be on the look-out for the protean signs and symptoms that are discernible very early.

I have not time to deal with insufficiencies of the other ductless glands; nor have I time to mention some of these glands at all. You will find in my book, *The Sex Complex*, especially in the new edition about to be issued, a more complete picture. I shall be amply satisfied if I have been lucid in this hasty sketch with which I have sought to attract your attention to the triplication of effects—in the mind, in the soma, and in the reproductive organs—which forms such striking evidence of what I have called the Correlation of Function.

THE COMMONER COMPLICATIONS OF BACILLARY DYSENTERY IN MILITARY PRACTICE.

BY

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THE complications of bacillary dysentery have received scant attention from medical writers in the past, but since the recent campaigns in the East many symptoms, apparently due to the absorption of the toxins of the *Bacillus dysenteriae*, have occurred with considerable frequency in military practice.

Arthritis in Bacillary Dysentery.

Of these complications, monarthritides, or more generally polyarthritides, have been frequently noted during the Egyptian and Palestine campaigns.

That such an arthritis may supervene during the course of a bacillary dysentery, even of a mild type and untreated by any specific serum, and that the joint disintegration so produced may persist for a long time—even a year or more—and may result in permanent disability, has long been recognized, though in many epidemics in India and elsewhere such occurrences have been rare. Davidson,¹ who wrote mainly from Indian experiences, remarked upon the tolerable frequency of arthritis in dysentery unaccompanied by any involvement of the endocardium. This, he noted, may be ushered in by pyrexia, either during the acute stage of the disease, or when, apparently, the bowel condition has once more become normal. In the Döberitz epidemic in Germany, in 1900, arthritis supervened in 3.75 per cent. of all cases, and the condition persisted from four days to four months. It is significant that, writing in 1913, Sir Leonard Rogers² mentions only a single case of arthritis of an obstinate character as having occurred to his knowledge during the course of such an epidemic in India.

In a bacillary epidemic of a more virulent character, which visited the Fiji Islands in 1897, I was informed by Daniels that fully 10 per cent. of the patients developed arthritis, whilst in 1910, during a study of 300 cases in the same colony, I did not see a single one.

During the war on the eastern European front 7 cases of arthritis out of a series of 600 have been reported. A streptococcus is said to have been isolated from the blood of one case, and the joint symptoms were regarded therefore as a result of streptococcal septicaemia secondary to the bacillary infection.

Arthritis occurring in the course of amoebic dysentery appears to be very rare. I have only been able to find a record of one case.

During the first nine months of 1916 a number of cases of arthritis occurred amongst patients suffering from bacillary dysentery in Egypt. The bacillus responsible was the Shiga bacillus in all cases which could be properly investigated, and it is noteworthy that no cases of arthritis were observed at the same time in Flexner-Y infections. Though the latter bacillus was commonly met with amongst the numerous cases of bacillary dysentery in Turks at the Prisoners of War Hospital, Heliopolis, Cairo, yet no instances of joint involvement were noted amongst these patients.

Arthritis in Cases Untreated by Serum.

The majority of the cases of arthritis encountered during the course of bacillary dysentery have been those previously injected with antidysenteric serum, though

arthritis was observed twice in cases untreated by serum of any kind.

In one such case the right knee alone was affected, and there was a large effusion into the subcrural pouch, which was very gradually absorbed. In the other cases all joints were affected, including the temporo-maxillary and the interphalangeal; there was also a uniform swelling of the right parotid gland. Arthritic symptoms in both instances supervened during convalescence from dysentery and while the stools were completely faeculent.

Arthritis occurring Subsequent to the Administration of Antidysenteric Serum.

According to my personal observation, arthritis occurring in a patient subsequent to the administration of antidysenteric serum, either by the subcutaneous or the intravenous route, can be classified under two headings:

- (a) Fugitive polyarthritides, with or without joint effusions, occurring during the course of "serum sickness."
- (b) Intractable polyarthritides, with effusion into joints and wasting of adjoining muscles, apparently due to absorption of dysenteric toxins.

(a) *The Fugitive Form*.—Eleven out of 29 acute cases of bacillary dysentery injected intravenously with doses of from 30 to 40 c.cm. of antidysenteric serum developed a fugitive polyarthritides seven to twelve days after the injection; that is to say, the arthritis was ushered in with pyrexia, urticaria, general malaise, and hyperaesthesia of the muscles. This condition lasted as a general rule for two to three days and then cleared up, and might possibly be ascribed to the elimination of foreign proteins originally contained in the serum injected.

(b) *The Intractable Form*.—Eight out of 29 cases (or 27 per cent.) developed joint symptoms, often of a very intractable nature, with intra-articular effusions. This came on generally from the sixth to the tenth day after injection of serum. This is a much higher percentage of incidence of arthritis than in the series from France and Mesopotamia recently described by Klein³ and Waller⁴; the latter reported 12.4 per cent. of arthritis as occurring in his cases treated by serum.

The effusions in my cases took place with surprising rapidity, accompanied by acute pain and a rise of temperature to 102° to 103° F., especially when the knee-joint was involved. The one death in this series was preceded by profuse watery diarrhoea with a septic pyrexia ending finally in collapse.

In the knee-joint the effusion took place into the subcrural pouch and, in less than twenty-four hours from the commencement, the joint cavities were distended to their utmost capacity and the superjacent skin was stretched and shiny. There were no signs of local inflammation such as hyperaemia of the adjacent tissues. In the interphalangeal joints the swelling occurred into the tissues immediately surrounding the articulations, thus giving the spindle-shaped appearance of rheumatoid arthritis.

In one case large sterile effusions took place into the substance of the gluteus maximus and latissimus dorsi muscles, and subsided very slowly so that the patient was incapacitated for six months. The stage of the disease at which the arthritis supervenes is of importance; in all the cases I observed, the arthritic symptoms commenced at a time when the intestinal condition had considerably improved—even, in some cases, when the stools had been apparently normal for a week or more. The effusion was straw-coloured and slightly viscid, sterile on culture and containing a considerable number of polymorph cells. According to Klein this fluid agglutinates the specific bacilli in high dilutions.

In all cases observed, and especially in several cases not included in the series quoted above, intermittent pyrexia persisted as long as the joint symptoms were in evidence. Another characteristic seems to be that the pain, or, in some cases, a sense of stiffness, appears to be more marked at night time or in the early mornings.

As bearing on the etiology it is important to note that in two cases previous arthritis of rheumatic or traumatic origin had occurred a year or more before the onset of dysentery; it therefore seems probable that previous joint injury may exert a very definite predisposing influence on the supervention of joint symptoms in a subject subsequently attacked by a bacillary dysentery.

The question now arises whether the brand of the serum employed played any active part in the causation of this particularly intractable form of polyarthritis. I think there can be no question that polyarthritis may occur during the course of bacillary dysentery, quite independently of any serum treatment, but may it not be that some substance in the brand of antidysenteric serum employed, such as a large proportion of toxic proteins, can exert a deciding influence on the production of joint effusions? There would appear to be, from the figures at my disposal, some grounds for such a supposition; for amongst my series of cases a polyarthritis occurred in 8 out of 29 injected with a certain brand of serum (that is, 27 per cent.), whereas in 335 convalescent and slight bacillary cases admitted to hospital during the same period, and who were not treated with serum of any kind, only one case of arthritis occurred.

In addition to this evidence, through the kindness of Lieut.-Colonel C. J. Martin, C.M.G., D.S.O., F.R.S., I have been able to obtain his statistics from an Australian General Hospital for comparison with my figures. The Australian statistics show the remarkable fact that 358 cases, from nearly all of whose stools the specific bacillus was isolated, were treated with large intravenous injections (100 c.cm. or more) of Lister Institute antidysenteric serum with apparently favourable results, and without the super-vention of a single case of arthritis. Similarly, in 1910 I gave over one hundred consecutive intravenous injections of Lister Institute antidysenteric serum without the supervision of a single complication of this nature.

Infrequent Complications.

Iridocyclitis and *parotitis*, which have recently been noted.

The *iridocyclitis* occurred in two cases six weeks after the initial dysenteric attack; one patient suffered from arthritic symptoms, whilst the other did not.

Parotitis was observed in three cases presenting no obvious signs of oral sepsis. In one there was a unilateral and in the other two a uniform bilateral swelling of the parotid gland which appeared suddenly and disappeared almost as suddenly. In both cases the swelling of the parotid coincided with the development of the concomitant arthritis.

SUMMARY.

It is reasonable to suppose that there exists an idiopathic dysenteric arthritis due to the absorption of specific dysenteric toxins from the bowel wall and their excretion (as is known to be the case during the absorption of toxins of septic and gonorrhoeal origin) into the joint cavities.

In the same manner the arthritic symptoms occurring during the course of serum sickness may be justly regarded as representing an effort on the part of the organism to rid itself of toxins peculiar to horse serum; and it is possible that a particularly high percentage of these toxins, even when introduced in moderate doses into a subject already suffering from dysentery in which *per se* arthritis is not an infrequent complication, may not only determine the onset of the condition, but also the amount of disintegration of the joint thus produced.

REFERENCES.

¹ *Hygiene and Diseases of Warm Climates*, 1893. ² *The Dysenteries*, p. 382. ³ *Lancet*, November 1st, 1919, pp. 775-778. ⁴ *Ibid.*, pp. 778-780.

INSTINCT AND HYSTERIA.

BY

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THE springs of conduct are obscure and not to be discovered at a glance, but it seems likely that our actions can be traced back to a basis of psycho-physical dispositions, more or less modified by outside influences and by interaction between such dispositions themselves. The innate dispositions, when considered in their simplest manifestations, are known as the primary instincts. On analysis an instinct is found to consist of three elements—the cognitive or afferent, the affective or central, and the conative or efferent. McDougall describes a number of primary instincts, to each of which he assigns a primary emotion, which is the affective element of the instinct.

He describes others in which the emotion, though doubtless present, has no name. From his list we select the following as having a bearing on our subject:

- (a) The instinct of flight and the emotion of fear.
- (b) The instinct of curiosity and the emotion of wonder.
- (c) The instinct of pugnacity and the emotion of anger.
- (d) The instincts of self-abasement or subjection, and self-assertion or display; of which the affective sides are the emotions of subjection and elation, or negative and positive self-feeling.
- (e) The parental instinct and the tender emotion.
- (f) The sex instinct.

When we watch the play of instincts we notice that their conative activity is directed to the attainment of pleasure, the elimination of painful feeling, and to the good of the individual or species; in other words, that the conation arising in the activity of an instinct is of a teleological or purposive nature. But this is not the same as to say that it is a conscious endeavour towards a foreseen end; for example, the salmon, surmounting the waterfall by a supreme effort, has not directly in view the good of its progeny. And many a man who all his life has held strong political views, imagining them to be founded on the dictates of pure reason, would be offended if it could be shown that his opinions are founded (as is often the case) on his instinct of pugnacity and the emotion of anger against those who hold opposite views. The action of running away under the impulse of fear might seem to be a consciously directed endeavour; but the other motor activities, such as rapidity of the heart's action and respiration, are equally part of the flight instinct, and are obviously not consciously directed.

Instinctive behaviour is sometimes extremely simple, at other times complicated to a high degree. The simpler forms are commonest among the lower animals, and the highest complications are found in man. As an example, the instinct of pugnacity when aroused may result in an attempt to hurt an opponent by a blow, or in the complex and long-lasting efforts involved in a lawsuit. An observer who was unacquainted with civilized man might find some difficulty in classifying under the same heading the conduct of the cock that flies at his enemy's head at sight, and that of the prosecutor in a lawsuit sitting for weeks in a court listening to speeches, conferring with counsel, and taking notes. A savage, also, whose notion of the sex instinct was limited to the sexual act, would be puzzled to account for the civilized young man writing verses "To Chloe, on finding her fan." But though man shows the highest degrees of complicated instinctive behaviour, in animals also the conative aspect of an instinct may be exceedingly complex. This is seen in the case of bees, spiders, birds, etc., in whom the parental instinct is greatly modified and complicated. Differences between the modifications of the instinctive behaviour of animals and man lie in the fact that the complicated conative disposition of animals is the same in different individuals and is transmitted unchanged to their descendants; whereas no two men act exactly in the same way under the influence of fear, anger, wonder, elation, and the rest, and complications are not transmitted as such. Though we can observe instinctive behaviour modified and complicated almost out of all recognition in both man and animals, the factors producing these modifications are somewhat obscure. That the intelligence may play a large part in the case of man is seen in such an instinct as curiosity, which is the mainspring of scientific research; but how birds were moved to build nests by the parental instinct, or how certain species of rats, moved by their flight instinct, adopted an aquatic life, and why these complications of originally simple conations were transmitted to their offspring, we do not know.

In the study of the etiology of certain functional disorders it has seemed that some advantage might be derived from considering the primary instincts. As is well known, mutism, paraplegias, paraesthesias, blindness, deafness, amnesia, etc., are common during the strain of battle. All these are disorders which incapacitate a man from service and cause his removal from a dangerous area to hospital and safety; in this way they serve the instinct of flight, which, like other instincts, is teleological or purposive in its conative aspects. It is surely not more remarkable that the flight instinct should make a man paraplegic than that the parental instinct should cause a bird to build a nest; or that the sex instinct should lead