses in promoting rest and in lessening the activity of the gastric juice. First and most important is morphine. For peace of mind, for rest and stillness of the stomach, to allay the sensation of thirst, there is nothing to take the place of morphine. Belladonna or atropine, particularly by the mouth, lessen the secretion of gastric juice. Alkaline mixtures or powders should be given freely and regularly during treatment. The carbonates of magnesia, soda, and calcium can be used alternately with the feeds. Bismuth may be given at intervals of six hours.

Other measures have their advocates. On the analogy of the hypotonic uterus, washing out the stomach has been recommended. It is rather a trying ordeal for a collapsed patient, but possibly would do good to a patient whose stomach was distended with blood, which he was unable

to vomit. However, unless a patient is dying, blood is usually vomited. Lavage then is not a method to be advised, as the passage of the tube is certain to cause tagging and straining, which will encourage further bleeding. Horse serum in various forms is recommended, but its efficacy is doubtful. Calcium has even less to recommend it. Opinions differ about opening the bowels. Some advise that no attempt be made for a week. Personally I recommend an enema or a glycerin suppository at the end of the second day, and repeating the treatment on alternate days.

After the patient has recovered from the haemorrhage full investigation has to be made into the gastric condition. In some cases there is difficulty in going further with the patient, as he may say that the haemorrhage has done him good. In some instances gastric acidity is lowered after haemorrhage, and, as many symptoms are dependent on this acidity, the patient feels better; rest in bed relieves the symptoms of many dyspeptics. But an energetic attempt should always be made to diagnose the condition which has led to gastric haemorrhage, for if the patient declines further treatment at the time he will almost certainly return at some future date on account of a recurrence of symptoms.

THE PHYSIOLOGY OF MONOTONY.

BY

R. J. S. McDOWALL, D.Sc., F.R.C.P. Ed.,
PROFESSOR OF PHYSIOLOGY, KING'S COLLEGE, LONDON;

AND

H. M. WELLS, Ph.D., B.Sc.

THE discussion at the Nottingham meeting of the Association on the subject of monotony was reported in the *BRITISH MEDICAL JOURNAL* on September 11th, 1926 (p. 472). Many extremely interesting views were expressed regarding the emotions which cause monotony, but apparently no suggestion whatever was made as to how it produces its deleterious effects on the individual.

While it is true that our knowledge of the subject is as yet most imperfect, it appears desirable to put forward what information there is on the matter in order to assist in the experimental investigation of what is certainly an increasingly important industrial problem. Within recent years various workers in this department have carried out researches in relation to the integration of the circulation, and considerable evidence has accumulated which indicates that certain factors are clearly concerned.

Normally, whenever any physical effort is made the circulation at once adapts itself to the demands of the various parts of the body. During exercise a definite series of mechanisms is brought into play which causes the tissues in use to be supplied with more blood. In the first instance the metabolites of muscular activity, such as carbon dioxide and lactic acid, dilate the capillaries in the tissues being used. This has recently been made clear by the work of Hemingway and McDowall. In addition, impulses passing up the afferent nerves call into operation the Lovén reflexes by which the larger vessels to the part are also dilated. At the same time the blood supply to unused parts of the body is reduced by the increased activity of the vasomotor centre. This centre has been shown by Dale and Evans to be controlled largely by carbon dioxide, and the production of this is, we know, increased in muscular exercise. Further, as a result of compression of the valvular veins, increased respiration, and the action of carbon dioxide on the venous reservoir—both directly and indirectly through the vasomotor centre—the venous pressure is increased and the heart accelerated. The total result is that in exercise the blood pressure is markedly increased.

But the adaptation of the circulation may begin before the actual commencement of the exercise. It has long been known that the heart of a sprinter is accelerated before the race, and that the respiration may be increased. Recently evidence has been obtained by Aveling, McDowall, and Wells that the blood supply of the skin, which is not called upon until sweating commences, is appreciably

reduced. This reflex, which is brought into operation in anticipation of any effort, they purpose calling the "skin constrictor reflex." The vascular change is accompanied by a fall in the electrical resistance, and has been studied under the name of the "psychogalvanic reflex," but, as recently pointed out by McDowall and Wells, there is no doubt that the two reflexes are the same. Such a diminution of the circulation through an unused part was recorded volumetrically by Mosso many years ago, but was attributed to a passive rather than an active effort.

For our present consideration it is important to emphasize that the vascular reaction may be brought about by any form of stimulation or effort, actual or anticipated, provided the stimulus is not too often repeated.

We have definitely established that as soon as the stimulation or effort becomes monotonous the vascular reactions are no longer obtained. We have indeed found in the investigation of these problems that it might be practically impossible to get rid of the effects of psychical states after a holiday, when interest in the recommencement of experimentation itself caused a marked vascular change.

A similar condition may also be seen experimentally in animals, in which it can readily be demonstrated that the increased blood pressure which results from sensory stimulation ceases if the stimulation is often repeated, although subsequent recovery indicates that there has been no actual destruction of tissue. From the work of Sherrington it is known that in reflex arcs such conditions are brought about by an increased resistance of the synapses through which the impulses have to pass.

When a certain task is uninteresting and often repeated a similar state of affairs may result. If, in virtue of the metabolites produced and the Lovén reflexes, the active tissues still demand blood while there is inadequate closing down of the unused areas, the result must necessarily be an inadequacy of the circulation to the work done. Waste products will accumulate and a feeling of lassitude, if not actual fatigue, result. This, after all, is what we feel when we appreciate monotony. We may, then, consider monotony as the reverse of emotion, not only in the popular, but also in the physiological sense. We can, indeed, extend the well known James Lange theory of emotion, in which the experience of emotion is considered to be the sensations which arise as a result of the cardio-vascular response, to include the condition of monotony, in which the vascular response is inadequate to the needs of the body. Thus the popular saying, "The man's heart is not in his work," receives physiological corroboration.

The typical instance of such effect of monotony is the staleness of the athlete or musician. Here we may imagine that repetition of the situation no longer arouses the same interest and effort, that the circulation is inadequate to demands, and the physical best is no longer obtained. It is clear that excessive repetition, which might produce nervous if not muscular fatigue, is not itself responsible for the effect, since similar conditions of repetition of a task do not produce monotony in every person. Further, as pointed out at the discussion referred to, a potentially monotonous task, which to the individuals concerned is not so, may only become monotonous when the condition is suggested by one of themselves or a visitor.

This is exactly what would be expected according to the vascular explanation of the reflex, for the normal vascular response is itself dependent on interest, and this in turn is suggested by the conditions. Hence also it is that even a task which is apparently most monotonous will produce a normal reaction in an individual who has an interest in the task—for example, by a suggested pride in efficiency—or who performs his work mechanically, and by thinking of other things supplies the necessary interest. It is well known that certain individuals prefer monotonous tasks which permit them so to day-dream. The more rapid and efficient the sense perceptions of an individual, and the richer his associations, the more likely will he be to derive interest from any work.

While it is agreed that crude muscular fatigue is almost entirely dependent on fatigue of nerve endings, insufficient attention appears to have been given to the possibility that fatigue of much lesser degree may effect all nervous synapses, and may be dependent on an inadequacy of the

circulation to the demands of the task. This is suggested by the fact that whereas Forbes and Ray have shown that the nerve fibres of mammals may survive for many days *in vitro*, and Hemingway and McDowall have shown the mammalian muscle may similarly last for several days if precautions are taken to counteract the effect of the cessation of oxidation, none of these workers have succeeded in obtaining the survival of mammalian nerve endings or spinal synapses for any appreciable period (as may be done in the frog). There is very definite evidence (Gillespie, Leonard Hill) of marked circulatory response to purely mental effort, which we find may vary appreciably according to the stimulation produced by the work, its associations and surroundings.

It should, however, be noted that it is not to be expected that the performance of a monotonous task will necessarily result in a fall of blood pressure; an inadequate rise of blood pressure would produce similar results. The subject is nevertheless clearly one which requires investigation from this point of view; but, unfortunately, the mere experimental procedure of taking the blood pressure would tend to relieve the monotony of an otherwise monotonous task. It will therefore be necessary to take vascular readings over a long period until the procedure produces no reaction whatever. The work will be continued with a view to ascertaining to what extent this is possible.

CARBON MONOXIDE POISONING:

ITS INCREASING MEDICO-LEGAL IMPORTANCE.*

BY

DOUGLAS J. A. KERR, M.B., D.P.H., M.R.C.P.ED.,

ASSISTANT, DEPARTMENT OF FORENSIC MEDICINE, EDINBURGH
UNIVERSITY.

ONE of the gravest social problems of the present day is the increase in suicide. This is not a new development, for unfortunately statistics for every decennium show an increase in the suicide rate in this as well as in other countries.

In 1883 Dr. Ogle, speaking on the chances of a person committing suicide, writes:

"The total chance of dying by suicide is much more considerable than would probably be supposed by anyone who had not examined the question. Few, for instance, would imagine that one out of every 119 young men who reach the age of 20 dies ultimately by his own hand. Yet such is the case."

Last year, of all males over 20 years of age dying in England and Wales, one out of every sixty-five was a suicide.

A recent study of the statistics of suicide in a large city has brought out many interesting facts, which no doubt will be found to coincide with those of other large centres of population. Amongst these I have been impressed by the changing methods adopted by the suicide. In former years the most frequent methods in this country were hanging, drowning, and cut-throat. To-day the same methods, while still very common, no longer hold the first place, having given way to poisoning. The most frequent poison employed is carbon monoxide or coal gas, and in Scotland not only is it the most frequent poison but the most common of all methods of suicide. Indeed, the frequency of suicidal coal-gas poisoning has become a question which demands very serious consideration.

Professor Littlejohn, in a paper published in 1899, investigated the statistics of suicides in Edinburgh for the thirteen years 1883 to 1895. The total number was 298, and did not include a single case of coal-gas poisoning. The suicides in Edinburgh for the last six years (1920 to 1925) number 353, of which 105, or 30 per cent., were due to inhalation of coal gas. In some other towns of Scotland, I am informed by the Registrar-General, the percentage is even higher. If we differentiate the sexes, we find that 42 per cent. of women employ coal gas as the lethal method, as compared with 25.2 per cent. of men.

This increase in coal-gas poisoning is well brought out by the Registrar-General's reports for Scotland. The

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