or relief of disease. At the present day the prevention of disease bulks hardly less largely in our thought, and this point of view indicates a distinct advance. In the future, one may predict with confidence that the preservation of the purity of the race will be regarded as one of the essential tasks of the art of medicine. The whole question, it is almost needless to say, is involved in the greatest difficulty, but it will certainly force itself increasingly upon our attention. It will do so with the greater insistence if we realize that the future physical well-being of the race will be determined more by natural selection than by attention to environment, important though this latter factor may be. That the medical profession will ever in this country be invested with disciplinary powers for the regulation of marriage seems doubtful. Such control would probably be foreign to the habits of mind of the British race, but we see that attempts have been made in this direction in some of the States of the American Union, and to a lesser extent in Germany, with what degree of success I am unable to say. It seems probable that in this country we shall have to rely upon the operation of an enlightened public opinion—enlightened as it must be, to a large extent, by the influence of the medical profession.

Is the human form destined to undergo important changes in the future under the operation of evolutionary law? Are we to look for the coming of the Super-Man, a conception with which the thought of Nietzsche has rendered us familiar? "What with man is the ape?" says Zarathustra, "a joke or a sore shame. Man shall be the same for Beyond-man, a joke or a sore shame." This is by no means certain. Weismann thinks it doubtful whether man may not have achieved the summit of his development both as regards physique and intellect, and is inclined to look for progress solely in the ethical sphere. Yet some of the facts adduced in this address seem to point decisively to the conclusion that the human body is destined in the course of many generations to undergo at least minor changes. The teeth, the hairy covering of portions of the body, the toes, the special senses, are almost certain to undergo modification. Nor can we limit the probability of change to such parts as these. All we can say in this connexion is that the changes which will come will be the outcome of evolutionary law. Useless organs will be eliminated. Useful organs will undergo progressive adaptation to altered conditions, such as diet, climate, habit, occupation. The possibility of Reversion and of Degeneration will always need to be reckoned with.

A general survey of the relation of Darwinism to the science and art of medicine is likely, I think, in many ways to be salutary. It will certainly tend to breadth of view, to a philosophic appraisal of the factors with which we have to deal, to a recognition of the great underlying laws and secular processes which are related to our art. It may, perhaps, act as a damper upon enthusiasm when we realize that evolutionary change is slow and only partially under our control; but, if this be the truth, it is better for us to know and recognize it. Medicine will gain in stability and in influence, as well as in dignity, by being in close relation with the higher thought of the day. It may in some not unimportant particulars react upon that thought. Disease becomes something more than a disagreeable and embarrassing fact when we realize how closely it is related to evolutionary processes, how vivid is the light it is capable of throwing upon evolutionary law. It even takes its place—a temporary place we may hope—in the eternal order. "Harmonious order," says Huxley, "governing eternally continuous progress; the web and woof of matter and force interweaving by slow degrees, without a broken thread, the veil which lies between us and the infinite—that universe which alone we know or can know—such is the picture which science draws of the world."

THE third International Congress of Physiotherapy will be held in Paris, March 29th to April 2nd, 1910, under the presidency of Professor Landouzy, Dean of the Paris Medical Faculty. The congress is under the patronage of M. Fallières, President of the French Republic. The work of the congress will be distributed among seven sections: Kinesitherapy, hydrotherapy and thermotherapy, climato-therapy, electrotherapy, treatment by x rays, radium, and light, watering-place treatment, and dietetics. An exhibition will be held in connexion with the congress.

THE IDENTITY OF BRITISH ULCERATIVE COLITIS AND TROPICAL BACILLARY DYSENTERY.

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In a paper read before the Bristol Medico-Chirurgical Society,¹ on the Natural History of British Ulcerative Colitis, I gave it as my belief that this disease, both the epidemic disease in asylums and the sporadic disease in the open, is a relic of the dysentery which in the seventeenth and eighteenth centuries covered the whole of Europe. I endeavoured also to ascertain how far we are justified in considering that the British disease is bacteriologically related to tropical bacillary dysentery of the Shiga-Kruse or Flexner type. The evidence as regards the ulcerative colitis of asylums is almost conclusive of the identity of the British and the tropical disease. But as regards the sporadic disease, the evidence would not bear a conclusion. Only in one certain case (Lieutenant Marshall, R.A.M.C.) has Flexner's bacillus been found. My own cases only furnished two instances in which the serum agglutinated Shiga's bacillus, and in no case was the specific dysenteric organism found.

I should like, therefore, to add a note of a sporadic case which, bacteriologically and clinically, was identical with the tropical disease as it occurs in the Philippines and West Indies. This case also illustrates a point which the series of cases from St. Thomas's Hospital makes clear, namely, that the grave condition, which is most familiar to us as ulcerative colitis, in which the ulceration of the colon is so deep and extensive that repair is unlikely or impossible, is often preceded by one or more minor attacks, which have considerable natural tendency to subside. I believe that these minor preliminary attacks are not commonly recognized, but are lumped together with other forms of acute diarrhoea. It is in these minor attacks, before other bacteria come into force, that the use of the serum prepared by the Lister Institute is most likely to be of use. It is probable that these attacks are true tropical dysentery of a mild type. In cases of long-standing ulceration, such as are commonly seen in hospitals, the specific bacillus may never be found, and it is not unlikely that its place has been taken by *Bacillus pyocyaneus* or by organisms of the *coli*, paratyphoid, or pyogenic groups.

History.

A man, aged 48, a metal worker, had in 1905 a severe attack of diarrhoea with gripping pain, but he could not remember any other details. In 1907 he had a second attack, lasting two or three weeks, in which he passed blood and mucus, and in 1908 a similar attack of shorter duration. All three attacks occurred in July or August, the season of flies. He had not been out of England.

On July 12th, 1909, he was again seized with diarrhoea, and severe gripping pain, chiefly in the left flank and groin (lower segment infection). He described the stools, of which there were four or five a day, as being "slimy" at first, but on the second day he passed red blood. There was no tenesmus. For a week the condition remained unchanged. On July 20th he was admitted into St. Thomas's Hospital, presenting diarrhoea such as he had described, the stools being liquid, dark, offensive, with mucus and a little red blood, slight pyrexia, and tenderness over the colon on the left side. At first he experienced considerable gripping pain and true tenesmus was present. The rectum was hyperaemic and showed patches of blood-stained mucus; it bled on the least touch. He was given 20 c.cm. of serum, with calomel and opium. Improvement was rapid and he left hospital apparently well after a stay of seven weeks.

Bacteriological Report.

Dr. Dudgeon kindly examined a high rectal scraping, with the following result:

"Plate cultivations were made by the direct method on MacConkey's bile salt neutral red lactose agar. A bacillus was obtained which, when tested in various media, gave the cultural characters of the bacillus of Flexner, with the exception that the organism did not form indol. The patient's serum gave a well-marked agglutination reaction with this bacillus with a dilution of 1 in 20, a good reaction with a dilution of 1 in 50, and a slight reaction with a dilution of 1 in 100, within half an hour at room temperature with the microscopical method. It also agglutinated with an antidyenteric serum (Shiga) with dilutions of 1 in 20, 1 in 50, and 1 in 100. A rabbit was immunized with the bacillus isolated from the patient. The rabbit's serum, when mixed in suitable dilutions with the

bacillus of Morgan and the bacillus of Shiga, gave no agglutination reaction with a dilution of 1 in 20. But an extremely well-marked reaction was obtained with a dilution of 1 in 20, 1 in 50, and 1 in 100, and a slight reaction in a dilution of 1 in 1,000 with this bacillus and the bacillus of Flexner. The rabbit's serum was saturated with the bacillus of Flexner and the bacillus used for the immunization of the rabbit, with the result that this bacillus was found to be specifically identical with the bacillus of Flexner."

REFERENCE.

¹ BRITISH MEDICAL JOURNAL, March 27th, 1909.

THE ALLEGED HETEROGENESIS IN ANKYLOSTOMA DUODENALE.

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IN the reports of the Belfast meeting of the British Medical Association Dr. A. T. Ozzard, of British Guiana, publishes a paper on the "Life-history of *Ankylostoma duodenale*,"¹ reaffirming his previously published conclusions that under certain suitable conditions the ankylostome embryo can develop outside the body into sexually mature forms. As the President of the Section before which the paper was read pointed out in his remarks, the question raised is one of great importance, "because prophylactic measures that would be of value if no heterogenesis occurred would be useless if it took place." It is of equal importance also to the zoologist and systematist. Dr. Ozzard's statements deserve, therefore, careful consideration and scrutiny.

1. Dr. Ozzard quotes the recent writings of Manson and Brookes to show that "there is considerable diversity of opinion on the subject," but in both these instances the authors are merely quoting Giles's work, and are far from adopting his views. No one who has read Giles's papers on the life-cycles of parasitic nematodes is likely to give credence to his conclusions. He entirely fails to recognize the existence of free-living nematodes, and passes with astonishing rapidity from the ovum and newly-hatched embryo as it appears in the faeces of the host to sexually mature "rhabdites" on the rank vegetation around.

2. In Dr. Ozzard's description of his experiments several important desiderata are lacking.

A small quantity of dejecta, known to contain only the ova of *Ankylostoma duodenale*, is mixed with about three or four times its bulk of water and poured on the surface of some sterilized river sand in a suitable vessel.

The embryos developed into free sexually mature worms in from eight to ten days.

No mention is made of the manner in which the sterilization of the river sand or of the water was ensured, nor of the keeping of controls. It is open to doubt whether the sterilization was efficiently carried out, for the author later remarks that, "To endeavour to cultivate them in sterilized vessels and on sterilized sand, is practically asking them to survive and reproduce their species on almost nothing at all." It is noteworthy that Giles, in his "Observations on the Life-history of *Sclerostomum tetra-canthum*,"² was unable to develop the embryos of this allied form on "moist sand," although he claimed to have found advanced forms later "on the cotyledonary leaves of some chance seedlings" near by. When we remember that free-living nematodes abound in all soil and vegetation, that their eggs and larvae are able to withstand a considerable degree of drying, and that they multiply exceedingly in the course of a few days, we should be very loth to accept results of experiments that do not rigorously exclude the possibility of their presence.

Two recent experiences of my own may be related in this connexion. Whilst pursuing certain investigations into the life-history of the *Trichostrongylus pergracilis* for the committee of the Grouse Disease Inquiry, a specimen tube was forwarded to me from the experimental station containing the dropping that had been collected from a clean board floor under one of the infected birds. On examining this a few days later, I found it to contain rhabditiform worms of small size but sexually mature. These worms continued to reproduce with amazing rapidity. The suggestion was afforded that these might

be "heterogenetic" forms of the *Tr. pergracilis*, but on carefully examining the whole content of the tube, I found a small stick of heather which had undoubtedly contaminated the faeces with a rapidly multiplying free-living nematode. If dry heather be soaked in water for twenty-four hours, numerous species of free-living worms will be found wriggling in the bottom of the vessel.

The other illustration is still more striking, but is less easily explained. It is the rule for the faeces of patients in the Seamen's Hospital, Albert Dock, to be placed in flat, covered, glass receptacles when sent to the London School of Tropical Medicine for examination. These dishes are used for no other purpose, and are invariably sterilized after use. In such a vessel the stool of a foreign sailor was received, and was found to contain *Strongyloides intestinalis* in considerable numbers. It was then transferred by one of the junior laboratory attendants to a large glass bottle that had lain in the school store for several years, and had originally contained pathological specimens in spirit. Some weeks later this stool was examined again, and was then found to contain very many sexually mature forms closely resembling the free adults of *Strongyloides intestinalis*. For a time they were so considered by myself. The preparation was examined daily for several weeks, and it soon became evident that many generations were succeeding one another although the embryos of the free-living *Strongyloides intestinalis* do not again develop into adult forms until they gain access to the human body. Thinking that I was dealing possibly with some unobserved phenomena in the life-cycle of this parasite I then engaged upon a detailed study of the structure of the free-living adults and closely compared them with those of undoubted *S. intestinalis* that I had obtained whilst in Egypt with Professor Looss, with the result that I was forced to the conclusion that the two forms differed in several constant features. Apparently the stool had become infected in some unknown manner with an ovum or larva of a free-living nematode. Most likely the bottle itself had become infected during its prolonged sojourn in the store, or with much less probability the origin of the infection had passed through the alimentary canal of the patient.

3. Turning now to the description of the free-living forms in Dr. Ozzard's cultures we unhappily find practically nothing to enable us to ascertain their structural similarity to other forms of free-living or parasitic nature. The possibility that they are *Strongyloides intestinalis* he himself emphatically rejects. Great stress is placed, so far as I can see with no reason whatsoever, on the similarity of the ova in the mature females in the cultures to those of ankylostome eggs in faeces, but the characters of the ankylostome egg, whilst distinctive enough for diagnostic purposes when seen in human faeces, present no such pathognomonic peculiarities as should distinguish it from the ova of all other nematodes.

4. Lastly, Dr. Ozzard makes the important statement that he kept his culture for months and "could at any time (after their first free-stage generation) obtain specimens at all stages of their growth from the eggs to the adult forms." This clearly shows that the supposed "heterogenesis" of *Ankylostoma duodenale* differs in an essential feature from that occurring in other forms, yet it is exactly what one would expect to find if so rich a food medium had become infected with a free-living nematode.

REFERENCES.

¹ Ozzard: Life-history of *Ankylostoma duodenale*, BRITISH MEDICAL JOURNAL, 1909, vol. ii, p. 779. ² Giles: Scientific Memoirs by Medical Officers of the Army of India, Part VII.

THE first meeting of the Italian National Committee for the Suppression of Endemic Cretinism was held at Milan on October 5th. Among those present were Professors Tamburini, Devoto, and Mangiagalli, the latter of whom occupied the presidential chair. The Minister of the Interior, the Minister of Public Instruction, and the Minister of Agriculture, together with a number of provincial and communal authorities connected with the infected zone, as well as a number of men of science, intimated their approval of the objects of the congress. Professor Tamburini read a report on the present state of knowledge in regard to endemic cretinism, and Dr. Cerletti read the proposed scheme for the study, prophylaxis, and cure of the disease, which was unanimously approved.