similar to those of the cases now under medical care." This mortality must have commenced subsequent to the journey of the first case and his medical attendant.

Thereafter the epidemic assumed greater proportions, so that up to October 12th, 1911, sixty-six cases had been reported, up to September 30th, 1912, ninety-three, and at the end of that year the total was 108. In 1913 the figures rose to 153, whilst at the end of 1915 there had been 240. Thereafter the epidemic seems to have died out gradually.

A parallel instance of an epidemic directly traceable to a human carrier is afforded in an unpublished report written in 1910 by a German, Dr. Woolf, dealing with sleeping sickness along the valley of the Rovuma River in Tanganyika Territory. Early in 1910 a native, Mnyao by name, was found ill with symptoms suggestive of trypanosomiasis, a diagnosis which was later confirmed. He had come from his village at the junction of the Upper Rovuma and Sawasaru Rivers. Following the discovery of this patient numerous cases of the same disease occurred along the route on which, it was definitely ascertained, the native had travelled. In 1911 a segregation camp was established at Sawasaru to deal with the outbreak, and between 1911 and 1913 seventy-two cases were isolated. From this area the disease spread northward, and in 1917 it had reached the hinterland of Kilwa.

Conclusions

This case may well afford an affirmative answer to the question: Can *T. brucei*, occurring in areas where human trypanosomiasis is unknown, infect man? Its impor-

tance lies in the fact that the spread of sleeping sickness is, in all probability, mainly due to the movements of human carriers of a strain of trypanosome which, while not immediately pathogenic, may become so after more than one passage through man.

It emphasizes the need for examination of the whole population when sleeping sickness arises apparently *de novo*. The investigation should include the examination of the blood of even the apparently healthy and of material obtained by puncture of the lymph glands.

Summary

1. The modern theories on the epidemiology of trypanosomiasis are reviewed.
2. The existence of a reservoir host in man is emphasized.
3. The case of such an individual is presented.
4. The spread of sleeping sickness through the agency of a human host is described.
5. The results which would follow the liberation of the case under reference are suggested.
6. The location of the reservoir host is made the crucial point in the investigation of future outbreaks of this disease.

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BIBLIOGRAPHY

- Duke, H. L.: "An Inquiry into an Outbreak of Human Trypanosomiasis in a *Glossina morsitans* Belt to the East of Mwanza, Tanganyika Territory," *Proc. Roy. Soc., B*, 1923, xciv, 250.
Wenyon, C. M.: *Protozoology*, 1926, p. 549.

ASSOCIATION OF *B. COLI* INFECTION AND RHEUMATOID ARTHRITIS

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The causation of rheumatoid arthritis remains obscure. It is generally agreed that the disease is an infective or toxic condition, but in spite of much experimental work no specific organism has been definitely demonstrated to be the causal factor. Many hold the view that it is possibly a streptococcal manifestation, while a minority of foreign workers would ascribe the condition to the presence of the tubercle bacillus. In support of the streptococcal theory is the fact that improvement is sometimes seen when the foci of suspicion, such as the teeth or tonsils or sinuses, are treated. Very frequently, however, in the majority of cases no diseased focus can be found, or even if one is present its removal generally leads to no marked improvement in the arthritic condition.

The various investigations of a case of rheumatoid arthritis are only possible in a nursing home or hospital, and in the course of the investigations of the cases that have been under our care we have found that nine out of twenty-four cases of rheumatoid arthritis have had an unsuspected bacilluria. *B. coli* was the organism isolated in eight cases, and a streptococcus was present in one. None of these patients, except the streptococcal one, complained of any urinary symptoms whatever, and it is interesting to note that the usual routine ward examination of the urine, which is carefully carried out in our cases, revealed no abnormality. It was only when

catheter specimens were taken and sent to the laboratory that the bacilluria was discovered, and in the table at the end the findings are clearly detailed.

Treatment

All these cases were treated with alkalis—usually potassium citrate—in doses up to 200 grains daily, or with sodium mandelate and ammonium chloride, following the usual technique in such cases. The latter treatment gave rise to heartburn and dyspepsia, and was less well tolerated than the alkali treatment, but in the cases in which it was used it proved very efficacious. The technique adopted was to give 40 grains of sodium mandelate three times a day, together with 10 grains of ammonium chloride, separately. The urine was tested to be acid to methyl orange, and the dose of ammonium chloride carefully regulated thereby. The course lasted from ten to fifteen days. The patients themselves stated that they felt better whilst on alkali treatment.

Gold therapy and colon washouts were also used, the technique followed being that described in the *Practitioner* of June, 1935. The preparations of gold used were either oleosanocrysin or solganol B oleosum. The latter preparation has a higher gold content than the oleosanocrysin. The doses were 0.05, 0.1, 0.1, 0.2, 0.2, 0.3, 0.3 of a gram, given at weekly intervals, intramuscularly. Colonic washouts of normal saline solution were also used once or twice weekly. All the cases except one were definitely improved on discharge, and they were all typical cases of multiple rheumatoid arthritis, affecting hands, knees, and feet.

Discussion

The administration of alkalis in arthritis generally was an early form of therapy, and it is possible that the presence of bacilluria is more frequent than is thought. Other authors have drawn attention to this fact: Roderer and Grafin in the *Monde Médical* in 1934 stated that *B. coli* infection, or infection of intestinal origin,

can cause not only arthralgias but also chronic arthritis. It does not explain all cases, but one must all the same suspect it sometimes, and institute, in addition to the local treatment for the arthritis, a general treatment for the *B. coli* infection. Attention has also been drawn to the presence of *B. coli* by Dr. Beresford-Knox in a communication at the Liverpool Medical Institution; he stated that in numerous cases under his care *B. coli* was found in the urine, and that the condition of the joints improved with vaccine therapy. No details, however, were given in the report of any other physical signs or treatment.

Further investigation is undoubtedly necessary in this important issue, and may offer the lines for a new research. The role of the bowel in rheumatoid arthritis must be carefully reviewed, in view of the possibility that *B. coli* infection may have an intestinal origin. A careful bacteriological examination of the faeces was made in all our cases, but no abnormal flora were discovered. The following table gives a synopsis of the

Age	Catheter urine on admission	Faeces	Treatment	Arthritic symptoms. Result.
43	Alkaline. Trace of albumin—no casts, renal cells, or red cells. B.C.C. + on repeated examination	B.C.C. and enterococci only	Pot. cit. Aurotherapy	Marked improvement both in examination and from patient's point of view
50	Minute trace of albumin. No casts, vesical or blood cells. B.C.C. ++	No abnormal strains detected	Mandelic acid. Aurotherapy	Improved
55	Minute trace of albumin. Pus cells present, but no casts or renal cells. A few lower tract epithelial cells present. B.C.C. present	Nil abnormal	Citrates. Aurotherapy. Dental sepsis treated	Improved
48	Trace albumin, and a few leucocytes. B.C.C. present in cultures.	Nil abnormal	Pot. cit. Aurotherapy	Much improved
62	Trace albumin: a few leucocytes present. B.C.C. +	Nil abnormal	Pot. cit. Aurotherapy	Much improved
44	Trace albumin: few leucocytes and lower tract epithelial cells present. B.C.C. +	Nil abnormal	Pot. cit. Aurotherapy	Improved
53	Trace albumin: few leucocytes. B.C.C. + In 1925 exploration of a kidney was carried out for pyuria? and calculus, also cholecystectomy	Nil abnormal	Pot. cit. Aurotherapy	Improved
57	Trace albumin and lower tract epithelial cells present. B.C.C. +	Nil abnormal	Mandelic acid. Aurotherapy. Bladder washouts	No improvement
50	Vesical cells, and short-chained non-haemolytic streptococcus. Frequency of urine	Nil abnormal	Pot. cit. Enterophages by mouth	Improved

urine examinations, faeces examinations, and the treatment given. All the patients were females, and the arthritis in all cases was confirmed not only clinically but also by x-ray examination.

To sum up, we should like to draw attention to the association of: (1) *B. coli* with rheumatoid arthritis; (2) to the fact that bacteriological examination of the faeces in these cases proved them to be completely normal; (3) the arthritis and general condition of the patients having improved greatly with treatment of the *coli* infection; and (4) the existence of *coli* infection was completely unsuspected, there being urinary symptoms in only one of our cases.

BIBLIOGRAPHY

- Beresford-Knox: *British Medical Journal*, February 1st, 1936.
Roderer and Grafm: *Monde Médical*, October 15th, 1934.
Slot, Gerald: *Practitioner*, June, 1935.

HISTIDINE TREATMENT OF PEPTIC ULCER

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It is well recognized that peptic ulcer constitutes an economic and social problem of some magnitude. The treatment of all the victims of this disorder as hospital in-patients is virtually impossible. It has been estimated that in some districts as many as one-third of the available medical beds would have to be in constant use for this one purpose if all the sufferers were to be accommodated. Almost every hospital has some scheme for the home treatment of such patients, but the success of any regime must depend upon the co-operation of the patient and of his doctor, and in no small measure upon the accommodation and financial resources of the patient's home.

Finally, in considering these cases, nothing less definite than the disappearance of a previously demonstrated radiological deformity can be accepted as evidence of healing, while no cure should be claimed in under seven years.

Diet and Alkalis

It has for many years been known that a large percentage of cases can be greatly improved by a careful dietetic regime combined with medicinal treatment. The various regimes are well known, and will not here be detailed; all involve complicated instructions, and are, without exception, irksome and difficult. Any new line of treatment in order to be generally acceptable must show results which are as good as those achieved by these well-established methods, and must also be more simple in use.

Parenteral Treatment

In view of the expense of in-patient treatment and the uncertainty of dietetics as practised in the average home, alternative methods of treatment have been sought. Many of these appear to have given good results, but the fact that none of them has become firmly established would suggest that they failed to satisfy the medical world of their superiority over the older methods.

Glaessner¹ has reported the use of injections of pepsin. This author assumed that excess of hydrochloric acid was the predominant factor in the genesis of peptic ulcers, and his treatment consisted in the injection of pepsin, rendered sterile by ultrafiltration, for two courses of thirty injections. It appears, however, that these cases while under treatment were also given careful dietetic instructions, and alkalis, olive oil, and belladonna, so the improvement can hardly be held to have been due to pepsin alone. Loeper, Debray, Michaux, and Sainton² used the same method, apparently quite independently, although the respective claims to priority gave rise to no little correspondence. Butman, Schultz, and Van Kleek³ draw an analogy between thrombo-angiitis obliterans and peptic ulcer, and suggest that the latter may result from an increased tendency to thrombosis. They treated a series of patients by intravenous injections of sodium citrate and sodium chloride carefully buffered to the correct hydrogen-ion concentration. Their results would appear to have been encouraging, but the radiological control rather inadequate.

Histidine Mono-hydrochloride

In the last two years attention has been increasingly focused upon the use of histidine mono-hydrochloride, and the preparation most extensively used has been larostidin.* The use of this substance is based upon a

* Marketed by the firm of Hoffmann-La Roche.