wave-length at which the organism can be destroyed at a minimum voltage, though at a longer wave-length an increased voltage would produce a similar effect.

Some fifteen or twenty years ago I was one of the first to treat dysmenorrhoea by diathermy. I was led to do so by the remark of a patient whom I was treating by diathermy for pelvic pain, unassociated with the menstrual period, to the effect that after her last period she had had the first period free from pain for fifteen years. I adopted this useful hint, and have learned the great value of this treatment in suitable cases of spasmodic dysmenorrhoea. It is, indeed, easy to visualize that the spasm tends to be relieved by the thermal effects of the high-frequency currents, and that dispersal of the engorgement is aided by the vibrations; the value of these united actions in the treatment of such distressing conditions is thus readily appreciated. I believe that the short or ultra-short wave high-frequency currents will prove to be of special value in these cases. Space will not allow me to deal fully with their advantages, but it must be evident that a technique which does not necessitate the removal of any clothing is in itself a great advance. This, however, is only a matter of convenience, and the specific value of the short-wave currents will be found to be due perhaps to some extent to their more rapid and finer vibrations, but chiefly to their more even concentration and action within the body. The long-wave diathermy of about 300 metres enters the body mainly by conduction, partly by condenser or leaky condenser effect through the skin, and in a few types of application by a condenser field action. Consequently, with such wave-lengths, the conductivity of the tissues influences to some extent the effect of the treatment. The short waves, on the other hand, excite their effects solely by a condenser field action; no current actually passing through the skin, the oscillations are excited solely within the body, and as a result the tissues and structures of the body react more evenly and uniformly. It is upon such lines that I venture to open this discussion and to explain the rationale of our processes; in this manner we travel along a path, parallel to that along which physical science is to-day advancing, towards a goal of as great efficiency and exactitude as has as yet been reached by any branch of medical science.

REFERENCE

- ¹ Golding Bird: *Lectures on Electricity and Galvanism*, 1849.

Census of England and Wales, 1931: Occupation Tables is now on sale at H.M. Stationery Office, price 30s. net. In addition to the statistics for the country as a whole, data are furnished in similar detail of occupational subdivision for twelve geographical regions into which England and Wales has been divided, and also for counties and large urban areas. For the smaller urban areas and for rural districts data are supplied according to a condensed list of occupations and occupational groups. The statistics relating to industries will be published in a separate volume. The principle upon which the classification is based is the nature of the work performed, though in the case of the productive occupations the nature of the material worked in has been embodied in the scheme as a factor essentially determining the character of the operations. Full details of the classification, together with an alphabetical index of about 35,000 occupational terms, is published in a separate volume entitled *Classification of Occupations*, price 12s. net. On this occasion for the first time statistics of persons out of work at the date of the census are included. The classifications of such persons embrace all classes of the community, including those outside as well as those within the scope of existing statutory insurance schemes.

NON-SPECIFIC COLITIS IN RELATION TO DEFICIENCY DISORDERS AND ANAEMIA

BY

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Colitis is here used as a general term for a well-recognized clinical condition; "haemorrhagic colitis" and "ulcerative colitis" are considered as synonymous terms. Colitis is a sporadic disease occurring with some frequency in England and other temperate climates. The cause of this disease has always been very puzzling, for no specific infection has been found, though its chief symptom—diarrhoea with blood and mucus—suggests a relation to the dysenteric infections. Notwithstanding the failure to establish a definite intestinal infection, treatment has been to a great extent concentrated on the local condition, and colon lavage is employed almost universally, often assisted by irrigation from above through a stoma in appendix or caecum. The unreliable results of such treatment and its failure to prevent relapse are, however, generally acknowledged.

The purpose of this paper is to point out the resemblances of this disease to a deficiency disorder, and to urge treatment with high vitamin diets and, in particular, the vigorous treatment of the anaemia, when present, as a cure of this may be accompanied by an amelioration or remission of the colitis symptoms. Emphasis is laid on the necessity for massive doses of iron or liver. The temporary increase in diarrhoea or of other symptoms which often follows at the outset is no contraindication to continuing the treatment. Improvement in the bowel symptoms may be slow, especially at the beginning of an acute relapse, and perseverance is required. It is urged that all local treatment and sigmoidoscopic examination should be avoided if possible, as the bowel wall is highly susceptible to trauma; examples of the harm that may result are given. If colon lavage is continued, it may keep up the diarrhoea and bleeding, and cause apparent failure of other treatments.

Colitis a Deficiency Disorder

The evidence in favour of adding colitis to the list of deficiency disorders of the gastro-intestinal tract is gathered from experimental and clinical sources. The study of experimental vitamin deficiencies shows that both vitamin A and the vitamin B complex are necessary for the development of the healthy mucous membrane of the intestine and for maintaining its resistance to infection (Cramer,¹ Goldblatt and Benischek²). McCarrison,³ and Tilden and Miller,⁴ working with monkeys, found intense changes in the colon with vitamin-deficient diets, and in these animals the clinical signs of human colitis were closely reproduced. In human beings it is recognized that good nutrition may completely prevent the development of clinical dysentery, even though the amoeba is present in the gut. It is not suggested that non-specific colitis is the outcome of a gross diet deficiency in the majority of cases in this country; it may be due to a latent deficiency which is either inborn or acquired as the result of diet and disease. Colitis resembles a deficiency disease in that it occurs in attacks, with spontaneous remissions and relapses which follow without apparent cause; the first attacks are often slight and transitory, and each relapse tends to be more severe than the last. The highest incidence of the disease is in the second, third, and fourth decades.

A consideration of the functions of the colon is of interest. Starling states that its chief value in carnivora

and man is as an excretory organ. It has a remarkably selective capacity with regard to drugs, being particularly concerned with the excretion of calcium, iron, and bismuth. The association of a severe iron-deficiency anaemia with colitis and with malignant growths of the caecum and ascending colon is of particular significance in this connexion. The special tendency of certain metabolic toxins, as in uraemia, to cause colitis may be due to their elimination by this route, and it seems probable that clinical colitis represents some toxic attack on a colon of low resistance.

The Characteristics of Colitis

The disorder affects not only the mucosa of the bowel but the muscle wall as well. There are hypertonicity and irritability of the bowel and areas of irregular spasm and dilatation, or a general contraction with loss of haustrations: this disturbance of tone is very persistent, and causes diarrhoea with colicky pains or spastic constipation, the symptoms often alternating in chronic cases. This high tone is found after all other symptoms have disappeared, and is evidence of the continued tendency to relapse (Larimore⁵). In acute attacks the colon wall becomes atrophied to a papery thinness, and may perforate; in long-standing cases inflammatory reaction and thickening appear. The mucous membrane is granular, velvety, and intensely injected, bleeding everywhere on light touch; superficial necrosis with sloughing and ulceration may follow. The maximum incidence is usually in the sigmoid colon, from where it spreads upwards and downwards; but the caecum may be severely affected or the whole colon involved simultaneously. The stools differ with the acuteness of the condition. In early, slight, or chronic cases they may be well formed, with adherent streaks of blood and little mucus: in the acute condition offensive liquid faeces are passed with varying amounts of mucus and blood, which are less intimately mixed than in dysenteric stools; pus is usually present microscopically. The appearance of stools passed in succession may be very diverse: this is an observation of diagnostic importance.

In a severe attack, or in a chronic condition, an anaemia of secondary type develops which may be out of all proportion to the degree of haemorrhage, and is found in non-haemorrhagic cases. Severe general oedema and fever sometimes accompany the anaemia, and complications such as phlebitis and urinary tract infections are not infrequent at this stage. The differential diagnosis cannot be discussed here, but it may be based on a detailed history, repeated inspection of the stools, microscopy and culture of the stools, and opaque enema. Digital rectal examination should of course be made, but sigmoidoscopy should only be carried out if the diagnosis is still in doubt after other investigations have been completed.

The notes of twenty-five cases have been studied. Sixteen of these patients have been observed personally during some period of their illness; all were females, many of them being treated at the Elizabeth Garrett Anderson Hospital.

Aetiological Factors

The age of onset was under 20 years in four cases, from 20 to 25 in four, from 26 to 30 in eight, from 31 to 40 in five, and over 40 in four. The cause of an attack was given by fourteen patients, and may be grouped as follows: a chronic tendency to diarrhoea, but attack due to eating fruit (two cases); chronic or acute constipation (six cases); gastric influenza (two cases); influenza (one case); slimming diet (one case); sea-bathing (one case); twin pregnancy (one case).

Special dietary indiscretions in some of the above were eating excess of raspberries, plums, tomatoes, and cucumber. Barger⁶ has published the causes of relapse in a series of cases, and finds that the majority (52 per cent.) are related to infections of the upper respiratory tract, and 12 per cent. to gastro-intestinal conditions. The effect of trauma in producing an attack is evident when it occurs after taking food with indigestible residue. That colon lavage and sigmoidoscopy may also produce trauma and relapse is demonstrated in these notes. Colon lavage does not seem to produce harmful results in all cases, and patients may improve under treatment; but the results of local therapy are very uncertain, and a method which appeared to cure a first attack may be quite unsuccessful in a second. The benefits are at least doubtful, and such improvement as arises may be due to a spontaneous remission.

Relapse after Colon Lavage

One patient, aged 27, had had two previous severe attacks of colitis, but had been fairly well for fifteen months. She was thought to have a growth in the colon, and was admitted to hospital for examination. No growth was found, but there was a discharge of blood and mucus, for which daily lavage was given; acute relapse set in within three or four weeks and lasted many months. Two patients with chronic colitis were noted to have had normal motions for five and seven days respectively after admission; following colon lavage all the motions contained large amounts of blood and mucus. In one case the motions became normal when the treatments were stopped; in the other there was a prolonged relapse. In two other cases lavage brought about intense pain and increase in diarrhoea.

Relapse after Sigmoidoscopy

Sigmoidoscopy was carried out in fourteen patients in this series; in some it was repeated during treatment. All the cases showed a granular, intensely hyperaemic mucosa; three had small ulcers in addition; and one, a long-standing case, had rectal polyposis. Unfortunately an acute relapse may follow sigmoidoscopy even when carried out by experienced surgeons. One patient, aged 18, was admitted with a second attack of colitis of five weeks' duration; there were two motions daily after admission, with occasional blood, no fever; after sigmoidoscopy there was a severe relapse with fever: stools five to seven. Another patient of the same age had a first attack of colitis. The symptoms gradually increased for six months; there was no loss of weight and no fever; stools two to three; some blood. Sigmoidoscopy was followed by an acute fatal relapse: stools six to eight, with much blood and mucus.

Gastric Secretion and Colitis

No relation could be discovered between the gastric secretion and the severity of the colitis symptoms. In the present series fourteen patients had a fractional test meal: six had a normal acid reaction, six a low acidity, and two achlorhydria. Among the six normals, four had very severe attacks and the other two were chronic relapsing cases, and three in this group developed marked anaemia with oedema and phlebitis. Of the two patients with achlorhydria (histamine test not given), one had a slight attack without anaemia, and the other was a severe chronic case. In another case with dysphagia a "test vomit" contained no free acid; this patient had a very chronic colitis with Plummer-Vinson syndrome. Glossitis was noted in six instances, usually developing during an acute attack of colitis; it was most severe in two patients

with achlorhydria and chronic anaemia. Brittle nails were noted in four cases.

Anaemia and Colitis

The association of severe anaemia with diarrhoeal diseases with little or no haemorrhage is well recognized. It may in part be due to a deficiency associated with hurry and want of absorption in the intestine, but Castle⁷ has shown that the failure of haemopoiesis cannot be entirely related to this, but depends upon some associated though independent factor. Examples of such anaemias are afforded by tropical sprue, non-tropical sprue (Bennett, Hunter and Vaughan⁸), and chronic post-dysenteric colitis (Keefer⁹). The variability in the character of these anaemias is striking, and must depend on which of the essential factors is lacking. Further, it appears to be impossible to predict what form of therapy will prove effective, though as a rule a good response to liver may be expected when the anaemia tends towards the macrocytic group with a high colour index (as in Case 1). Massive oedema accompanying severe anaemia developed in three patients; two had phlebitis, and one a urinary infection.

Examples of Blood Changes

In five cases of anaemia without gross haemorrhage the haemoglobin values lay between 24 and 44 per cent., the red cells between 2,900,000 and 5,500,000, and the colour index between 0.4 and 0.56. These anaemias have all been hypochromic in type, such as respond well to massive doses of iron. Case 2 illustrates the importance of treating the anaemia, and the possibility of producing a prolonged or perhaps permanent remission of the colitis, even in a very chronic case. It should be emphasized again that a temporary increase in the diarrhoeal symptoms should not be regarded as a contraindication to treatment.

SUCCESSFUL TREATMENT WITH LIVER

Case 1.—The patient, aged 18, had acute colitis for eight months, with profound anaemia, oedema, and fever. There was a rapid clinical cure with massive liver therapy: no relapse after three years.

The first attack, sudden in onset, occurred in September, 1930, with the passage of blood, slight colic, and two to three stools daily. She continued at work for two months. In December, 1930, the anaemia was very severe; the stools contained blood and mucus; no specific infection. Sigmoidoscopy revealed a granular mucous membrane; one small ulcer was seen. Gastric acid was normal. For two months the symptoms gradually increased, with slight fever. Then there was an acute exacerbation, with fever up to 102° F. and pulse rate up to 125; stools six to twelve; not much loss of blood. Massive oedema developed, with rapid increase of anaemia: the increase of symptoms followed a course of daily colon lavage. In May, 1931, the oedema was better but there was still fever, the anaemia was unchanged and the patient had lost 2 st. Treatment during January to June included two blood transfusions and colon lavage; liver (4 oz.), ventriculin, and massive iron were each administered for short periods (coincidentally with the colon treatments), but were omitted as they appeared to increase the diarrhoea. In June, 1931, liver extract (1½ lb. daily) was again tried; it caused an acute reaction of fever and diarrhoea for eight days, but subsequently there was rapid improvement, with a gain in weight of about four pounds a week (2 st. in six weeks). When seen in April, 1934, the patient was very well, and had been free from any bowel trouble. Blood counts:—November, 1930: haemoglobin 27 per cent., red cells 2,500,000; colour index 0.56. June, 1931 (before liver treatment): haemoglobin 24 per cent., red cells 1,250,000; colour index 0.9. After two weeks of liver therapy: haemoglobin 36 per cent., red cells 3,130,000; colour index 0.58. Reticulocyte peak 13 per cent. on fourth day. After six weeks' liver and four weeks' massive iron: haemoglobin 70 per cent., red cells 4,580,000; colour index 0.76.

SUCCESSFUL TREATMENT WITH IRON

Case 2.—The patient, aged 45, had had a very chronic relapsing colitis for twelve years, and severe anaemia. Clinical cure was obtained with massive iron therapy: no relapse for four years. There was a history of severe constipation from childhood, and of anaemia. At the age of 29 she had the first attack of acute colitis, with much blood and mucus. At the age of 31 she had a relapse, and was treated by appendicostomy, which was closed after ten weeks. Subsequently chronic symptoms developed with severe anaemia: blood transfusions were given at the ages of 37 and 38. When 39 she first came under my personal observation, having frequent subacute attacks with slight fever. There was a typical Plummer-Vinson syndrome, with glossitis and dysphagia; a test vomit contained no free acid; haemoglobin 32 per cent., red cells 4,400,000. A full course of anti-dysenteric serum produced a strong reaction, but there was a relapse with blood and mucus two weeks later. In April, 1930, massive iron treatment was begun, and has been maintained almost continuously since. There has been no relapse of colitis in four years, although occasional slight bleeding occurs, and sore tongue and dysphagia reappear if the iron is omitted for long. The patient is able to do regular hard work. Blood counts:—March, 1928: haemoglobin 32 per cent., red cells 4,400,000; colour index 0.4. February, 1930: haemoglobin 38 per cent., red cells 4,400,000; colour index 0.43. December, 1930, after eight months' iron treatment: haemoglobin 106 per cent., red cells 5,650,000; colour index 0.94. Haemoglobin has been maintained between 90 and 100 per cent. since.

COMBINED TREATMENTS WITH IRON

Case 3.—The patient, aged 39, had been very anaemic all her life: no menses since the age of 35. She had always suffered from looseness of the bowels. In the first attack there was acute colitis for five months; phlebitis developed first in one leg and then in the other. There was much oedema on admission. Urinary infection was present; stools five to seven, with flecks of blood and very offensive. The patient was given two blood transfusions, intramuscular liver daily, massive iron, and radiostoleum. The haemoglobin rose from 24 to 80 per cent. in eight weeks, with marked general improvement; stools two to three.

Case 4.—This patient, aged 37, was seen in a second attack (first occurred twelve months previously). Apart from this her health had been good. She had a subacute colitis: stools one to two, with little blood or mucus. There was slight anaemia. She was treated with ventriculin and massive iron. The haemoglobin rose from 68 to 88 per cent. in five weeks; she gained four pounds in weight; the stools showed no marked change.

VITAMIN THERAPY WITHOUT IRON

Case 5.—The patient, aged 50, had had chronic colitis for three years, with very slight anaemia. Amoebic cysts were present in the stools (six to eight daily, with little blood). She was treated with emetine and yatren, with severe reaction. At first liver was given intramuscularly daily, and yeast powder by mouth. Later, marmite and cod-liver oil were given. After nine weeks the stools were one to two daily—"better than at any time in the past three years."

Failure of Liver Treatment

The following three cases gave no apparent response to liver treatment during acute and subacute attacks; there was no initial anaemia.

Case 6.—The patient, aged 18, had had a first attack (very slight) one year before. She was admitted with a second attack of five months' duration (subacute). There was no anaemia. An acute relapse set in after sigmoidoscopy: stools seven to nine. Liver was administered intramuscularly daily, and yeast powder. The condition did not improve in three weeks. She lost 14 lb. in weight, and discharged herself.

Case 7.—This patient, aged 45, had had her fourth attack in five years; she was quite well between attacks. There was no initial anaemia. She had a severe haemorrhagic diarrhoea: stools three to six, later six to nine. Liver

extract by mouth (1 lb. daily) resulted in no apparent improvement in three to four weeks. There was gradual improvement later on other treatments.

Case 8.—This patient, aged 22, was seen in a first attack (subacute) of eight months' duration: stools two to four daily; slight anaemia only. Liver extract by mouth (1 lb. daily) led to no definite improvement in three weeks. She gradually got better later on other treatments.

Diet and Drugs

A good diet, adequately balanced, is of great importance. Many chronic colitis patients tend to take an excess of carbohydrate food, and care should be taken to avoid this. Patients should have small meals and never go long without food, and in particular they should avoid a heavy meal when fatigued. Iced food and drinks should be forbidden. Even during the acute attack, if appetite allows, a generous diet may be given, including milk for its salt and vitamin value, and first-class protein, as fish, eggs, chicken, and, later, mutton and beef. Small amounts of green-leaf vegetables (sieved), a cupful of orange or tomato juice, and marmite should be added. In convalescence fresh green-leaf salads, stewed fruit or pulped raw apple, pear, or banana may be ordered. The usual instructions to eschew food with coarse residue should be given.

Constipation should be treated with liquid paraffin and antispasmodics, as atropine or belladonna, especially when there is colicky pain. Mild aperients, as senna, are sometimes necessary, but should be omitted as far as possible. The dose of intramuscular liver was 2 c.cm. of concentrated preparation of tested potency in pernicious anaemia. In the massive iron therapy 90 grains of iron ammonium citrate were given daily. The yeast powder—a preparation of high potency in the vitamin B complex—was prescribed in doses of 3 drachms daily.

I am indebted to my colleagues at the Elizabeth Garrett Anderson Hospital for giving me access to their patients and records, and to the pathological staff of the hospital for their assistance.

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The Queen Victoria Memorial Hospital at Welwyn, Herts, which the Duchess of York opened on July 24th, was founded in 1902. Until the present time it has been housed in the original building, to which additions were made from time to time. It is adjacent to a high road, which now carries a large amount of motor traffic. In consequence of a generous bequest made for the purpose of erecting an up-to-date cottage hospital in a quiet position, the committee was able to acquire an excellent site of about five acres and erect this new hospital.

The annual general meeting of the Medical Society of Individual Psychology was held at the Florence Restaurant, London, W., on July 12th. The chairman, Dr. J. C. Young, presided, and eighteen members dined together before proceeding to business. The present officers were re-elected. Dr. Neil Beattie and Dr. E. Taylor were elected to vacancies on the committee. The reports of the honorary secretary and honorary treasurer showed that the society is maintaining its position in membership and financial stability. An interesting programme is promised for next session.

LATE TENDON SUTURE

BY

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Although delay in the suture of a ruptured tendon diminishes the chance of success, there are occasions when excellent function follows a delayed operation.

Rupture of the Triceps Tendon

The patient, a theatrical gymnast, sustained an accident while performing in a Paris music-hall. He was standing on his hands and supporting his partner's weight when he came upon a ridge in the carpet, which flung him sideways, so that he wrenched his left arm and tore his triceps tendon. The injury was apparently not diagnosed, and when seen three months later he had a gap of 1/2 inch above the olecranon process, and was only able to extend the elbow by the feeble action of supinator longus and the forearm extensors. He

FIG. 1.

FIG. 2.

FIG. 1.—Case 1. Rupture of left triceps tendon. Theatrical gymnast, aged 43, one year after reinforced suture performed three months after his accident.

FIG. 2.—Nearer view, showing situation of operation scar.

had done no work since the accident, and it was manifestly impossible for him to do so. X-ray examination showed a few flakes of the olecranon lying 1/2 inch proximal to their normal insertion.

At operation, on May 24th, 1933 (three months after the accident), the tendon was found to be torn so close to the bone that direct suture was impossible. A hole was drilled transversely through the olecranon, and a part of the tendon pulled down with strong catgut and threaded through this. Reinforcement was obtained by a length of half the width of peroneus longus tendon, which was passed through the bone and through two holes in the triceps tendon, and was then stitched both to tendon and to itself with catgut. The limb was left in extension for six weeks before exercises were attempted, but the patient then made such good progress that he was able to resume his occupation on October 1st, when he appeared at a music-hall at The Hague and considered his arm "normal" again. I have since seen his performance at a West-End music-hall, and he certainly did not spare his triceps.

The photographs were taken on March 24th, 1934, and show him supporting a 15-year-old boy a year after the accident.